

CODES AND STANDARDS

- Building has been designed to, and shall be constructed in accordance with the following building codes and standards:
 - West Virginia State Building Code
 - 2015 International Building Code (IBC 2015)
 - 2015 International Existing Building Code (IEBC 2015)
 - ASCE 7-10, Minimum Design Loads for Buildings and Other Structures
- Unless explicitly modified in the Contract Drawings and Specifications, the Contractor shall comply with provisions of:
 - ACI 301-10, Specifications for Structural Concrete
 - ACI 318-11, Building Code Requirements for Structural Concrete
 - ACI 308-11, Building Code Requirements for Masonry Structures
 - ACI 308-11, Specification for Reinforcing Steel Bars
 - ASCE 360-10, Specification for Structural Steel Buildings
 - AWSD1.1-10, Structural Welding Code - Steel
 - SDB Design Manual for Composite Decks, Form Decks and Roof Decks - No. 31

DESIGN LOADS

Floor live load (unless otherwise noted)

Ground and first floors	100 psf (1)
Corridors above first floor	80 psf (1)
All other areas above first floor	60 psf (1)
Future floors	80 psf (1)(2)

- Live Loads are reduced per IBC section 1607.9 to a maximum reduction of 40%.
- Includes 20 psf partition allowance, unreduced (IBC 1607.5)

Roof live load

Roof live load	30 psf
Rain Load (ASCE 7, Section 8.3) ponded water	not critical (a)(4)
Ponding Instability (ASCE 7, Section 8.4)	not critical (a)
Allowance for hanging loads for roofs over mechanical equipment room	15 psf

- Assumes primary drainage is blocked and rain accumulates to depth of overflow (see Architect's detail at 62.4 psf).
- Architect has provided gutters and/or secondary drainage system

Roof snow load

Ground snow load (ASCE 7, Figure 7-1)	$P_g = 20$ psf
Flat roof snow load (ASCE 7, 7.3)	$P_s = 24$ psf (5)
Snow exposure factor (ASCE 7, Table 7-2)	$C_e = 1.0$
Snow importance factor (ASCE 7, Table 1.5-2)	$I_s = 1.2$
Thermal factor (ASCE 7, Table 7-3)	$C_t = 1.0$

- Supplier to increase for snow buildup / unbalanced per ASCE 7.7.6 to 7.9

Wind design data

Basic wind speed (3-second gust) (ASCE 7, Figure 26.5-1B)	$V = 120$ mph
Wind importance factor (ASCE 7, Table 1.5-2)	$I_s = 1.0$
Occupancy category (ASCE 7, Table 1.5-1)	B
Wind exposure category (ASCE 7, Section 26.7.3)	B
Internal pressure coefficient (ASCE 7, Fig. 26.11-1) Encl. Components and cladding	$G C_{pi} = +0.18$
Effective Wind Area	10 ft^2
Zone 1 (Roof Interior)	+10.5, -25.9 psf
Zone 2 (Roof Edge)	+10.5, -43.5 psf
Zone 3 (Roof Corner)	+10.5, -66.4 psf
Zone 4 (Wall Interior)	+25.9, -28.1 psf
Zone 5 (Wall Corner)	+25.9, -34.7 psf

- Indicates pressure acting toward the surface
 - Indicates pressure acting away from the surface
- Edge and corner zones are defined as areas within 6'-0" of edge or corners

- Components and cladding engineer may calculate wind loads based on actual effective wind area per ASCE 7

Earthquake design data

Seismic importance factor (ASCE 7, Table 1.5-2)	$I_s = 1.5$
Occupancy category (ASCE 7, Table 1.5-1)	IV
Mapped spectral response accelerations	
Short period	$S_s = 0.110$ g
1-second period	$S_1 = 0.057$ g
Site class (Per Geotech. Report)	
Spectral response coefficients	
Short period	$S_{s1} = 0.088$ g
1-second period	$S_{s2} = 0.065$ g
Seismic design category	A
Basic seismic-force-resisting system (ASCE 7, Table 12.2-1)	
C. Moment-resisting frame systems	
6. Intermediate reinforced concrete moment frames	$V = 55$ Kips
Design base shear (ASCE 7, 12.8.1)	$C_d = 0.01$
Seismic response coefficient (ASCE 7, 12.8.11)	$R = 3$
Response modification factor (ASCE 7, Table 12.2-1)	
Analysis procedure	Equivalent lateral force procedure

