

SECTION 02110 – SITE WORK

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division – 1 Specifications section, apply to work of this section.

DESCRIPTION OF WORK:

Extent of site work is shown on drawings.

Site work includes, but is not limited to:

- Removal of trees.
- Protection of existing trees to remain.
- Top soil stripping and stockpiling.
- Clearing and grubbing.
- Disposal of waste materials.

JOB CONDITIONS:

Protection of Existing Improvements: Protect improvements on adjoining properties.

Restore damage improvements to their original conditions, as acceptable to parties having jurisdiction.

Protection of Existing Trees and Vegetation: Protection of existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

Provide protection for roots over 1-1/2" diameter cut during construction operations. Coat cut faces with emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissue. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

Reference Points: Protect and maintain benchmarks, monuments, and reference points. Replace as directed by the Engineer if disturbed or destroyed. Repair or replace trees and vegetation indicated to remain, which are damaged by construction operations, in a manner acceptable to Engineer.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

CLEARING AND GRUBBING:

General: Remove vegetation, improvements, or other obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated. Removal includes digging out stumps and roots.

Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2" in diameter, and without weeds, roots, and other objectionable material.

Strip Topsoil: To whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other underlying subsoil or other objectionable material.

Remove heavy growths of grass from areas before stripping.

Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance to prevent damage to main root system.

Stockpile Topsoil: In storage piles in areas shown, or where directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust. Use topsoil for topping off final finish grading.

Use only hand methods for grubbing inside drip lines of trees indicated to be left standing.

Fill depressions caused by clearing and grubbing operations with satisfactory soil material. Unless further excavation or earthwork is indicated.

Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

DISPOSAL OF WASTE MATERIALS:

Burning of debris on site will be allowed provided the Contractor obtains the appropriate permits from the Parish Fire Department.

Removal from Owner's Property: Remove waste materials and unsuitable and excess soil from Owner's property and dispose of off site.

END OF SECTION 02110

SECTION 02120 – CLEANING

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division – 1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Cleaning shall include daily "policing" of the work and surrounding areas to clear general debris, waste paper, painting materials, metal and other objectionable material along with the final cleanup of the site required for project acceptance.

Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

DAILY CLEANING:

Execute daily cleaning to keep the work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris resulting from construction operations.

Provide onsite containers for the collection of waste materials, debris and rubbish. All materials including containers, food debris and other miscellaneous materials must be disposed of in onsite containers.

Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

No burning of debris will be allowed onsite.

FINAL CLEANING:

Employ skilled workmen for final cleaning.

Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

Broom clean exterior surfaces; rake clean other surfaces of the grounds.

Prior to final completion or Owner occupancy, the Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire work is clean and acceptable.

COMPLIANCE:

Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 02120

SECTION 02140 – PROPERTY PROTECTION

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division –1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

The Contractor shall take all necessary precautions in the preventing of spray paint mist or droplets of paint being transmitted through the air onto private or public property such as vehicles, building, etc. The Contractor shall not paint when the wind conditions are such to cause damage to passing vehicles or adjacent property unless protective shields have been erected to prevent said transmission of paint mist or over spray.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

PROPERTY PROTECTION:

Tank area shall have protective shrouding when such conditions are warranted to protect surrounding properties from damages of sandblasting. The Contractor shall be liable and shall carry the required insurance to cover any such damage.

EQUIPMENT PROTECTION:

The Contractor shall be responsible for the removal and reinstallation of all electrical conduit, manways, hatches, piping and other attachments where necessary for the application of paint in hidden areas.

The Contractor will cover all floors, gauges, instruments, windows and other attachments to protect against over spray.

The Contractor shall be liable and carry the required insurance to cover any such damage.

EQUIPMENT SAFETY:

The Contractor shall have the proper equipment, scaffolds, safety belts, cable chains, etc. to guard against all hazardous working conditions. No working personnel shall be allowed to work without the OSHA required safety devices. No equipment or materials shall be left in the upper elevated areas unsecured.

CONTAMINATION PROTECTION:

Precautions shall be taken to prevent any possible contamination of the domestic supply of water, both during the emptying and filling of the stored water by the Contractor.

REMOVAL OF PROTECTION:

Remove temporary protection and facilities installed for protection of the Work during construction.

Any damages caused by removal of such facilities shall be repaired in accordance with paint manufacture's recommendations such as not to void warranty.

END OF SECTION 02140

SECTION 02150 – STERILIZATION AND TESTING

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division –1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Upon completion of the work the Contractor shall disinfect the interior of the tank, riser, and piping in accordance with the Louisiana Department of Health and Hospitals and AWWA.

The Contractor shall be responsible for all testing associated with the project. Bacteriological samples shall be taken and sent to the Louisiana Department of Health and Hospitals for testing.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

STERILIZATION:

The interior of the structure and riser shall be thoroughly hand-washed and sterilized in accordance with the requirements of the State Health Department and AWWA Standards.

Finished water storage structures shall be disinfected in accordance with current AWWA Standard C652.

Disposal of heavily chlorinated water from the tank disinfection process shall be in accordance with the requirements of the State Pollution Control Agency.

The disinfection procedure (AWWA C652 chlorination method 3, section 4.3) which allows use of the chlorinated water held in the storage tank for disinfection purposes is not recommended.

TESTING:

Two or more successive sets of samples taken at 24-hour intervals shall be sent to the Louisiana Department of Health and Hospitals for testing. If the test results are positive, the structure shall be re-sterilized as set out above until results are microbiologically satisfactory. The structure shall not be put into service until negative results are obtained.

END OF SECTION 02150

SECTION 02200 – EXCAVATION, FILLING AND GRADING

PART 1 – GENERAL

Provide all materials and equipment required for site clearing, excavation and back-fill and site grading specifically required or implied by Contract Documents.

Examine and investigate the building site prior to bid to become fully informed of conditions and problems to be encountered during the Work. No allowance will be made for conditions encountered during construction, which were identifiable in nature prior to starting the Work.

PART 2 – PRODUCTS

Fill Beneath Earth Supported Slabs and Foundations:

All fill beneath earth supported slabs and foundations shall be clean "river sand" with less than 10% by weight passing the No. 200 sieve and a Plasticity Index of 10 or less or shall be a silty clay with a Plasticity Index of 20 or less. Fill shall be completely free of debris, organic matter and chlorides. This material shall be placed in 6-inch thick loose layers and each layer shall be compacted to 95% of its maximum dry density as obtained by the Standard Proctor Test (ASTM D698). Each layer shall be compacted prior to placing the succeeding layer. Fill shall be placed at a moisture content within $\pm 3\%$ of the optimum Proctor Moisture.

Fill Beneath Paving:

All fill beneath paving shall be clean "river sand" with less than 10% by weight passing the No. 200 sieve and a Plasticity Index of 15 or less or shall be a silty clay with a Plasticity Index of 20 or less. Fill shall be completely free of debris, organic matter and chlorides. This material shall be placed in 6-inch thick loose layers and each layer shall be compacted to 95% of its maximum dry density as obtained by the Standard Proctor Test (ASTM D698). Each layer shall be compacted prior to placing the succeeding layer. Fill shall be placed at a moisture content within $\pm 3\%$ of the optimum Proctor Moisture.

