GENERAL STRUCTURAL AND CONSTRUCTION NOTES

1.0 GENERAL

1. All work shall conform to the "Pennsylvania Uniform Construction Code" incorporating the 2009 International Building Code, the 2009 International Residential Code and to all other applicable Federal, State, and local regulations.
2. In case of conflict between the General Notes, Specifications, and details, the most rigid requirements shall govern.
3. Work not indicated on a part of the drawings but reasonably implied to be similar to that shown at corresponding places shall be repeated.
4. Job site safety and construction procedures are the sole responsibility of the Contractor. The contractor shall take all necessary precautions to maintain and insure integrity of the structure at all stages of construction and coordination of work with mechanical and electrical work.
5. The Contractor shall provide for dewatering as required during excavation and construction. Refer to Specifications for additional information.
6. The Contractor shall coordinate openings, sleeves, concrete housekeeping pads, inserts, and depressions as required and with existing field conditions.
7. Refer to Structural Drawings for locations of masonry and drywall non-load bearing interior partitions. Provide slip connections that allow vertical movement at the heads of all such partitions. Connections shall be designed to support the top of the walls laterally for the code-required lateral load.
8. All costs of investigation and/or redesign due to Contractor improper installation of structural elements or other items not in conformance with the Contract Documents shall be at the Contractor's expense.
9. In no case shall heavy equipment be permitted closer than 8'-0" from any foundation wall. If it is necessary to operate such equipment closer than 8'-0" to the wall, the Contractor shall be the sole responsible party and, at his own expense, shall provide adequate supports or brace the wall to withstand the additional loads superimposed from such equipment.
10. No blasting shall be permitted without written approval.
11. Inspection is required of all construction delineated on the Structural Drawings and/or specifications. The Owner (Contractor) shall employ a Testing/Inspection Agency which shall provide personnel with the following minimum qualifications:
    Certified by Institute of Certified Engineering Technicians, or other recognized comparable organization, and,
    1. For inspection, sampling, testing concrete and masonry: ACI Certified Concrete Field-Testing Technician, Grade I; and Construction Inspector, Level II.
    2. Structural Steel Inspection: AWS Certified Welding Inspector.
12. Submit periodic reports within one business day after receipt by the Contractor to Engineer and the construction code official during construction. Submit final inspection report summary for each division of work, certified by a licensed professional Engineer, that inspections were performed and that work was performed in accordance with Contract Documents.
13. The Contractor shall engage a testing agency to provide testing services as indicated in each section of these General Notes.
14. All materials shall be stored to protect them from exposure to the elements.

2.0 SHOP DRAWINGS & SUBMITTALS

1. The Contractor shall submit, for review, drawings and calculations for all performance assemblies identified in the General Notes and listed below. The design of these assemblies is the responsibility of the Contractor's Engineer registered in the project's jurisdiction. All submittals shall bear this Engineer's seal and signature. Review shall be for general conformance with the project requirements as indicated on the Drawings and in the General Notes.
2. Shop drawings for all structural items to be submitted to Engineer for review prior to the start of fabrication or commencement of work. Review period shall be a minimum of two (2) weeks.
3. Reproduction of any portion of the Structural Contract Drawings for resubmittal as shop drawings is prohibited. Shop drawings produced in such a manner will be rejected and returned.
4. Shop drawings submitted for structural review shall consist of two (2) sets of prints and one (1) set of reproducibles. Only one (1) marked up set of reproducible with the Structural Engineer's comments will be returned to the Contractor.
5. Shop drawings shall bear the Contractor's stamp of approval which shall constitute certification that the Contractor has verified all construction criteria, materials, and similar data and has checked each item for completeness and compliance with the Contract Documents.
6. The shop drawings shall include dimensioned floor and roof edges, openings and sleeves at all floors required for all trades.

3.0 EXISTING CONDITIONS

1. The Contractor shall verify all existing building information shown (dimensions, elevations, etc.) and notify the Engineer of any discrepancies prior to fabrication of any structural component.
2. The structural drawings shall be used in conjunction with the specifications and the existing building drawings. If there is a discrepancy between drawings, it is the Contractor's responsibility to notify the Engineer prior to performing the work.
3. The Contractor shall verify and/or establish all existing conditions and dimensions at the site. Failure to notify Engineer/Engineer of unsatisfactory conditions constitutes acceptance of unsatisfactory conditions.
4. If the existing field conditions do not permit the installation of the work in accordance with the details shown, the Contractor shall notify the Engineer/Engineer immediately and provide a sketch of the condition with his proposed modification of the details given on the Contract Documents. Do not commence work until condition is resolved and modification is approved by the Engineer.
5. Field verify and/or establish the all existing conditions, locations, dimensions, elevations, conditions, and clearances for existing conditions, including but not limited to: existing walls, beams, joists and other structural framing members, architectural elements and construction, and MEP construction including equipment, lighting, electrical, ductwork, and piping which may be affected by the work.