Alterations are in accordance with ASCE 7, Appendix 11B.4. Proposed structural alterations comply with IBC requirements for new structures. Additionally, proposed alterations do not increase the seismic force in any existing structural element by more than 10 percent, nor do they decrease the design strength of any existing structural element to resist seismic forces by more than 10 percent. Therefore, further analysis and design of the existing structure for seismic force-resistance are not required.

Flood design data

Building is not in a flood hazard area (IBC 1612.3)

Special loads

Handrails and guardrails (IBC 1607.7)	50 psf or 200 lbs.
Interior walls and partitions (IBC 1607.13) Horizontal	5 psf min.
Soil Lateral Loads (per Geotechnical Report)	
Restrained (basement walls) at rest pressure	64 psf
Unrestrained (cantilever retaining walls)	44 psf

DESIGN STRESSES

Concrete (strength design) minimum compressive strength in 28 days:

Footings	$f'_c = 3,000$ psi
Reinforcing bars on ground, grade beams, walls, interior structural frame, and concrete on metal deck	$f'_c = 4,000$ psi
Concrete subject to freezing and thawing	$f'_c = 5,000$ psi
Lean concrete, for use with overexposed conditions	$f'_c = 1,500$ psi
Reinforcing bars (ASTM A615, Grade 60)	$F_y = 60,000$ psi
Welded wire reinforcement (ASTM A185)	$F_y = 70,000$ psi
Structural steel (ASTM A992 or ASTM A572/50)	$F_y = 50,000$ psi
Structural steel other shapes (ASTM A36)	$F_y = 36,000$ psi
Anchor bolts (F1554, Grade 36) unless otherwise noted	$F_u = 38,000$ psi
Deck (ASTM A36)	$F_y = 33,000$ psi
Hollow structural sections (ASTM A500, Grade B)	$F_y = 46,000$ psi
Rectangular	$F_y = 42,000$ psi
Round	$F_y = 35,000$ psi
Steel pipe (ASTM A53, Grade B)	$F_u = 1,500$ psi
Masonry	
Load bearing CMU (ASTM C55 or C90)	2,000 psi
Brick (ASTM C216 Grade SW)	Type M or S
Mortar (ASTM C270)	2,000 psi
Grout (ASTM C476)	2,000 psi
Soil bearing pressure for foundations	6,000 psf
After ground improvement per Geotechnical Report	

GENERAL

- All new construction shall comply with the Contract Documents and the Building Code.
- Typical details and general notes apply to all parts of the work except where specifically detailed or unless otherwise noted. Refer to architectural, mechanical, and electrical drawings for non-structural items which require special provisions during the construction of the structural members.
- Drawings are not to be scaled.
- Refer to architectural plans for floor depressions, openings, slopes, drains, curbs, pads, embedded items, non-bearing partitions, etc. Refer to mechanical and electrical plans for sleeves, openings, and hangers for pipes, ducts, and equipment. The Contractor shall verify and be responsible for all dimensions and conditions which impact the work. Field verify sizes, elevations, hole locations, etc., prior to fabrication.
- The Contractor shall carefully review the drawings to identify the scope of work required, visit the site to relate the scope of work to existing conditions and determine the extent to which those conditions and physical surroundings will impact the work.
- Conditions shown as shown on these plans are for reference only. The Contractor is required to verify all existing conditions prior to construction. The Contractor shall resolve any conflicts on the drawings or in the specifications and the Architect/Engineer before proceeding with the work.
- Any deviation, modification, or substitution from the approved set of structural drawings shall be submitted to the Owner, Architect, and Engineer for review and approval prior to its use or inclusion on the shop drawings.
- The Contractor shall provide all necessary shores, braces, and guys required to support all loads to which the building structure and components, soils, other structures, and utilities may be subjected during construction. Shoring systems shall be designed, signed, and sealed by a professional engineer licensed in the jurisdiction where the project is located.
- The Contractor shall provide means, methods, techniques, sequence, and schedule of construction as required.
- The Contractor shall protect all work, materials, and equipment from damage and shall provide proper storage facilities for materials and equipment during construction.
- The Contractor shall provide all necessary shores, braces, and guys required to support all loads to which the building structure and components, soils, other structures, and utilities may be subjected during construction. Shoring systems shall be designed, signed, and sealed by a professional engineer licensed in the jurisdiction where the project is located.
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- The Contractor shall review shop drawings for completeness and compliance with contract documents. The Contractor shall stamp shop drawings prior to submission to the Architect and Engineer.
- Review of the shop drawings by the Architect's Engineers shall not be construed as an authorization to deviate from the Contract Documents.
- Shop drawings will not be processed if they are incomplete, lack coordination with relevant portions of contract documents, lack calculations if required, or if deviations, modifications, and substitutions are indicated without prior written approval from the Architect/Engineer.
- No pipes or ducts shall be embedded into structural members unless so shown on the plans or approved by the Engineer.