Fill for Site Grading and Landscaping:

Fill for general grading and landscaping shall be clean, free from roots, lumps and other deleterious materials and shall be of such composition to form a firm and stable ground surface suitable for the planting of lawn grass. This fill shall have a sufficient clay content to resist erosion from rainfall. This fill shall be placed to a uniform surface texture and graded to smooth contours between elevations shown on the Drawings.

Limestone:

The limestone for parking areas, or base work shall be 610 limestone aggregate per ASTM Specifications and shall be spread and compacted in accordance with Section 401 of the Louisiana Department of Transportation and Development Specifications. The material shall be spread uniformly and graded to the thickness and widths as shown on the Construction Plans. The thickness shown on the plans are loose vehicle measurements (L.V.M.) compaction will be completed by use of a light roller or rubber tire vehicle.

Earthwork for Pipe Installation:

All excavations for pipe installation shall be made by open cut and to the dimensions and depths shown on the drawings. The Contractor shall, when required, provide and set in place the required sheet piles for shoring up the vertical earthen walls to protect from erosion during the excavation of material during pipe installation. Sheet piles shall meet the requirements of Section 803 of the La. Dept. of Transportation Standard Specifications for Roads & Bridges. Excavated areas shall be cleared of all debris, water, slush, muck and unsound soft or loose foreign matter. Bedding shall be placed beneath the pipe as required. Bedding shall be an aggregate approved by the Project Engineer. Trenches shall be backfilled with excavated materials, free from large clods or stones. If excavated material is unacceptable for backfill then select fill shall be hauled-in and placed in the trench. Backfill over pipe shall be thoroughly compacted by mechanically tamping in layers of not more than twelve (12) inches. Backfilling shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage. The backfill shall be compacted to a density of not less than 95 percent of the surrounding natural ground density.

PART 3 – EXECUTION

Site Drainage:

Grade and cut trenches on the site as required to assure drainage away from the work area of any free water which collects during the earthwork operations. Use pumps if necessary.

Clear the site of all obstructions to the Work, including aboveground and underground utilities.

Existing Utilities:

Locate all existing underground utilities in areas of excavation work. If utilities are to remain in place, provide adequate support and protection during earthwork operations.

If uncharted, or incorrectly charted utilities are encountered, contact utility owner immediately before proceeding.

Do not interrupt existing utility services without prior notice to the Owner and to the respective utility authorities. All temporary interruption of utility services must be coordinated with utility companies.

Protection of Public:

Barricade all open excavations and post with warning lights.

Subgrade Preparation Beneath Earth Supported Slabs and Foundations and Beneath Paving:

In the area where fill is to be placed remove all surface vegetation and loose topsoil and all organic materials such as grass, roots, tree stumps, etc. If necessary, disc the subgrade and allow to dry (or add water) as required to obtain optimum moisture content in the top 6-inch layer.

After completing the above preparation, proof roll the entire area, which receives, fill with a 48-inch diameter sheep's foot roller filled with sand and water. Any soft spots or stump holes shall be mucked out and backfilled with the river sand fill above specified. Soft spots and holes, which have been refilled, shall be compacted to 95% of Standard Proctor Density before any new fill is placed.

Compact the prepared subgrade to 90% of Standard Proctor Density before any new fill is placed.

No fill shall be placed until the subgrade has been certified as complying with these specifications.

Excavation:

Excavation shall be made to the dimensions and elevations shown on the Drawings. Dimensions may be increased only the minimum required for tolerances of machine excavation or for the placement of edge forms.

Bottoms of excavations shall be level, free from loose material and brought to the required elevations in undisturbed earth or compacted fill.

If unsuitable bearing material is encountered at the elevations indicated, the Engineer shall be immediately notified.

Should excavations be oversized because of machine digging tolerances or because of error, such additional volume shall be filled with concrete poured monolithically with the structural section.

Backfill:

Remove all forms and debris from excavation prior to backfilling.

The backfill material and compaction for each excavation shall be identical to the fill used above the excavation.

Excavated material may be used as backfill only if it is certified as meeting these specifications.

Site Grading:

Grade all areas where changes of grade are indicated on the Drawings or where stockpiled materials, equipment, etc. has disturbed the original ground surface.

Tolerances:

All graded surfaces shall be finished to uniform levels, slopes and texture within the following tolerances:

lawn or unpaved areas:	at all points finished surface shall be within plus or minus 0.10 foot of required elevation
beneath exterior pavement:	at all points surface shall be within plus or minus ½ inch of required elevation
beneath building slabs:	at all points finished surface shall be within plus or minus ½ inch of required elevation and shall not vary more than ½ inch in any 10 foot length

Clean Up:

Remove from the site, all debris resulting from the Work and leave the entire site in neat and clean condition.

All surplus material resulting from excavation and grading operations shall be removed from the site and disposed of in a legal manner.

END OF SECTION 02200

SECTION 02510 – WATERLINE INSTALLATION:

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

Section 02300 Earthwork
Section 03300 Cast-In-Place Concrete

DESCRIPTION OF WORK:

Contractor shall supply and install the required piping from the St. John the Baptist Parish existing waterline where a connection with a valve shall be made and the line extended to the proposed facilities. The Contractor shall install the proposed P.V.C. line in accordance with the dimensions, locations and included appurtenances as shown on the plans.

QUALITY ASSURANCE:

All line installation shall meet or exceed the requirements of the American Water Works Association (AWWA) the National Sanitation Foundation (NSF) and the American Society of Testing Materials (ASTM).

SUBMITTALS:

Contractor shall submit sizes and types of pipe and fittings proposed for this project.

PART 2 – PRODUCTS

A. Polyvinyl Chloride Pipe (PVC):

The pipe shall meet the requirements of AWWA C 900 polyvinyl chloride (PVC) pipe. All Class 100 pipe shall meet the requirements of SDR 25 and all Class 200 pipe shall meet the requirements of DR 14 at 73° F. The pipe shall be "UL" approved and bear the National Sanitation Foundation (NSF) seal for potable water pipe. Pipe shall be made from Class 12454 A or Class 12454 B virgin compounds, as defined in ASTM D 1784. Provisions must be made for expansion and contraction at each joint with an elastometric ring recessed in the bell of each joint, which meets the requirements of ASTM F-477. The pipe shall have integral bell containing a locked-in ring and spigot joints for the conveyance of water. The maximum laying lengths shall be 40-feet and the minimal shall be 10-feet. The pipe shall be designed to pass without failure for 1,000 hours a pressure of 350 psi for Class 100 pipe and 650 psi for Class 200 pipe when tested in accordance with the requirements of ASTM D1598.

PVC pipe shall be as manufactured by J. M. Manufacturing Co., Inc., Clow Corp., or an approved equal.

B. Polyethylene PE Pipe:

Polyethylene (PE) pipe shall be plain end that meets the requirements of AWWA C-906. PE pipe shall have 130 psi rating, an ~~SDR of 13.5~~ and shall be manufactured to ductile iron size outside diameters (DIPS). Standard lengths shall be 40 feet.