4.0 TEMPORARY SHORING, BRACING, AND HOUSE ELEVATION

1. Where alterations involve the existing supporting structure, the Contractor shall provide shoring and protection required to ensure the structural integrity of the existing structure.
2. The Contractor shall be responsible to determine allowable construction loads and to provide design and construction of falsework, formwork, stagings, bracing, sheeting, and shoring, etc.
3. Contractor to provide sheeting, bracing, and underpinning as necessary to prevent any lateral or vertical movements of existing buildings, streets, and any existing utility lines.
4. Bracing, sheeting, shoring, etc., required to insure the structural integrity of the existing buildings or new construction, sidewalks, utilities, etc., shall be designed by a Professional Engineer engaged by the Contractor. Detailed signed and sealed shop drawings shall be prepared indicating all work to be performed. Submit the shop drawings in accordance with the Contract requirements.
5. The Contractor is responsible for locating all underground structures and utilities, such as water mains, sewers, telephone and electric conduits, etc., and above ground utilities such as boilers, heaters, pumps, etc.., which may be encountered during construction operations.
6. The Contractor shall submit, for review, signed and sealed drawings and calculations, and shop drawings by a structural engineer registered in the state in which the project is located showing designs of temporary supports and lifting assemblies used to elevate the existing structure and the procedures and controls for the lifting operations. All submittals shall bear this Engineers seal and signature.
7. Sheeting, shoring, and associated excavation shall be performed in accordance with OSHA guidelines.

5.0 COORDINATION

1. Coordinate with the Owner for requirements of construction operations. Perform construction operations within the approved schedule as agreed upon with the Owner.
2. Coordinate construction access, material storage, access to utilities, etc. as required for construction with the Owner.
3. Coordinate any restrictions in access or use to areas impacted by the construction operations. Contractor to coordinate areas to be closed to the public, or restricted in use, during construction operations.
4. Coordinate with the Owner and Utilities any temporary shut off or interruption in utilities or services of the MEP systems required. Provide temporary measures, or other alternate arrangements, as required to maintain services, or provide temporary services as required.

6.0 ARCHITECTURAL & MEP

1. Field verify and/or establish the all existing conditions, locations, dimensions, elevations, conditions, and clearances of existing construction, including but not limited to: Architectural elements, including existing construction and finishes, and MEP construction including HVAC equipment, ductwork, lighting, electrical, conduit, ductwork, and piping which may be affected by the construction work.
2. The contractor shall provide temporary protection as required to protect the existing construction from damage during the work. In the event that the existing construction is damaged, the contractor shall restore the existing construction to its original condition.
3. The contractor shall review the existing conditions in the field as permitted prior to bidding. The price submitted for the proposed repairs shall include all costs associated with providing temporary shoring and protection, temporary and/or permanent removal or relocation and reinstallation of architectural finishes, HVAC equipment, ductwork, piping, lighting, conduit, etc, as required to complete the designated work.
4. Remove portions of existing construction, including architectural construction and finishes, MEP equipment and units, and other items as required for the work prior to the commencement. Store and protect existing materials as required. Reinstall temporarily removed and/or relocated construction and other architectural construction and finishes, MEP equipment and units, and other items after completion of the work, matching original construction. Repair or replace any damaged materials or construction as required.
5. Remove portions or MEP systems as required for the work prior to the commencement of repairs. Coordinate with scheduled temporary shut off and/or interruption of utilities and services as required with the Owner and Utility Service Providers. Store and protect existing materials as required. Reinstall and provide portions of new MEP systems as required after completion of repair work, matching original construction. Repair or replace any damaged materials or construction as required.
6. Where existing MEP systems are required to be terminated, capped, or cut off, install cap, valve or plug and seal remaining portions as required to protect existing systems and construction.
7. Coordinate with the Owner where necessary to adjust, move, or relocate existing MEP services, lines, or units and appurtenances located in, or affected by the repair work.
8. The Contractor is responsible for verifying required clearances for all existing equipment, piping, ductwork and related components.
9. Patch, repair, or replace existing construction and materials disturbed during repair work or other construction activities. All repair or replacement shall match adjacent existing quality, finishes, and materials.