DEMOLITION

- The Contractor is to obtain and pay for all necessary permits for the demolition and removal work.
- Notify all local agencies having jurisdiction.
- Locate existing underground utilities in areas of construction. Coordinate with utility companies for any shut-off requirements of all active lines. Utilize West Virginia "Call Before You Dig" at 800-245-4848.
- Demolition procedures, shoring requirements, sequence techniques, etc., either given or implied by these drawings, are suggestions only. Contractor shall retain, at his own expense, a professional engineer licensed in the jurisdiction where the project is located to determine all construction phase requirements. Contractor shall submit drawings, signed and sealed by his Engineer, to the Owner and Engineer for concept review and record purposes. Contractor shall be solely responsible for the protection, stability, etc., of existing and new structures during execution of the work.
- Before undertaking any demolition work, ascertain the existing conditions of the properties and buildings adjoining or in close proximity to the premises by survey. Contractor shall perform all work in such a manner as to protect existing and adjacent structures and be responsible to properly repair any damage that occurs as a result of his work. Contractor shall repair all damage to streets, sidewalks, utility lines, or any other public or private properties resulting from the execution of the work at no cost to the Owner or Engineer.
- Close operations and notify Owner and Engineer immediately if safety or integrity of structure appears to be endangered. Properly brace and support structure before removing operations.
- Notify Owner and Engineer immediately if any portion of existing structure which is not to be demolished is damaged. Contractor shall pay for all repair costs, including design and inspection expenses.
- Do not cut or alter any structural members without written authorization of the Engineer unless indicated on the structural drawings.
- Do not allow resulting debris to accumulate. Dispose of this material in a legal manner.

TEMPORARY SHORING AND BRACING

- Structure is designed to be self-supporting and stable after the building is fully completed.
- Each contractor shall be responsible for erection procedures and sequence, shall maintain stability of the building and its component parts, and shall be responsible for adequacy of temporary or incomplete construction or connections during erection. Such responsibilities include, but are not limited to: addition of shoring as required to support forms, decks, columns, walls, and other elements as required during construction, sheathing, temporary connections, bracing, guys, or tie-downs necessary to maintain stability of parts, subassemblies, or all of the structure.
- Contractor shall assume full design responsibility for temporary shoring and bracing, which shall be designed, signed, and sealed by a professional engineer licensed in the jurisdiction where project is located.
- Temporary shoring shall be maintained throughout construction and shall be removed only after completion of all required supporting elements.
- Remove any remaining temporary shoring after construction is complete.

ROOF, FLOOR, OR WALL OPENINGS

- The Contractor shall verify and coordinate the number, size, and location of all openings and openings required for mechanical or electrical items.
- Sleeves and openings shall be located in a manner that will maintain the structural integrity of the roof, floor, or wall system.
- No structural elements shall be cut or cut unless specifically approved by the Engineer.