Materials used for manufacturing of polyethylene pipe and fittings shall be PE 3408 High Density Polyethylene (HDPE) meeting the ASTM D 3350 cell classification of 345434C. The material shall have a minimum Hydrostatic Design Basis (HDB) of 1,600 psi at 73° F and shall be approved by NSF.

PE pipe shall be manufactured in accordance with AWWA C-906. Permanent identification of pipe shall be provided by co-extruding longitudinal blue stripes into the pipe's outside surface. The striping material shall be the same material as the pipe material except for color. Stripes printed or painted on the pipe shall not be acceptable.

Joints shall be the "buttfused" method. When jointing PE pipe to PVC pipe, a flanged adapter with ductile iron back-up ring shall be fused to the PE pipe and a mechanical joint by flanged adapter with a retainer gland for PVC pipe. All under ground flange bolts and nuts shall be 304 stainless steel. PE pipe will require concrete weights for all bayou and slough crossings. The weights and spacing will be as per manufactures recommendations. Contractor's attention is called to the fact that potable water is required to sink pipe in place.

Polyethylene pipe shall be PE 4,000 as manufactured by Phillips Drisco Pipe or an approved equal.

C. Ductile Iron:

Ductile iron pipe shall be centrifugally cast in a metal mold according to ANSI-AWWA C 151 and ASA Specifications A 2151. Joints, unless otherwise noted shall be flanged with gasket in accordance with ANSI-AWWA C111-A21.11 Class 50 requirements. Mechanical joint fittings shall be used when connecting PVC pipe at the joints. Pipe shall be safe for conveyance of potable water. The minimal wall thickness shall be Class II. Pipe shall be cement lined and seal coated in accordance with ASA Specifications Article 21.4 (latest revision). All piping and fittings shall be wrapped in visqueen or polywrap in accordance with ASTM D-1248 and AWWA C105. The Contractor shall furnish and install all incidental special piping not necessarily shown on the drawings.

NOTE: All tees and elbows shall be ductile iron and NOT PVC. Mechanical joint with gland shall be used to connect tees and elbows to main line. Mechanical joint fittings shall be manufactured by Pratt, Mueller, M & H Valve and Fitting Company, or approved equal.

D. Metallic Tape:

A non-corrosive metallic tape shall be placed along the entire length of the PVC pipe on the top and approximate center of pipe and continuous at approximately 18 inches above the line.

E. Valves 4-Inch thru 10-Inch – Gate Valves Resilient Seat:

Valves 4-inch thru 10-inch shall be resilient seat, epoxy coated gate valves and shall be for a working pressure not less than 200 psi, and conform with the requirements of AWWA C-509 for resilient seated gate valves. The valve shall be iron body bronze mounted, with a wedge resilient gate fully encapsulated where exposed to line velocity with a vulcanized SBR rubber, for long life. The valves shall be non-rising stem type fitted with square operating nut opening counterclockwise. The valve shall be epoxy coated meeting the standards of AWWA C-550. The valve shall be manufactured by M & H Valve Company, Mueller, or an approved equal.

F. Valves 12-Inch and Larger – Butterfly Valves:

Valves 12-inch and larger shall be butterfly valves and conform to the latest revision of the AWWA Standard C-504, Class 150B. The valve body shall be cast iron, with ductile iron resilient seated discs and epoxy coated in accordance with AWWA C-550. The valve shaft shall be an 18-8 type 304 stainless steel with "O" ring seals. The valve operator shall be of the traveling nut design with limiting devices to prevent over travel of the disc and opening counterclockwise. The valve shall be Mueller Lineseal III, catalog # B-3211 or Henry Pratt Code # 103 or an approved equal.

G. Gate Valve Water Meters:

A threaded brass nipple and a Class 125 bronze gate valve shall be installed upstream of each meter as shown on the Construction Plans.

H. Valve Boxes:

Cast iron boxes shall be provided for all valves. They shall consist of a base covering the operating nut and head of valve, a vertical shaft at least 5¼-inches in diameter and a top section extending to a point even with the finished ground surface, provided with a cast iron collar and a cover marked "WATER".

I. Corporation Stops:

Corporation stops shall conform with AWWA Standard as last revised and shall be Mueller No. H-15009, Ford Meter Box Co., No. F600, or an approved equal.

J. Service Clamps:

Service clamps for PVC shall be combination Corporation Stop and Saddle Outlet for 110 conductive compression connection for type K copper services pipe or

plastic pipe having same O. D. to outside iron pipe thread. If combination Corporation Stop and Saddle Outlet are not used, the saddle must have Mueller thread for use with the H-15008 Mueller Corporation Stop. H-13420 X 2", H-3428 X 4", H-13431 X 6". The Combination Clamp and Corporation Stop can be used on 2", 3" and 4" mains but not available for 6" mains.

K. Venturi Flow Meter:

The Venturi Flow Meter shall be rated for up to 4,000 gpm max flow with a minimum straight run of pipe. Flow meter shall be a MAGFLO MAG 5100 W Series "F" by Sitrans or approved equal. Meter shall produce a 4-20 MA DC signal to the UV Light Controls.

L. Meter Boxes: (AS REQUIRED)

Meters will be installed in either concrete meter boxes and conform to ASTM Specifications C-14 as to material or the Milner Plastic Meter Box as manufactured by Opelike Foundry Co., Inc. Opelika, Alabama, or an approved equal. Boxes shall have a hinged cast iron lid for the purpose of reading the meter. The dimension of the meter box shall be approximate to those shown on the Construction Plans.

M. Fire Hydrants: (NOT APPLICABLE)

Fire hydrants shall conform to the AWWA Standards C-502-54 and be designed for a 150 psi working pressure. All fire hydrants shall have one 4 ½-inch connection and two 2 ½-inch connections. The hydrant shall have mechanical joint inlets and shall be the breakaway traffic model type. The hydrant shall be painted with one coat of red zinc primer and two coats of a finish approved exterior paint. The hydrants shall be Mueller Catalog No. A-423.

N. Flushing Hydrants: (NOT APPLICABLE)

Flushing hydrants or blow-off valves shall meet the AWWA Standards. They shall be the post type hydrants with a 2-inch nozzle manufactured by the Mueller Co., Catalog No. A-24058, or an approved equal.

O. Casing Pipe:

Casing pipe shall be wrought steel and have a minimum yield strength of 3,500 psi. Minimum wall thickness of the pipe shall be 0.188-inches and shall have an exterior coating of coal tar enamel in accordance with AWWA C204.

P. Restrained Joints-PVC Pressure Pipe:

When mechanical joint fittings, valves, or appurtenances are used to join PVC Pressure Pipe, restrained joints shall be provided in the following cases:

DIRECTION CHANGE (bends, offsets)	Restrain inlet & outlet
SIZE CHANGE (reducers)	Restrain inlet & outlet
BRANCHES (tees, crosses, wyes)	Restrain branches only

DEAD ENDS (caps, valves, hydrant run outs)

Restrain all joints

Restraint shall be provided by a clamping ring installed on the PVC pipe and connected to the mechanical joint fitting with T-Head bolts or rods. All clamping rings shall incorporate serrations on the inside surface to provide positive restraint on the outside surface of the PVC pipe. Restraints shall provide full support (360 degree contact) around the circumference of the pipe to maintain roundness and avoid point loading.