7.0 EARTHWORK

1. Engineered (controlled compacted) fill within the building area shall be constructed prior to footing excavation. See Specifications for requirements of controlled compacted fill.
2. Excavation shall be performed so as not to disturb existing adjacent buildings, streets, and utility lines. Verify location of all utilities prior to commencement of work. Hand excavate around utilities as required.
3. See the specifications for excavation, backfill and preparation of the foundation and slab-on-grade subgrade, including compaction requirements.
4. Satisfactory fill materials are those complying with ASTM D2487, groups GW, GP, GM, SM, SW, and SP. On site borrow material shall be tested to determine suitability for use as fill material.
5. Compact soil to not less than the following percentages of maximum density of modified proctor (ASTM D1557):
   Under building foundations – 98%
   Under building slabs, steps, pavements – 95%
6. Remove existing vegetation, topsoil, and unsatisfactory soil materials. Compact subgrade to obtain uniformly densified substrata prior to placing fill material evenly in 8" thick (maximum) layers and compacted to the required density.
7. The Contractor shall retain the services of a Professional Geotechnical Engineer, subject to the approval of the Engineer, to perform soil testing and inspection. The geotechnical engineer shall inspect the subgrade to verify bearing levels and ensure that the safe bearing capacity meets or exceeds the design value indicated below. Reports shall be submitted to the Engineer outlining the work performed and test results.
8. Backfill shall be brought up simultaneously on each side of walls and grade beams, with a grade difference not to exceed 2'-0" at any time.
9. Do not backfill against basement walls until basement slab on grade and all framed slabs are in place and have attained the specified design strength. Provide temporary shoring where required.

8.0 FOUNDATIONS

1. A Subsurface Investigation Report, with foundation recommendations, has not been provided for this project at this time. The soil information and bearing capacity shall be verified by a qualified Geotechnical Engineer during construction.
2. Footings shall bear on undisturbed stratum or engineered fill with a minimum bearing capacity of 2000 psf.
3. Prior to footing concrete placement, the footing subgrade shall be approved by the inspecting Geotechnical Engineer. If conditions prove to be unacceptable at elevations shown, footing bottoms shall be lowered to acceptable subgrade material. Fill over-excavation with lean concrete (2,500 psi).
4. The bottom of exterior footings shall be a minimum of three feet (3'-0") feet below finished grade, or as required by Local building codes.
5. The bearing elevations of new footings adjacent to existing footings are to match the adjacent existing footing bearing elevations unless indicated otherwise on plans.
6. Slabs on grade shall bear on mechanically compacted soil capable of supporting 150 psf. Drainage fill under slabs shall be compacted gravel or crushed stone.
7. Concrete for foundations shall be poured on the same day the subgrade is approved by the Geotechnical Engineer.
8. Utility lines shall not be placed through or below foundations without the Structural Engineer's approval.
9. The Contractor shall observe water conditions at the site and take the necessary precautions to ensure that the foundation excavations remain dry during construction. Any sheeting or shoring required for dewatering shall be the responsibility of the Contractor.

9.0 CAST-IN-PLACE CONCRETE

1. Concrete shall be designed and detailed in accordance with the Building Code Requirements for Structural Concrete (ACI-318-05), and constructed in accordance with the CRSI Manual of Standard Practice.
2. Concrete shall have a minimum 28-day compressive strength as follows:

Type:	F'c (psi):
Footings	4000
Walls / Piers	4000
Interior Slabs	4000
Exterior Slabs	5000