STRUCTURAL TESTING AND SPECIAL INSPECTIONS

Special structural testing and inspections are required. The Owner shall hire an approved independent testing agency. The agency shall be designated as the special inspector and shall provide structural testing and special inspections as required by the building code and as specified in the Contract Documents. Reports of inspection and testing shall be sent to the Architect, Engineer, Owner, Contractor, and Building Department. Structural testing and special inspection shall include:

- Concrete: mix data, daily pour reports, cylinder tests, slump, entrained air tests, and temperature. See specifications for all testing and inspection requirements.
- Reinforcement: placement, type, size, and grade of steel. See specifications for all testing and inspection requirements.
- Structural steel: welding and bolting in the shop and field. See specifications for all testing and inspection requirements.
- Masonry: masonry piers, size and location of piers, use of proper masonry units, reinforcing placement, grouting operations, and concreting for masonry block walls. See specifications for all testing and inspection requirements.
- Foundations:
 - Inspect and test bearing surfaces, soil compactions, fill and backfill materials.
 - Inspect all excavations and shoring installations and review backfill procedures.

- Earth Fill: certification of all fill material and in-place density tests. See specifications for all testing and inspection requirements.

FOUNDATIONS, SLABS ON GROUND, RAMPES, AND STEPS

- Foundations for this project are designed in accordance with the recommendations made by Geomechanics, Inc., Geotechnical Engineers. All the work regarding site preparation, earth fill construction, backfill requirements, foundation preparations, etc., shall be in accordance to the requirements and recommendations of the Geotechnical Engineer's report.
- All footings must be supported on undisturbed soil capable of achieving the design bearing pressure of Engineer when permitted, welded rebar shall be required to attain the design bearing pressure, backfill the overexcavated area with lean concrete up to the design bearing elevation.
- Provide (2) #5 minimum continuous in all footings directly under masonry walls, walls, and wall footings; minimum 1'2" depth with height equal to one-third of member depth, unless otherwise shown or noted.
- All exposed corners of concrete beams, columns, walls, and steel members encased in concrete are to be chamfered 45°. Minimum chamfer to be 12".
- Unless otherwise noted in project specifications or drawings, all exposed concrete subjected to freezing and thawing shall have a minimum cement content of 610 pounds per yard, a maximum water/cement ratio of 0.40, and 6%±1% of entrained air.
- In granular soils (sands and gravel) the soil shall be mechanically tamped to a hard surface immediately prior to placing footing.
- Existing foundations:
 - Existing foundations shown on drawings are approximate. Exact conditions must be verified at time of construction.
 - Unless otherwise noted, new footings shall not bear below existing footings.
- Before backfill, all walls must be adequately braced. For backfill requirements, see specifications and geotechnical report.
- Provide a minimum of (4) #5 vertical bars and #3@12" on center horizontal ties for concrete piers under columns or beams.
- Locate existing underground utilities in areas of construction. Coordinate with utility companies for any shut-off requirements of all active lines. Utilize West Virginia "Call Before You Dig" at 800-245-4848.
- Unless otherwise noted, the ground water level, the water level shall be lowered by an acceptable dewatering system so that the water level is maintained continuously a minimum of 2'-0" below the excavation.
- The bottom of foundations shall be protected against freezing until backfill is obtained.

SUGGESTED UNDERPINNING PROCEDURE

- The Contractor shall be totally and solely responsible for adequacy of underpinning installation and complete permanent protection of all existing construction in the vicinity of installation.
- Submit sequence and details of underpinning in writing for Engineer's information not less than two weeks prior to starting underpinning operations.
- Protect all excavated soils against displacement of soil by elements or other causes.
- Bear all underpinning blocks on compact, undisturbed soil.
- Place underpinning in individual blocks not more than 3'-0" wide. See plan for suggested block placement sequence. Blocks with the same number may be placed at the same time. Lower elevation bearing blocks shall be placed before higher elevation bearing blocks. Adjacent blocks shall not be placed at the same time.
- Place underpinning blocks to within 2" of bottom side of existing footing.
- After the concrete has reached a minimum compressive strength of 3,000 psi (24 hours minimum), wedge tight between top of block and bottom of existing footing with steel shim plates.
- Dry-pack space between top of block and footing with premixed, non-shrink, non-metallic grout to finish each block prior to placing adjacent underpinning block.