In addition to the above, a sufficient length of restrained pipe shall be provided before and after these mechanical joints. All bells and spigot pipe joints within this length shall be restrained with a clamping ring and an additional ring designed to seat on the bell end of the pipe. The rings shall be connected with T-Head bolts or rods.

Restraining devices shall be FM approved and shall meet or exceed all requirements of UNI-BELL B-13, "Recommended Standard Performance Specifications for Joint Restrainers for use with PVC pipe."

Restraining devices shall be UNI-FLANGE Series 1,300 or 1,350, or an approved equal.

Q. Concrete Thrust Backing:

For all below grade piping concrete, thrust backing shall be placed at every change in direction. Concrete used as thrust backing shall be in accordance with ACI 318-71 with a 28-day compressive strength of 3,000 psi of these specifications and shall be placed against firm, undisturbed earth. See Construction Plans for details.

R. Concrete and Reinforcement:

The design for concrete mixes shall conform with the requirements of the ACI 318-71 with a 28-compressive strength of 3,000 psi. Defective concrete structures shall be removed and then the structures will be rebuilt. The cost for this rework shall be borne by the Contractor. All forms shall be in accordance with the ACI 347-63 Recommended Practice for Concrete Formwork. All bar reinforcement shall consist of new billet intermediate grade steel conforming to ASTM A 305-50 T.

S. Service Tubing:

PE 3408 3/4-inch or 1-inch Driscop Polyethylene Water services tubing, 160 psi working pressure at 73.4° F. SDR-9 ASTM 2737-68 National Sanitation Foundation, manufactured by Phillips Products or an approved equal. All service tubing shall have stainless steel inserts on all ends.

T. Air Release Valve: (WHERE REQUIRED)

The air release valve shall be a Crispin Type N, 2-inch valve with a 1/4-inch orifice or an approved equal.

PART 3 – EXECUTION

A. Installation:

1. Alignment and Grade:

The pipe shall be laid and maintained to the required lines and grades with fittings, valves, and hydrants at the required locations and all valves and hydrants stem plumb. All pipe shall be laid with a minimum cover of 30-inches unless otherwise shown on Construction Plans.

2. Excavation and Preparation of Trench:

The trench shall be dug so that the pipe can be laid to the alignment and depth required. The trench shall be drained of any standing water and the pipe will be laid on a uniform dry ground surface. Whenever necessary to determine the location of existing pipes, valves, or other underground structures, the contractor shall examine all available records and shall make all explorations and excavation for such purpose.

3. Laying Pipe:

All PVC pipe ends shall be thoroughly cleaned prior to installation. All odd ends shall be cut square and the edges neatly leveled. Pipe and fittings shall be assembled with a lubricant approved for use in potable water systems. PVC pipe shall be installed in accordance with the manufacturer's recommendations. The pipe shall be carefully examined for defects and the inside cleaned. Upon lowering the pipe into the trench, the bottom of the ditch shall be graded so that when the pipe rests in the ditch it will have a bearing for its entire length.

4. Direction of Laying:

Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. When there is a steep slope, the bells shall face upgrade.

5. Deflections:

Horizontal or vertical deflection in the pipeline shall not be of less radius than that recommended by the manufacturer of the pipe. If the alignment requires deflection in excess of these recommendations, the Contractor shall provide the necessary bends and fittings to meet the case.

6. Cutting Pipe:

Pipe shall be cut with a suitable pipe-cutting tool so as to leave a smooth end.

7. Service Pipe:

Service pipe shall have a minimum depth of 30-inches at all highway crossings and 18-inches elsewhere. All service tubing shall have stainless steel inserts at compression fittings.

8. Steel Casing:

Steel casing shall be installed by either jacking or boring in accordance with Section 728 of the Louisiana Standard Specifications for Roads and Bridges as last revised.

9. Concrete Encasement:

Concrete encasement will be utilized in the location shown on the Construction Plans and where the distance between the water main and a sewer line is less than 10-feet vertically. Design criteria shall be in accordance with the detail sheet of the Construction Plans.

10. Thrust Block Backing:

Thrust block shall be placed at all bends, tees and dead end plugs. The thrust block shall be in accordance with the Construction Plans.

11. Setting Valves & Fittings:

Valves, fittings, plugs and hydrants shall be set in locations shown on the Construction Plans or as directed in the field. A valve box or pit shall be provided for every valve as shown on the plans or as specified herein. If necessary to prevent movement of the appurtenances, the Contractor shall apply suitable metal rods or straps as directed.

12. Backfilling:

Backfilling material shall be free from cinders, ashes, refuse, vegetable or organic material, rock or stones, or other material unsuitable for backfill. It shall have a moisture content suitable for compaction to the equivalent density of the surrounding earth.

Backfill under areas to be paved shall be placed in the trench in a maximum of 8-inch layers and mechanically tamped full width and depth to the top of the original ground to density of not less than 100 percent the maximum density determined by A.A.S.H.O. Method Y-99. The Contractor will supply any deficiency of backfill at his expense.

13. Repaving:

The Contractor shall replace all pavement cut or disturbed with pavement similar in all respects to the existing pavement. Where the trench is excavated through asphalt, the pavement shall be cut on each side to a line which is 2-inches outside the nominal dimension of the trench.

The paving shall be replaced by pouring 6-inches of concrete to within 2-inches of asphalt plant mix to finish and the 2-inches of DOTD Type 3 asphalt placed

and rolled to a smooth finish over the concrete base. This will be performed in a neat workmanlike manner.

14. Meter Assemblies:

Meters shall be set as shown on the detail sheet of the Construction Plans. Meter boxes shall be placed with tops flush with the ground and with the metal hinged lid centered over the meter register.

15. Borings:

All borings shall be in accordance with Section 728 of the Louisiana Standard Specifications for Roads and Bridges by the Department of Transportation and Development. The boring of a line shall be such that the finished line is not to be subjected to any linear stress. All lines crossing state highways shall be encased in steel casing pipe which shall be two (2) pipe diameter sizes larger than the carrier pipe diameter and shall meet the design specifications as set forth by the Louisiana Department of Transportation and Development.

Backfill under areas to be paved shall be placed in the trench in a maximum of 8-inch layers and mechanically tamped full width and depth to the top of the original ground to density of not less than 100 percent the maximum density determined by A.A.S.H.O. Method Y-99. The Contractor will supply any deficiency of backfill at his expense.

16. Concrete Thrust Backing:

For all below grade piping concrete, thrust backing shall be placed at every change in direction. Concrete used as thrust backing shall be 3,000 psi in accordance with Section 03300 of these Specifications and shall be placed against firm, undisturbed earth. See Construction Plans for details.