3. Air Entrainment 4% to 6% in all exposed concrete.
4. Maximum water/cement ratios:
   A. Foundations 0.50
   B. Interior Slabs 0.45
   C. Exterior Slabs 0.40
5. All concrete shall be normal weight concrete (144 pcf +) with all cement conforming to ASTM C150, Type I. Maximum aggregate size shall be 3/4", conforming to ASTM C33.
6. Reinforcing steel: ASTM A615 Grade 60.
7. Welded Wire Reinforcement: (WWR) ASTM A-185.
8. Leveling Grout shall be non-shrink, non-metallic type, factory pre-mixed grout in accordance with CE-CRD-C621 or ASTM C109, with minimum compressive 28-day strength of 5,000 psi.
9. Reinforcing steel clear cover shall be as follows unless noted otherwise:
   A Concrete cast against and permanently exposed to earth 3".
   B. Concrete exposed to earth or weather
      #6 bars and larger 2"
      #5 bars and smaller 1-1/2"
   C. Concrete not exposed to weather or in contact with ground
      Slabs, walls, joists 3/4"
      #11 bars and smaller 3/4"
      Beams and columns 3/4"
      Primary reinforcement, ties, stirrups, or spirals 1-1/2"
10. Submit to Engineer of Record reinforcing steel shop drawings for approval and mix designs for review prior to placing any concrete.
11. All reinforcement shall be securely held in place while placing concrete. If required, additional bars, stirrups or chairs shall be provided by the Contractor to furnish support for all bars.
12. Lap welded wire reinforcement two (2) full wire spaces at splices and wire together.
13. Provide plastic tipped bolsters and chairs at all locations where the concrete surface in contact with the bolsters or chairs is exposed.
14. Placing of concrete shall not start until the placement of reinforcing has been approved by the Testing & Inspection Agency.
15. Bonding agent shall be used where new concrete is placed against existing concrete.
16. Epoxy adhesive shall be used where dowels are to be installed into existing concrete. Submit manufacturer information for engineer review.
17. No sleeve shall be placed through any concrete element unless shown on the approved shop drawings or specifically authorized in writing by the Structural Engineer. The Contractor shall verify dimensions and locations of all slots, pipe sleeves, etc. as required for mechanical trades before concrete is placed..
17. Pipes or conduits placed in slabs shall not have an outside diameter larger than 1/3 the slab thickness and shall not be spaced closer than 3 diameters on center. Aluminum conduits shall not be placed in concrete. No conduits may be placed in exterior slabs or slabs subjected to fluids.
18. Prior to placing concrete, the Contractor shall submit for review by the structural engineer, a concrete pour schedule showing location of all proposed construction joints.
19. Prior to concrete placement, the Contractor shall submit to the structural engineer for review, concrete mix designs prepared in accordance with the specifications and requirements indicated in the general notes.
20. Concrete shall not be pumped through aluminum pipes and shall not be placed in contact with aluminum forms, mixing drums, buggies, chutes, conveyors or other equipment made of aluminum.
21. All inserts and sleeves shall be cast-in-place whenever feasible. Drilled or powder driven fasteners will be permitted when proven to the satisfaction of the Structural Engineer that the fasteners will not spall the concrete and have the same capacity as cast-in-place inserts.
22. When installing expansion bolts or adhesive anchors, the Contractor shall take measures to avoid drilling or cutting of any existing reinforcing and destruction of concrete. Holes shall be blown clean prior to placing bolts or adhesive anchors.
23. Chamfer all exposed concrete corners unless noted otherwise.
24. The concrete slabs shall be finished flat and level within tolerance, to the elevation indicated on the drawings. The Contractor shall provide additional concrete required due to formwork, metal deck, and framing deflection to achieve this finished top of slab elevation. The Contractor shall provide the means by which the maximum and minimum concrete slab thickness can be monitored and verified during and after the placing and finishing operations.
25. Construction joints for mild-reinforced concrete shall be located within the middle third of span. Proposed construction joint locations shall be shown on reinforcing steel shop drawings. Any stop in concrete work must be made with vertical bulkheads and horizontal keys, unless otherwise shown. All reinforcing is to be continuous through joints.
26. Early drying out of concrete, especially during the first 24 hours, shall be carefully guarded against. All surfaces shall be moist cured or protected using a membrane curing compound as soon as forms are removed. If membrane curing agent is used, exercise care not to damage coating.
27. Cold weather concreting shall be in accordance with ACI-306. Hot weather concreting shall be in accordance with ACI-305R.
28. Throughout construction, the concrete work shall be adequately protected against damage due to excessive loading, construction equipment, materials or methods, ice, rain, snow, excessive heat, and freezing temperatures.
29. Provide concrete test cylinders from each day's pour. Cylinders shall be properly cured and stored. Sample fresh concrete in accordance with ASTM C172.
30. Retain laboratory to provide testing service. Slump per ASTM C1431 air content per ASTM C231 or C173, unless noted. Tests per ASTM C31 C39. One set of six (6) cylinders for each 50 cubic yards for each mix used. Reports of all tests to be submitted to the Engineer.

10.0 CONCRETE ANCHORS

1. All headed concrete anchors shall be manufactured from material which conforms to ASTM A108 for low carbon steel.
2. All welds shall be made in accordance with the structural welding code, ANSI/AWS D1.1, latest edition and with the recommendations of the stud manufacturer.
3. All adhesive anchors shall be anchored using the "Hilti Hit HY 150 MAX" system by Hilti Fastening Systems, Inc. or an approved equal.
4. The spacing, minimum embedment, and installation of the anchors shall be in accordance with the manufacturer's recommended procedures.
5. Anchor rods used in adhesive anchorage systems shall conform to the manufacturer's recommended steel.
6. Stud anchors shall conform to ASTM A108 and the nuts shall conform to ASTM A563.