EARTHWORK SHORING

- Temporary shoring for foundations, full-depth trench footings, and grade beams shall be provided when required by local, state, or OSHA officials or codes at no additional cost to the Owner.
- Where forces from existing structures, roadways, walks, utility lines, or other encumbrances required for construction come onto shoulders of foundations, footing, or grade beam excavations, the Contractor shall provide shoring of adequate size and strength to resist the combined earth and adjacent surcharge pressures.
- The Contractor shall be responsible for design and placement of shoring and bracing of temporary earth retaining structures required for foundation and footing construction.
- Local, state, and OSHA safety requirements for personnel working in trenches shall be enforced by the Contractor. The Contractor shall hold the Owner, Architect, and Engineers harmless from claims due to injury from violation of safety requirements resulting from work persons or others working in foundations, trench, or grade beam excavations.

CONCRETE CONSTRUCTION

- All concrete construction shall be in accordance with the latest Building Code Requirements for Structural Concrete ACI 318 and ACI Detailing Manual, except that construction and removal of forms and reshoring shall be inspected by the Contractor's engineer.
- Reinforcing steel shall have the following minimum coverage. Place bars as near to the concrete surface as these minima permit wherever possible, unless noted otherwise:
 - Concrete poured against earth: 3"
 - Formed concrete in contact with earth: 2"
 - Exterior face of walls: 2"
 - All other wall faces, slabs, joists: 3/4" (#1 and smaller), 1 1/2" (#14 and #18)
 - Beams, columns: 1 1/2" (2" for exterior)
- Welded wire reinforcement for slabs on ground shall have a minimum top coverage of 1" and a maximum top coverage of 1 1/2", unless otherwise noted.
- Reinforcement shall be positively supported and maintained in this position during placement of concrete.
- Furnish bar supports where necessary during construction.
- Provide plastic-coated (not plastic-jointed) or stainless steel chairs in all concrete exposed to view in completed structure.
- Provide pipe sleeves and inserts in concrete work where required. See architectural and mechanical drawings.
- Obtain approval of Engineer before caulking sleeves, holes, or inserts in slabs within 2'-0" of face of columns or anywhere in beams, joists, or columns.
- Unless noted otherwise, provide the following minimum reinforcing:
 - Slabs on ground, slabs on deck, and toppings (2" minimum): 6x6-W1.4xW1.4 welded wire reinforcement in flat slabs.
 - Grade beams: (2) #6 top and bottom continuous.
 - Walls: #4@12" on center each way (for each 8" of wall thickness).
 - D. Framed slabs: #4@8" on center with #3@12" on center temperature.
- Provide a minimum of #4 dowels at 12" on center connecting framed floors to concrete walls.
- Cantilevered construction shall be shored for a minimum of 28 days after being placed.
- Provide a minimum of 38" camber in all concrete work when spans exceed 20'-0".
- Reinforcing steel shall be positioned so as not to change the structural design requirements. Framed floors and roofs shall have construction joints so that the length of width of a single pour shall not exceed 2'. The location and size of all construction joints shall be approved by the Engineer. Submit proposed layout for Engineer's review and approval two weeks prior to placing concrete.
- Welding of reinforcing bars (including tack welding) is not permitted without permission of Engineer in writing. Where and when permitted, welded rebar shall comply with ASTM A706 (Fy=60 ksi) and welding shall conform to AWS D1.4. Welding shall be performed by certified welders.
- Provide horizontal keyways in construction joints in beams, joists, supported slabs, walls, and wall footings with specifications and details as shown on drawings. Member depth, unless otherwise shown or noted.
- All exposed corners of concrete beams, columns, walls, and steel members encased in concrete are to be chamfered 45°. Minimum chamfer to be 12".
- Unless otherwise noted in project specifications or drawings, all exposed concrete subjected to freezing and thawing shall have a minimum cement content of 610 pounds per yard, a maximum water/cement ratio of 0.40, and 6%±1% of entrained air.
- Provide a minimum of #3 closed stirrups in all span/beam beams. Spacing to be equal to minimum beam dimension but not greater than 16" on center.
- Slab thickness indicated over steel form deck includes form depth. Provide form deck continuous over at least three supports and weld to each support at minimum 12" intervals. Use decking that will safely support all construction loads, including weight of concrete and construction loads.
- At wall and footing corners, innermost reinforcing shall have 1'-0" long hook at far face. For outer reinforcing, provide corner bars with lap length of 36 bar diameters (2'-0" minimum).
- Key and dowel all areas and other projecting elements to supporting walls with #4@12" on center extending 1'-0" into supporting wall unless noted.
- All bars interrupted by structural steel shall extend to within 1" of structural steel flange or web and have a 90° hook unless otherwise shown.
- Drawings show typical reinforcing conditions. Contractor shall prepare detailed placement drawings of all conditions showing quantity, spacing, sizes, clearances, laps, intersections, and other reinforcing required by the structural details, applicable codes, and trade standards. Contractor shall notify reinforcing inspector of any adjustments from typical conditions which are proposed in placement drawings to facilitate field placement of reinforcing steel and concrete.
- Bar bends shall be made cold. Bars shall not be bent after any portion of the bar is encased in concrete.
- Provide staggered mechanical splices in columns if lap splices are not possible. Stagger splices a minimum of 2'-6".
- Beams and slabs under concrete walls terminating at a floor shall be fully shored during and after pour until concrete wall attains design strength.
- Splices (grade 60 deformed bars):
 - Lap all compression splices 30 bar diameters of the larger bar.
 - Lap all tension splices in accordance with the following tables. Provide Class B Tension Lap Splices unless otherwise noted.
 - Increases are Cumulative:
 - Epoxy-coated bars: 1.5
 - Top bars are defined as horizontal bars with more than 12" of fresh concrete below.
- Mechanical splices shall develop 125% of the yield strength of the bar and are required for tension tie members and splices with #14 or #18 bars. Mechanical splices in adjacent bars shall be staggered at least 30 inches.