17. PVC Joint Restrainers:

When mechanical joint fittings, valves, or appurtenances are used to join PVC Pressure Pipe, restrained joints shall be provided with retainer glands in the following cases:

All Mechanical Joint Bells

DIRECTION CHG. (bends / offsets)	– Restrain inlet & outlet.
SIZE CHANGE (reducers)	– Restrain inlet & outlet.
BRANCHES (tees, crosses, wyes)	– Restrain branches only.
DEAD ENDS (caps, valves & hydrants)	– Restrain all joints.
PE TO PVC TRANSITIONS	– Restrain 3 Pipe Joints

Direction Changes "L" Dimension Shall Be:						
	4	6	8	10	12	24
90° Ells	20'	21'	26'	32'	39'	47'
45° Ells	11'	13'	16'	20'	24'	30'
22-1/2° & 11-1/4° Ells	6'	7'	10'	11'	14'	20'
Dead Ends	20'	21'	26'	32'	39'	109'

TEES AT BRANCHES

TEES WHEN USED AS 90 DEGREE ELLS. SAME AS DEAD ENDS.

Restraint shall be provided by a clamping ring installed on the PVC pipe and connected to the mechanical joint fitting with T-Head bolts or rods. All clamping rings shall incorporate serrations on the inside surface to provide positive restraints on the outside surface of the PVC pipe. Restraints shall provide one full support (360 degree contact) around the circumference of the pipe to maintain roundness and avoid point loading.

B. Testing & Sterilization:

1. Testing:

All tests shall be made in the presence of the Engineer. Lines or convenient sections of the system shall be tested subjecting them to a water pressure of 100 psi for a period of four (4) hours before they are accepted. The test shall be applied to check leakage through all valves and joints. Visible leaks shall be corrected regardless of total leakage.

The Contractor shall furnish the pump, pipe connections, and all necessary apparatus including gauges. He shall also make all taps into the pipe and furnish all necessary assistance for conducting the test.

All air shall be expelled from the lines by a suitable method. No pipe installation will be accepted until or unless this leakage (evaluated on a pressure basis of 100 psi) is less than ten (10) U. S. Gallons per 24 hours per 1,000 feet per inch nominal diameter. Lines that fail to meet these tests shall be repaired and retested as necessary until test requirements are complied with.

2. Sterilization:

After the distribution system has been tested to the satisfaction of the Engineer, it shall be disinfected or sterilized in accordance with AWWA Specification C-651-92 which provides for the injection of a 50 ppm solution of chlorine remaining for twenty-four hours.

In the process of chlorinating water pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.

Following chlorination, all treated water shall be thoroughly flushed and a sample collected by the Contractor who shall secure an approval from the Louisiana Department of Health and Hospitals on all new lines.

END OF SECTION 02510

SECTION 03010 – CONCRETE FORMWORK

PART 1 – GENERAL

Provide all materials, labor, equipment and incidental services for the installation of all forms for structural concrete.

The design and engineering of formwork, as well as its construction shall be the responsibility of the Contractor. All formwork shall comply with the American Concrete Institute (ACI) Standard "Recommended Practice for Concrete Formwork" (ACI-347).

Forms shall have sufficient strength to withstand all forces resulting from placement and vibration to the concrete and shall have sufficient rigidity to maintain specified tolerances.

PART 2 – PRODUCTS

Earth cuts may be used as forms for footings and grade beams if the surfaces can be held true to line and grade. Earth cut forming may not be used on concrete surfaces to be exposed. If a previously acceptable earth cut form is ruined by rain, sloughing or other such phenomenon, the Contractor shall remove reinforcing steel, re-excavate and provide form materials as required to meet specified tolerances.

All lumber and plywood shall be sound and undamaged and shall conform to requirements of ACI Special Publication No. 4, Formwork for Concrete.

For exposed concrete surfaces, use form liners or special coatings to prevent wood grain marks on the concrete surface.

PART 3 – EXECUTION

Construct all formwork so as to insure that the concrete surfaces will not exceed the following tolerances:

Footing Dimensions:

Plan.....plus 6 inch; minus 3 inch

Depth.....plus 4 inch; minus 0 inch

Slab variation from the level.....1/4 inch per 10 feet but not more than 1/2 inch.

Variation from designated elevation (top and bottom of slabs and beams).....1/2 inch.

Variation of the building line from established position.....1 inch.

Variation in cross-sectional dimensions of beams and in thickness of slabs and walls.....
plus 1/2 inch; minus 1/4 inch.

Where those tolerances do not apply, all tolerances shall comply with those suggested in ACI 347-77 "Recommended Practice for Concrete Formwork".

Forms shall not allow leakage of cement paste.

Form coatings to prevent bond with concrete shall be applied before reinforcing is placed. Coating material shall not be allowed to stand in puddles within the forms; nor be allowed to contact concrete against which fresh concrete is to be placed.

Accessories and Inserts:

Form accessories to be wholly or partially embedded in the concrete, such as ties and hangers, shall be a commercially manufactured type and shall break off not less than one inch within the concrete surface.

All inserts necessary for connecting work shall be securely fastened in proper position before concrete placement begins.

Form Removal:

All structural members shall be adequately shored until control cylinder tests indicate the concrete has reached its specified 28-day compressive strength.

Side forms for grade beams may be removed 24 hours after concrete is placed.

When side forms are removed within 48 hours of pour, these formed surfaces shall be cured by damp mats or curing compounds as herein specified.

Immediately after stripping forms remove all projections and patch surface defects with a mortar paste of same proportions as concrete. Defects which expose reinforcing steel or which extend over an area greater than 200 square inches shall not be repaired until inspected by Engineer.

END OF SECTION 03010

SECTION 04200 – UNIT MASONRY

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division – 1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of each type of masonry work is indicated on drawings and schedule.

Types of masonry work required include:

- Brick Masonry
- Rigid Insulation Board
- Copper-Fabric Flashing

Extruded Polystyrene Board Insulation

Furnished and installed as part of this work.

QUALITY ASSURANCE:

Contractor shall furnish the "Certificate of Underwriters Laboratories, Inc." from concrete masonry unit manufacturer certifying that concrete masonry units comply with ratings indicated on the drawings.

Field Constructed Mock-Up:

Prior to installation of masonry work, erect sample typical exterior face brick representative of completed masonry work required for project with respect to qualities of appearance, materials and construction.

Locate mock-up, which is approximately 6' long by 4' in height by full thickness including all shapes.

When directed, demolish mock-up and remove from site.

SUBMITTALS:

Product Data: Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.

Samples: Submit, for verification purposes, samples of each exposed masonry unit and

colored masonry mortar. Include in each set of sample work. Label samples to indicate type and amount of colorant used.

For initial selection of exposed masonry units and colored masonry mortar, submit samples showing full range of colors and textures available.

JOB CONDITIONS:

Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

Extend cover a minimum of 24" down both sides and hold cover securely in place.

Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of covering spread on ground and over wall surface.

Protect sills, ledges and projections from droppings of mortar.

Cold Weather Protection:

Do not lay masonry units, which are wet or frozen.

Remove all masonry determined to be damaged by freezing conditions.