11.0 MASONRY

1. Masonry has been designed in accordance with the Building Code Requirements for Masonry Structures (ACI 530-05/ASCE 5-05) and shall be constructed in accordance with the Specifications for Masonry Structures (ACI 530.1-05/ASCE 6-05), except where otherwise modified by these General Notes and Specifications.
2. Mortar shall conform to ASTM C270, with mortar types specified by location as indicated below. Type M or S. All Portland cement shall conform to ASTM C150, Type I. Lime shall conform to ASTM C207.
   a. Below Grade Masonry Type M
   b. Above Grade Masonry Type S
   c. Brick/Masonry Veneer Type N
3. Grout shall conform to ASTM C476 and shall have a minimum 28 day compressive strength of 3000 psi. Slump of grout shall be 8 to 10 inches and the maximum aggregate size shall be 3/8" (aggregate graded to produce fine grout per ASTM C476 Table 4).
4. Concrete Block Units: A. Solid and hollow load bearing units per ASTM C90, Type N-1, as required to provide 28 day compressive strength, f'm as noted below.
5. Minimum 28-day compressive strength of masonry shall be 1500 psi, unless noted otherwise. Compressive Strength of the Masonry shall be verified by the Unit Strength Method in accordance with ACI 530-05.
6. Full bed and head joints shall be provided.
7. Horizontal Joint Reinforcing: ASTM A82; 9-gage truss-type, galvanized.
8. Deformed bar reinforcement shall conform to ASTM A615, Grade 60 and shall be full height of walls unless otherwise noted. Provide bar spacers and positioners as required to properly locate and stabilize reinforcing during grouting operations. Grout all reinforced cells solid with grout.
9. Hollow concrete units below grade and slab on grade shall be normal weight and have all cells grouted solid.
10. Provide and install temporary bracing required insuring stability of all walls during construction and until erection of attached structural framing is completed.
11. Provide galvanized horizontal joint reinforcement in all walls and partitions at 16" O.C. unless otherwise shown or noted. Provide one (1) piece prefabricated units at 8" O.C. at all wall corners and intersections.
12. Lap splices for deformed reinforcing bars used in masonry construction shall be 108 bar diameters unless noted otherwise.
13. Submit grout mix design and masonry unit certifications to the Engineer for review.
14. Grout placement shall not start until the placement of reinforcing has been approved by the Inspection Agency.
15. Fill all cells in top two courses below finished floor, CMU lintels, bond beams, and beam bearings and cells with reinforcement full height solid with grout.
16. Allow grout in reinforced CMU walls to cure a minimum of 48 hours before imposing concentrated or other loads from above.
17. Provide masonry anchors set on coursing and attached to all beams at 32" O.C. horizontal, columns at 24" O.C. vertical, partitions and walls at 16" o.c at all beams, columns, partitions and walls abutting or embedded in masonry unless noted otherwise on Structural drawings.
18. Provide bond beams with two (2) #5 horizontal reinforcement continuous in all masonry walls at each framing level. Provide a minimum of two (2) #5 bars at the ends of all walls and on each side of each opening.
19. All piers and partitions shall be bonded or anchored to adjacent masonry walls. Provide ties to adjacent floor and roof construction in accordance with details on drawings.
20. The Contractor shall verify all openings below lintels indicated are adequate to accept doorframes, lowers, etc. as shown on the drawings. Notify Structural Engineer of any discrepancies prior to lintel installation.
21. No openings shall be placed above any lintel within a height less than or equal to the width of the clear opening below the lintel, unless specifically shown or approved by the Structural Engineer.
22. All masonry work to be executed in cold weather shall be in conformance with the recommendations for cold weather construction found in the Building Code Requirements for Masonry Structures (ACI 530-05/ASCE 5-05) and shall be constructed in accordance with the Specifications for Masonry Structures (ACI 530.1-05/ASCE 6-05) with the following additions: For all conditions when temperatures fall below 40 degrees F, the temperature of the newly laid masonry or newly grouted masonry shall be maintained above 32 degrees F for a minimum of 24 hours using the methods described in ACI 530.1.
23. The Testing and Inspection Agency shall monitor the proportioning, mixing, and consistency of mortar and grout; the placement of mortar, grout, and masonry units; and the placement of reinforcing steel for compliance with the Contract Documents.
24. All wall sections and piers less than two square feet in cross-sectional area shall be fully grouted.