Bar Size	Reinforcing Centered in Wall						Reinforcing at Face of Wall
	6"	8"	10"	12"	16"	18"	
#3	18"	18"	18"	18"	18"	18"	18"
#4	24"	24"	24"	24"	24"	24"	26"
#5	32"	30"	30"	30"	30"	30"	40"
#6	61"	43"	40"	40"	40"	40"	54"

CLASS B TENSION LAP SPLICED

Bar Size	$f'_c = 3000$ psi		$f'_c = 4000$ psi		$f'_c = 5000$ psi	
	Top	Other	Top	Other	Top	Other
#3	28"	22"	24"	19"	22"	17"
#4	37"	29"	33"	25"	29"	23"
#5	47"	36"	41"	31"	36"	28"
#6	56"	43"	49"	37"	43"	34"
#7	61"	48"	54"	42"	48"	38"
#8	72"	55"	62"	48"	56"	43"
#9	81"	62"	70"	54"	63"	48"
#10	91"	70"	79"	61"	70"	54"
#11	101"	78"	87"	67"	78"	60"

Bar Size	$f'_c = 3000$ psi		$f'_c = 4000$ psi		$f'_c = 5000$ psi	
	Top	Other	Top	Other	Top	Other
#3	22"	17"	19"	15"	17"	13"
#4	29"	22"	25"	19"	23"	17"
#5	36"	28"	31"	24"	28"	22"
#6	43"	33"	37"	29"	34"	26"
#7	53"	48"	54"	42"	48"	38"
#8	72"	55"	62"	48"	56"	43"
#9	81"	62"	70"	54"	63"	48"
#10	91"	70"	79"	61"	70"	54"
#11	101"	78"	87"	67"	78"	60"