For clay masonry units with initial rates of absorption (suction), which require them to be wetted before laying, comply with the following requirements.

For units with surface temperatures above 32 deg. F (0 deg. C), wet with water heated to above 70 deg F (21 deg. C).

Do no masonry work (including mortar-mixing) unless temperature is 40 deg. Or above and rising.

Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry temperature ranges apply to anticipated minimum night temperatures.

40 deg. F (4 deg. C) to 32 deg. F (0 deg. C):

Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

32 deg. F (0 Deg. C) to 20 deg. F (-7 deg. C):

Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

20 deg. F (-7 deg. C) and below:

Maintain masonry temperature above 32 deg. F (0 deg. C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40 deg. F (4 deg. C) for 48 hours.

PART 2 – PRODUCTS

MASONRY UNITS, GENERAL:

Manufacturer: Obtain masonry units of each type from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

Masonry Unit Characteristics: Provide units complying with standards referenced and requirements indicated.

BLOCK:

Size: Provide blocks – Nominal sizes 8" x 8" x 16", 8" x 8" x 8".

For sills, caps and similar applications resulting in blocks which will require concrete fill and steel reinforcement, use open channel or "u" blocks as required and overlap post openings into the lace wall sections as shown on the Construction Plans.

MORTAR AND GROUT MATERIALS:

Masonry Cement: ASTM C-91-83A.

Aggregate for Mortar: ASTM C-144

Aggregate for Grout: ASTM C-404

MASONRY ACCESSORIES:

Horizontal Joint Reinforcing and Ties for Masonry:

Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner ("L") and intersecting ("T") units.

Fabricate from cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain trussed rods, into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8" on joint faces exposed to exterior and not less than 1/2" elsewhere. Provide the following type of joint reinforcing.

For all interior walls, truss type fabricated with single pair of Extra Heavy, 3/16" side rods and 9 gage cross rods. Provide mill galvanized finish.

For exterior walls, use prefabricated continuous joint reinforcement and adjustable tie system consisting of truss reinforcement of 3/16" side rods and 9 gage truss rods, with adjustable wall tie eye sections welded thereto, at 16" o. c. horizontal spacing. Rectangular adjustable wall tie pintle sections shall be fitted into the eye sections to complete the reinforcement and tie function of the assembly. Provide mill galvanized finish. Provide mill galvanized finish.

For attachment to structural steel framing, use triangular ties and column anchors ASTM A 82 Steel wire in 1/4" diameters, mill galvanized finish; see plans for correct sizes. Anchors shall be ASTM A 82 steel wire, shaped or formed to accept ties. The triangular metal ties shall be maximum length manufactured that can be accommodated by the masonry thickness at each specific condition.

Flashings for Masonry:

Provide concealed flashings, shown to be built into masonry.

Provide concealed flashings as follows:

Copper-Fabric Laminate Flashing: Copper bonded to waterproof glass fabric both sides.

Fabricate with 3 oz. Copper.

Premolded Control Joint Strips: Solid rubber strips with a Shore A durometer hardness of 60 to 80, designed to fit standard sash block and maintain lateral stability in masonry wall, size and configuration as indicated.

Premolded Control Joint Strips shall be one of the following:

AA Wire Products Co.	AA2000
Durowall	D/A2001
Wire Bond	2901

Non-Metallic Expansion Joint Strips: Provide pre-molded, compressible, elastic fillers of foam rubber, neoprene, or extruded plastic.

Non-Metallic expansion joint strips shall be one of the following:

Durowall	D/A 2015
Block Mesh	26020
Williams Products Co.	New-Seal IV 2218-3

Bondbreaker Strips: 15-lb. Asphalt roofing felt complying with ASTM D 226, or 15-lb coal-tar roofing felt complying with ASTM D 227.

Rigid Insulation Board:

Extruded Polystyrene Board Insulation: Rigid cellular polystyrene thermal insulation with closed cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578, Type IV; 5-year aged r-value per in ch of 5 Btu/hr x sf x deg F at 75 deg F (24 deg C); in manufacture's standard length and widths; thicknesses as indicated.

Products: Subject to compliance with requirements, provide one of the following:

"Styrofoam SM/SB"; Dow Chemical USA.
"Foamular 250"; UC Industries.
"Certifoam", Minnesota Diversified Products, Inc.

Adhesive: Type recommended by insulation board manufacturer for application indicated.

MORTAR AND GROUT MIXES:

Do not lower the freezing point of mortar by use of admixtures or antifreeze agents.

Do not use calcium chloride in mortar or grout.

Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for type of mortar required.

Use Type M Mortar for masonry below grade and in contact with earth, and where indicated.

Use type S Mortar for face brick, concrete masonry units, and glazed facing tile units.

Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of fine consistency at time of placement, which will completely fill all spaces intended to receive grout.

PART 3 – EXECUTION

INSTALLATION, GENERAL:

Thickness: Build masonry construction to the full thickness shown, except build single-wythe walls to the actual thickness of the masonry units.

Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.

Do not wet concrete masonry units.

Pattern Bond: Lay exposed masonry in running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe bonded by lapping not less 2". Bond and interlock each course of each wythe at corners.

Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement-type joints returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.

Lay-up-walls plumb and with courses level, accurately spaced and coordinated with other work.

Stopping and Resuming Work: Rack back $\frac{1}{2}$ - masonry unit length in each course; do not tool clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.

Built-in Work: As the work progresses for the "built-in" items specified under this and other sections of these specifications, General Contractor shall coordinate all the "built-in" items required by all trades to assure that all are accurately located, and run plumb and true-to-line. General contractor shall verify that Masonry Contractor maintains and protects such "built-in" items so that the finished installation will result in a smooth, flush, straight, and plumb appearance. Fill in solidly with masonry around "built-in" items.

Fill space between hollow metal frames and masonry solidly with mortar.

Where "built-in" items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

Intersecting Load-bearing Walls: If carried up separately, block vertical joint with 8" maximum offsets and provide rigid steel anchors spaced not more than 4'-0" o.c. vertically, or omit blocking and provide rigid steel anchors at not more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1-1/2" x 1/4" x 2'-0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar filled cores.

All Interior Masonry Walls and Partitions: Build full height of story to underside of structural roof decks above. Contractor shall extend masonry as close as possible to underside of roof deck, and seal with rubber closure strip any remaining space between top of masonry and roof deck.

MORTAR BEDDING AND JOINTING:

Lay block with completely filled bed, head and collar joints; butted ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. Lay walls with 3/8" joints. Cut joints flush for masonry walls, which are to be concealed or to be covered by other materials. Tool exposed joints slightly concave using a jointer larger than joint thickness. Rake out mortar in preparation for application of caulking or sealants where shown.

Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units, which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

Collar Joints: Fill joints between wythes solidly with mortar. Fill collar joints after each course is laid.

EXTRUDED POLYSTYRENE BOARD INSULATION:

On units of polystyrene insulation install small pads of mastic spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

Use continuous horizontal joint reinforcing embedded in horizontal joints for bond tie between wythes. Install at not more than 16" o.c. vertically as specified. Provide continuity at corners and intersections using prefabricated "L" and "T" units.