12.0 STRUCTURAL STEEL

1. Fabrication and erection of structural steel shall conform to the "Steel Construction Manual, Thirteenth Edition, 2005, American Institute of Steel Construction including Specifications for Structural Steel Buildings, Specification for Structural Joints Using ASTM A325 or A490 Bolts, and AISC Code of Standard Practice for Steel Buildings and Bridges except section 3.1.2 shall not include the complete design of the connections by the structural Engineer of Record.
2. Submit shop drawings for fabrication and erection of structural steel. Clearly indicate coordinated dimensions of mechanical unit and roof penetration sizes. Shop and Erection drawings must show all shop/floor and field welds. Initial shop drawing submittal shall include proposed connection details and job standards. Provide signed and sealed calculations for all connection designs not indicated on the Drawings. Calculations shall show design capacities for all connections.
3. All welding shall be performed by certified welders and shall conform to "Structural Welding Code ANSI/AWS DI .1-92", American Welding Society.
4. Wide Flange Shapes: ASTM A992.
5. Channels, Angles & Plates: ASTM A36, A572 or A992.
6. Steel Pipe: ASTM A53, GRADE B.
7. Steel Tubing (square, rect. or round): ASTM A500, Grade B.
8. Galvanized structural steel:
   A. Structural shapes and rods ASTM A123.
   B. Bolts, fasteners and hardware ASTM A153.
9. All bolted connections shall be with ASTM A325 high strength bolts 3/4" minimum diameter, unless noted otherwise.
10. Anchor rods shall conform to ASTM F1554, Grade 36, unless noted otherwise.
11. Welding electrodes shall be E70XX for manual arc welding and F7X-MXX for submerged arc welding. All welders shall be certified by the AWS. Minimum weld size shall be 3/16" unless noted otherwise.
12. Welding of reinforcing bars to other bars or structural steel: E90-XX electrode.
13. Cuts, holes, coping, etc. required for other trades or field conditions shall be shown on the shop drawings and made in the shop. Cutting or burning of main structural members in the field will not be permitted.
14. Steel members shown on plan shall be equally spaced unless noted otherwise.
15. The General Contractor and Steel Erector shall notify the Structural Engineer of any fabrication or erection errors or deviations and receive written approval before any field corrections are made.
16. Alternate connection details may be used if such details are submitted to the engineer for review and approval. However, the engineer shall be the sole judge of acceptance and the Contractor is responsible for the design of such alternate details which he proposes.
17. All steel shall be painted with shop standard primer unless noted otherwise.
18. Steel angles and plates along with bolts and washers, in direct contact with exterior finish masonry, and all exterior exposed structural steel, shall be hot-dipped galvanized.
19. Spandrels and columns adjacent to masonry shall have adjustable masonry ties.
20. Existing framing requiring welding shall be thoroughly cleaned to ensure proper welding. Provide temporary shoring when welding to existing steel.
21. Where painted steel is field welded, surfaces within four (4) inches of weld shall be cleaned and ground smooth. After welding coat the exposed area with appropriate primer/paints as specified.
22. Where galvanized steel is field welded, surfaces within four (4) inches of weld shall be cleaned and ground smooth. After welding coat the exposed area with galvanizing repair paint. Galvanizing repair paint shall be a high zinc dust content paint complying with ASTM A780.
23. The steel structure is a non-self-supporting steel frame and is dependent upon diaphragm action of the (roof/floor) deck and attachment to the masonry walls for stability and for resistance to wind and seismic forces. Provide all temporary supports required for stability and for resistance to wind and seismic forces until these elements are complete and are capable of providing this support. All such temporary supports required for stability and for resistance to wind and seismic forces shall be designed by a Professional Engineer registered in the state in which the project is located.
24. All connections shall be "Framed Beam Connections" designed in accordance with the AISC Manual and the ends reactions from the "Uniform Load Tables", but not less than 6 kips. Provide double angle connections or knife plates connections for full depth of supporting beam, unless otherwise approved. Minimum two (2) bolts per connection. Single angle or shear tab connections are not acceptable. All beam to column connections shall be designed for the minimum shear reaction indicated above in combination with a 10 kip axial force (acting in both tension and compression).
25. Visually inspect all fillet welds. 10% of all field fillet welds in primary connections and multi-pass welds shall be tested by the magnetic particle method, complying with E109, performed on the root pass and on the finished weld.
26. 100% of full penetration welds shall have ultrasonic inspection, complying with ASTM E164.
27. 100% of welds in beam and column moment connections shall have ultrasonic inspection, complying with ASTM El 64.
28. Field test bolted connections in accordance with AISC.
29. All steel shall be thoroughly cleaned by power tool cleaning prior to painting.
30. All dissimilar metals shall be treated or properly separated to prevent galvanic and/or corrosive effects.
31. All bracing or truss connections, which have not been specifically detailed, shall be designed by a professional engineer registered in the project's jurisdiction for the forces noted on the elevations and details. This shall include all gusset plates, filler plates, angles, stiffeners, bolts or welds, or other material required for the connection. Stamped calculations for the connection design shall be submitted along with the shop drawings for review by the engineer.
32. All connections shall be symmetrical about the axis of the member connected. Provide only one grade of bolt for each bolt diameter to be used in the connections. Do not mix grade of bolts.