CLASS A DEVELOPMENT LENGTH, Ld

Bar Size	$f'_c = 3000$ psi		$f'_c = 4000$ psi		$f'_c = 5000$ psi	
	Top	Other	Top	Other	Top	Other
#3	22"	17"	19"	15"	17"	13"
#4	29"	22"	25"	19"	23"	17"
#5	36"	28"	31"	24"	28"	22"
#6	43"	33"	37"	29"	34"	26"
#7	53"	48"	54"	42"	48"	38"
#8	72"	55"	62"	48"	56"	43"
#9	81"	62"	70"	54"	63"	48"
#10	91"	70"	79"	61"	70"	54"
#11	101"	78"	87"	67"	78"	60"

CONDUITS AND PIPES IN FORMED SLAB CONSTRUCTION

- The acceptance of the placement of conduits and pipes in formed slabs is at the discretion of Architect/Engineer. Submit layout for Architect/Engineer's review and approval. A guideline to placement of conduits and pipes in formed slabs follows:
- No aluminum conduits or pipes shall be permitted in the slab construction.
 - Conduits, pipes and sleeves passing through shall not impair the strength of the slab construction.
 - Concrete cover for pipes, conduits, and fittings shall not be less than 1 1/2" for concrete exposed to earth or weather, nor less than 3/4" for concrete not exposed to weather or in contact with earth.
 - In solid slabs, piping shall be placed between top and bottom reinforcing, unless it is adjacent to a wall or a column. Reinforcing with an area not less than #3@12" on center x 3'-0" for slabs less than 6 1/2" thick and #4@12" on center x 4'-0" for slabs 6 1/2" thick or greater shall be provided perpendicular to piping.
 - Size, spacing, cover and bundles:
 - The maximum out-to-out dimension is the smaller of 1/3 of the total slab thickness but no more than 2" in diameter.
 - Minimum spacing is not less than 3 diameters on center.
 - Alternatively, conduits or pipes can be bundled. A maximum of three can be bundled:
 - If two are bundled, there must be at least 4 diameters clear spacing between bundles.
 - If three are bundled, there must be at least 6 diameters clear spacing between bundles.
 - If more than three are bundled, notify Architect/Engineer prior to bundling.
 - Conduits and pipes may cross only if the sum of the diameters does not exceed the smallest of 1/3 of the total slab thickness but no more than 2" total.

MASONRY CONSTRUCTION

- Masonry walls shown on structural drawings have been designed in accordance with ACI 530, Building Code Requirements for Masonry Structures.
- Masonry walls shown on structural drawings shall be constructed in accordance with ACI 530.1, Specifications for Masonry Structures, and the project specifications.
- Determine compressive strength of masonry (fm) by the unit strength method (Section 1.4.2 of ACI 530.1).
 - Mortar shall meet the Property Specification requirements of ASTM C270, and shall be field tested in accordance with ASTM C1019.
 - The strength of grout shall be determined by tests in accordance with ASTM C1019.
- The use of masonry cement shall not be permitted.
- Provide corner bars in bond beams at wall intersections and corners to match bond beam reinforcing.
- Provide horizontal joint reinforcement per ASTM A82, galvanized, at 16" on center vertically. See specifications. Unless otherwise noted, provide a galvanized ladder type joint reinforcement.
- Welding of reinforcing bars (including tack welding) is not permitted without permission of Engineer in writing.
- Provide shop drawings which indicate size, spacing, bending details, and type of all reinforcing bars placed in masonry walls.
- Provide dowels supporting masonry footing, beam, or slab for all reinforced walls same size, location, and spacing as wall reinforcing.
- Wall reinforcing shall be placed in position during grouting.
- For bars at face of wall, maintain 1/2" clearance from inside face of CMU to reinforcing.
- Splices (grade 60 deformed bars, fm=1.50psi):
 - Lap all splices in accordance with the following table.
 - Mechanical splices shall develop 125% of the tensile capacity of the bar and are required for #10 bars or larger.

Bar Size	Reinforcing Centered in Wall Nominal Wall Width					Reinforcing at Face of Wall
	6"	8"	10"	12"	16"	
#3	18"	18"	18"	18"	18"	18"
#4	24"	24"	24"	24"	24"	26"
#5	32"	30"	30"	30"	30"	40"
#6	61"	43"	40"	40"	40"	54"