HORIZONTAL JOINT REINFORCING:

Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on

exterior side of walls and ½" at other locations. Lap reinforcement a minimum of 6". Do not bridge control and expansion joints with reinforcing. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

Space continuous horizontal reinforcing as follows:

For multi-wythe walls (solid or cavity) where continuous horizontal reinforcing acts as structural bond or tie between wythes, space reinforcing as required by code but not less than 16" o.c. vertically, starting at top of footings.

For single-wythe walls, space reinforcing at 16" o.c. vertically, starting at top of footings.

For parapets, space reinforcing at 8" o.c. vertically, unless otherwise indicated.

Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above lintels and below sills. Extend reinforcing a minimum of 2'-0" beyond jambs of the opening, bridging control joints where provided.

ANCHORING MASONRY WORK:

Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:

Provide an open space not less than 1" in width between masonry and structural member. Keep open space free of mortar or other rigid materials.

Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible tie sections.

Space anchors as shown, but not more than 16" o.c. vertically.

LINTELS:

Install loose lintels of steel and other materials where shown.

CONTROL AND EXPANSION JOINTS:

Provide vertical expansion, control and isolation joints in masonry where shown. Build-in related masonry accessory items as the masonry work progresses.

See Division- 7 sections for "Joint Sealers".

Build-in joint fillers where shown, specified in a Division-7 section "Joint Sealers".
Joint width for sealants: 3/8".

FLASHING OF MASONRY WORK:

Provide concealed flashings in masonry work at, or above, all shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections, which would puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar.

Extend flashings to full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from a line ½" in from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", and through the inner wythe to within ½" of the interior face of the wall in exposed work. At heads and sills turn up ends not less than 2" to form a pan.

Install flashings in accordance with manufacturer's instructions.

Install cooper-fabric flashings at heads and sill of all exterior windows and elsewhere as indicated.

Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

REPAIR, POINTING AND CLEANING:

Remove and replace masonry units which are loose, chipped broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

Pointing: During the tooling of joints, enlarge any voids or holes, except weepholes and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

Clean exposed block-masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method. Comply with requirements of BIA Technical Notes No. 20 "Cleaning Brick Masonry".

Use commercial cleaning agents in accordance with manufacturer's instructions.

END OF SECTION 04200

SECTION 05100 – STRUCTURAL STEEL

PART 1 – GENERAL

Provide all materials, labor, equipment and incidental services necessary for the fabrication, painting and erection of all structural steel, incidental steel framing and steel joists included in the Contract.

Fabricate and erect all structural steel in conformance with the "Specification for Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction.

All references herein to standards of the American Institute of Steel Construction (AISC) and the American Society for Testing Materials (ASTM) and the American Welding Society (AWS) apply to the latest revision thereof.

Submit to the Engineer for review, two prints and one sepia of all Shop and Erection drawings. Before submittal to the Engineer, all shop drawings shall be checked by the Contractor and shall be signed to verify that this has been done. The Engineer will review these Drawings and return the sepia to the Contractor with marks thereon indicating any exceptions taken to the content of these Drawings. Review of Shop Drawings shall be only for general conformance with design concept of the Project and for general compliance with information given in the Contract Documents. Review of the Shop Drawings shall not be construed as approval of quantities and dimensions, of fabricating processes, of construction techniques or of approval of any variance from the intent of the Contract Documents.

Final structural Contract Drawings shall not be used in any form for shop drawings.

Splices and connections not shown on the drawings shall be designed by the Contractor to develop the full strength of the largest connecting member. Such connections shall be submitted for review separately from the shop drawings. Fully descriptive sketches and a written request for review shall be submitted by the Contractor.

The Contractor shall obtain from the structural steel fabricator copies of mill certificates for all structural steel used on the project. The mill certificates shall be accompanied by a letter from the steel fabricator certifying that the steel represented by the submitted certificates was used on the project and no other steel was used on the project. This letter of certification and the mill certificates shall be submitted to the Engineer for his file. This submittal in no way relieves the Contractor of his responsibility to assure that all structural steel installed in this project meets the requirements of these specifications.

If foreign steel is used on any part of the Project, it shall be certified by Supplier as complying with all applicable ASTM, AWS, and AISC requirements herein specified.

PART 2 – PRODUCTS

All material shall be new and undamaged.

Structural steel shapes and steel plates shall conform to ASTM A-36.

Pipe shall conform to ASTM A501 or ASTM A53 Types F or S, Grade B.

Square and rectangular structural tubing shall conform to ASTM A500 Grade B.

Bolts, including anchor bolts, shall conform to ASTM A-307 unless specifically noted otherwise on the Drawings.

High strength bolts shall be heavy hexagon structural bolts conforming to ASTM A-325.

Steel joists shall be as designated on the Drawings and shall conform to the latest "Standard Specifications and Load Tables for Steel Joists and Joist Girders", as adopted by the Steel Joist Institute.

Expansion type anchor bolts for fastening to existing concrete or masonry shall employ steel wedges and shall have hex-heads. Anchors shall be placed in drilled holes of same diameter as fastener. Embedment length shall be at least six times nominal bolt diameter but not less than 3 inches. Use Dynabolt by Ramset, Red Head Sleeve Anchors by ITT Phillips Drill Company, WEJ-IT Anchors by Allied Products Corporation, KWIK-Bolt by McCulloch Industries, Parabolt by USM Corporation or an approved substitute anchor.

PART 3 – EXECUTION

Welding:

Materials and processes used, and details of all joints shall comply with the American Welding Society Code for Arc and Gas Welding in Building Construction.

Use AWS A5.1 or A5.5 E70XX electrodes for manual arc welding and AWS A5.17 F7X-EXXX electrodes for submerged arc welding.

All welders shall be qualified according to AWS Standards for the type of welding that they perform on this Project. Welders shall carry their certification papers and show them to the Owner's representatives upon request.

High Strength Bolting:

High strength bolted joints, where called for on Drawings, shall be assembled in accordance with "Specification for Structural Joints using ASTM A-325 or A490 Bolts" as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation and endorsed by the AISC.

Erection:

Provide adequate bracing and shoring during erection and throughout construction.

Erect all steel in accordance with standards and specifications of the AISC. Use close fitting bolts with nuts drawn up tight. Locate anchor bolts accurately and install into connection work in advance. Install base plates true to line and level and set solid in non-shrinking grout.

Do not enlarge shop-made boltholes by flame cutting in the field. If shop-fabricated components do not assemble properly in the field, do not modify them in any manner without first obtaining the approval of the Engineer.

Install steel joists to the spacing shown on the Plans with the top chord of all joists in the same plane. Install joist bridging immediately after each joist is placed so that no joist is unbraced during the time that other joists are being erected.

Unless noted otherwise on the Drawings, all joists bridging shall be the horizontal type as required by the Steel Joist Institute. In no cases shall the bridging size be smaller than 1-1/2 x 1-1/2 x 1/8 inch steel angles. At each end of each run of bridging the horizontal angles shall be x-braced with two additional angles between the end joist and the first interior joist.