13.0 STRUCTURAL WOOD

1. Design, fabrication, and construction of wood framing shall conform with the following codes and standards.
   A. 2009 International Residential Code. Association (APA).
   B. "National Design Specifications for Wood Construction, 2005 Edition. (with Supplement), American Forest and Paper Association.
   C. "Timber Construction Manual", Fourth Edition, as adopted by the American Institute of Timber Construction, including the "Code of Standard Practice"; AITC 106.
   D. ANSI/TPI 1-1995 "Design Specifications for Metal Plate-Connected Wood Truss Construction and Commentary", Truss Plate Institute.
   E. Building Component Safety Information BCSI 1-03 "Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses," Wood Truss Council of America and Truss Plate Institute.
   F. American Wood Preservers Association.
2. Design, detail, and install prefabricated trusses including erection bracing and special reinforcement. Submit the following:
   A. Design calculations with bearing points, loadings, stress diagrams, allowable stresses, joint plate and member sizes, splices, member bracing requirements, etc.
   B. Complete truss fabrication drawings indicating location, spacing, and details of all trusses, including member diagrams, sizes, grades, joint plate sizes and locations.
   C. Complete erection drawings with size and location of temporary bracing, including provisions for field assembly of special individual trusses. Erection drawings shall be specifically prepared for this project; mere reference to Handling, Installing, and Bracing Booklet, BCSI 1-03 is not acceptable.
   D. Wood trusses shall conform to the most current applicable version of the design specifications for light metal plate connected wood roof trusses, of the Truss Plate Institute, Inc. and the National design Specifications for Stress Grade Lumber and its fastening, of the National Forest Products Association.
   E. The deflection of the floor and roof trusses under the indicated loads and at the span and spacings shown on the contract drawings shall meet the following criteria:
      a. The deflection due to live load shall not exceed the span length/360.
      b. The deflection due to the total loads shall not exceed the span length/240.
   F. The wood truss manufacturer shall specify and provide all bracing at top and bottom chords required to stabilize the floor or roof structure during and after construction, in addition to the bracing indicated on the structural drawings.
   G. The wood truss manufacturer shall submit structural calculations stamped by a registered professional engineer licensed to practice in the product's jurisdiction for all truss types, which indicates truss capacities and deflections.
   H. Section shall be in accordance with Truss Plate Institute recommendations.
3. Base Design Values for roof/floor joist framing: Doug-Fir No. 1 and No.2 (Fb = 850 psi, Fv = 180 psi, E = 1,600,000 psi) minimum.
4. Base Design Value for wood studs and bracing: Doug Fir Stud Minimum compression parallel to grain Fc =850 psi, minimum tension parallel to grain, Ft = 400 psi, minimum compression perpendicular to grain, 625 psi.
5. Base Design Values for Timber Framing (5"x5" and larger): Douglas Fir-Larch No. 1 with the following minimum design values:
   A. Beams & Stringers: (Fb = 1300 psi, Fv = 170 psi, E = 1,600,000 psi)
   B. Posts & Timbers: (Fb = 1200 psi, Compression perpendicular to grain, Fc-= 625 psi, Tension parallel to grain, Ft = 825 psi, E = 1,600,000 psi)
6. Wood framing marked Microllam LVL (laminated veneer lumber) shall be as manufactured by Trus Joist MacMillan or approved equal. Minimum extreme fiber in bending, Fb = 2,800 psi; minimum horizontal shear, Fv = 285 psi; minimum modulus of elasticity, E = 2,000,000 psi.
7. Wood framing marked Parallam PSL (parallel strand lumber) shall be as manufactured by Trus Joist MacMillan or (Note: Snow drifting to be considered in accordance with the code) approved equal. Minimum extreme fiber in bending, Fb = 2,900 psi; minimum horizontal shear, Fv = 290 psi; minimum modulus of elasticity, E = 2,000,000 psi.
8. All members shown on plans as "PSL" are to be designed with PSL members. All parallam structural lumber shall be APA rated, exposure I. All adhesives shall comply with ANSI/ARI A190.1 "Wet-Use Type.
9. Wood framing marked Timberstrand LSL (laminated strand lumber) shall be as manufactured by Trus Joist MacMillan or approved equal. Minimum extreme fiber in bending, Fb = 2,600 psi; minimum horizontal shear, Fv = 400400 psi; minimum modulus of elasticity, E = 1,700,000 psi.
10. All solid sawn members shall be identified with the species of lumber and its supporting beam, unless otherwise approved. Minimum two (2) bolts per connection. Single angle or shear tab connections are not acceptable. All beam to column connections shall be designed for the minimum shear reaction indicated above in combination with a 10 kip axial force (acting in both tension and compression).
11. All parallam beam ends which frame into beams shall be hung with hangers as manufactured by Kant-Sag or with approved substitutes with working load capacities equivalent to the "THD" or "THJD" series hangers.