All bridging shall be completely welded prior to beginning the installation of the roof deck. The ends of all bridging shall be securely anchored to the building walls.

Non-shrink grout beneath column base plates shall be Embeco by Master Builders, Ferrolith G. by Sonneborn Building Products, Supreme Grout by Gifford-Hill Co., Five Star Grout by U. S. Grout Corporation or Firmix by Euclid Chemical Company or an approved substitute.

Painting:

Paint all structural steel and steel joists in the shop after fabrication is completed. After erection, paint all field connections, all welded areas and touch up all abrasions, damaged or defective paint and rust areas and remove all dirt, mud, mortar, debris, etc., from all steel surfaces.

Immediately before painting, thoroughly prepare the steel surface in compliance with the Steel Structures Painting Council Specifications SP-3. Remove all oil and grease, loose mill scale, loose rust, loose paint and other detrimental foreign matter from the steel surface.

Apply paint with brush, roller or spray; or dip in accordance with manufacturer's specifications.

For shop painting and for field touch-up painting, use Tnemec 10-99 Modified Alkyd Primer or Southern Coatings Heavy Duty RIP Primer 1-0969. Dry film thickness shall be 2.4 mils.

Where called for on Drawings, galvanizing shall conform to ASTM A 123 and A 153.

END OF SECTION 05100

SECTION 05500 – METAL FABRICATIONS

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division – 1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Definition: Metal fabrications includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere. Types of work in this section include metal fabrications for:

- Rough hardware.
- Loose bearing and leveling plates.
- Miscellaneous framing and supports.
- Miscellaneous steel trim.

Structural steel is specified in another section within Division 5.

QUALITY ASSURANCE:

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

SUBMITTALS:

Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of section and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.

Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Engineer.

PART 2 – PRODUCTS

MATERIALS:

Metals:

Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

Steel Plates, Shapes and Bars: ASTM A 36.

Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.

Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.

Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.

Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish and supported rails, unless otherwise indicated.

Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required.

Grout:

Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C588. Type M.

Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C588. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

Fasteners:

General: Select fasteners for the type, grade and class required.

Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.

Lag Bolts: Square head type, FS FF-B-561.

Machine Screws: Cadmium plated steel, FS FF-S-92.

Wood Screws: Flat head carbon steel, FS FF-S-111.

Plain Washers: Round, carbon steel, FS FF-W-92.

Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

Toggle Bolts: Tumble-wing type, FS FF-B588, type, class and style as required.

Lock Washers: Helical spring type carbon steel, FS FF-W-84.

Paint:

Metal Primer Paint: Red lead mixed pigment, alkyd varnish, linseed oil paint, FS-TT-P-86, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, FS TT-P-615, Type II.

Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9.

FABRICATION, GENERAL:

Workmanship:

Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws or bolts.

Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

Shop Painting:

Shop paint miscellaneous metal work, except members of portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified.

Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning," or SSPC SP-3 "Power Tool Cleaning," or SSPC SP-7 "Brush-Off Blast Cleaning."

Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning."

Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods, which will result in full coverage of joints, corners, edges and exposed surfaces.

Apply one shop coat to fabricated metal items, except apply 2 coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

MISCELLANEOUS METAL FABRICATIONS:

Rough Hardware:

Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.

Fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts, which bear on wood structural connections; elsewhere, furnish steel washers.

Miscellaneous Framing and Supports:

Provide miscellaneous steel framing and supports, which are not a part of structural steel framework, as required to complete work.

Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

Except as otherwise shown, space anchors 24" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

Miscellaneous Steel Trim:

Provide shapes and sizes for profiles shown. Except as otherwise indicated, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

PART 3 – EXECUTION

PREPARATION:

Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

INSTALLATION:

General:

Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, wood screws and other connector as required.

Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items, which are to be built into concrete, masonry or similar construction.

Fit exposed connections accurately together for form tight hairline joints. Weld connections, which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat.

Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

Setting Loose Plates:

Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic, non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6" of posts.

ASJUST AND CLEAN:

Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 of these specifications.

END OF SECTION 05500

SECTION 06100 – ROUGH CARPENTRY

PART 1 – GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division – 1 Specification sections, apply to work specified in this section.

SUMMARY:

Types of work in this section include rough carpentry for:

- Wood studs, joist and rafters
- Wood grounds, nailers and blocking.
- Wood furring
- Plywood Sheathing

SUBMITTALS:

Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.

Preservative Treatment: Include certification by treating plant stating type of preservative solution and pressure process used, not amount of preservative retained and conformance with applicable standards.

For Water-Borne Treatment: Include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

PRODUCT HANDLING:

Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials. For lumber and plywood pressure treated with water-borne chemicals, sticker between each course to provide air circulation.

PROJECT HANDLING:

Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.

PART 2 - PRODUCTS

LUMBER, GENERAL:

Lumber Standards: Manufacture lumber with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

SPIB – Southern Pipe Inspection Bureau.
WCLIB – West Cost Lumber Inspection Bureau.
WWPA – Western Wood Products Association.

Grade Stamps: Factory-mark each piece of lumber with grade stamp in inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

Provide dressed lumber, S4S, unless otherwise indicated.

WOOD GROUNDS, BLOCKING, NAILERS, AND FURRING:

Provide wood for support or attachment of other work including bucks, nailers, blocking, and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows.

Grade: No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 3 board per SPIB rules. All lumber shall be preservative pressure treated as hereinafter specified.

PLYWOOD:

Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PS 1 provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural-Use Panels", Form No. E445.

Trademark: Factory-mark each construction panel with APA trademark evidencing compliance with grade requirements.

Exposure Durability Classification: Exterior.

All plywood shall be preservative pressure treated as hereinafter specified.

MISCELLANEOUS MATERIALS:

Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices.

WOOD TREATMENT BY PRESSURE PROCESS:

Preservative Treatment: Where lumber or plywood is indicated as pressure treated or P.T., or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark Requirements.

Pressure-treat above-ground items with water-borne preservatives to comply with AWPB LP-2. After treatment, Kiln-dry lumber to a maximum moisture content, of 19 percent. Treat indicated items and the following:

Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, wood sleepers, blocking, furring, stripping and similar concealed members. Plywood at roof edge, expansion joints, and elsewhere indicated.

PART 3 – EXECUTION

INSTALLATION, GENERAL:

Discard units of material with defects, which might impair quality of work, and units which are too small to use in fabrication work with minimum joints or optimum joint arrangement.

Set carpentry work to required levels and lines, with members plumb and true to line and cut and fitted.

Securely attach carpentry work to substrate by anchoring and fastening as shown. Nailers shall be anchored to masonry as indicated on the drawings. However, provide anchors a minimum of 4" from ends of each board.

Countersink nail heads on exposed carpentry work and fill holes.

Use common wire nails: Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

WOOD GROUNDS, NAILERS, BLOCKING AND SLEEPERS:

Provide wherever shown and where required for screeding or attachment of other work.

Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

Attach to substrates to support applied loading. Countersink bolts and nuts flush with surfaces. Build into masonry during installation of masonry work. Where possible, anchor to form work before concrete placement.

END OF SECTION 06100