12. Provide end-coat sealing to end and cross cuts after cutting to final length for all parallam beams.
13. Provide nailing pattern in compliance with IBC recommended fastening schedule when joining two or more framing members.
14. Provide double layer plywood under all ceramic tile floors.
15. Base Design Value for other structural wood framing: minimum extreme fiber in bending, Fb = 850 psi; minimum horizontal shear, Fv = 180 psi; minimum compression parallel to grain, Fc = 400 psi.
16. Hanger connections for joists, beams, trusses, and manufactured wood framing shall be Strong-Tie connectors by Simpson (Trus Joist MacMillan).
17. See International Building Code for minimum bearing and fastening requirements.
18. Members shall be set with crown up and have a minimum of 3" bearing.
19. Provide additional joist under parallel non-loading bearing partitions that run more than 1/3 the span of the joist.
20. Splice double sole plates directly over stud. Stagger splice of each plate.
21. All joists and rafters shall be rigidly bridged at intervals not exceeding 8'-0".
22. Guys and other bracing required to provide lateral stability to wood frames shall be adequately sized and anchored. This bracing shall remain until permanent bracing elements and attached construction is installed.
23. The wood structure is a non-self-supporting frame and is dependent upon diaphragm action of the panels and attachment to the shear walls for stability and for resistance to wind and seismic forces. Provide all temporary supports required for stability and for resistance to wind and seismic forces until these elements are complete and are capable of providing this support.
24. All bolts and lag bolts shall be fitted with galvanized, malleable iron or steel plate washers. 25. No field alteration of pre-fabricated trusses is permitted unless done in accordance with truss manufacturer's approved modification details.
26. All wood framing that is exterior, or exposed to weather or earth, and wood framing in contact with masonry, including all sill plates, or where otherwise indicated, shall be pressure treated with waterborne preservatives. Pressure treatment shall comply with requirements of a WPB Standards C2 and LL-22.
27. Penetrations through headers and beams shall not be permitted without approval of the Engineer.
28. Penetrations through joists shall be limited to the center 1/3rd of the member and located at mid-depth of the joist. Maximum penetration shall be limited to member depth (actual)/7, and spaced no closer than 32" center-to-center, unless specifically approved by the Engineer.
29. Penetrations in the wide face of bearing wall and shear wall studs shall be limited to stud depth (actual)/5, spaced no closer than 32" center-to-center, and no closer than 16" from top or bottom of stud, unless specifically approved by the Engineer. Penetrations are not permitted in shearwall endposts.
30. Penetrations in the narrow face are not permitted.
32. Exterior stud walls shall be continuously bridged at mid-height with wood blocking. Provide continuous double 2 x 4 top plate typical all walls. Brace all exterior building corners with 1/2" plywood sheathing fastened to stud wall full height for a minimum width of 4'0".
33. All wood joists bearing ends shall be anchored to support in wood framing with a Type A34 framing anchor, as manufactured by Simpson Strong-Tie Company, Inc.
34. All wood joist or headers ends which frame into beams shall be hung with the following joists hangers, as manufactured by Simpson Strong-Tie Company, Inc., or with approved substitutes with the following working load
35. JOIST SIZESIMPSON HANGERLOAD CAPACITY2 x 61126495 lbs2 x 8U28653 lbs2 x IOU210833 lbs2 x 12U2121013
    lbs2-2 x 6HU26-2990 lbs2-2 x 8HU28-21303 lbs2-2 x 10HU210-21666 lbs2-2 x 12HU212-22016 lbs
36. Alternate connection details may be used if such details are submitted to the engineer for review and approval. However, the engineer shall be the sole judge of acceptance and the contractor's bid and shall anticipate the use of those specified details shown on the drawings. The Contractor is responsible for the design of such alternate details which he proposes.

14.0 PLYWOOD

1. All plywood shall conform to the most current applicable specification and supplements of the American Plywood
2. Each panel shall be identified with the appropriate trademark of the APA and shall meet the requirements of the Paper Association. latest edition of the APA Performance Standards.
3. Panel thickness, grade and span rating shall be equal to that shown on the drawings. The center-to-center spacing in inches shall not exceed the span rating stamped on the panels. Installation of the panels shall be in accordance with the recommendations of APA.
4. All panels which have any edge or face permanently exposed to the weather shall be classed exterior, except open soffits or roof sheathing exposed on the underside may be classed exposure 1.
5. All plywood panel end joints shall occur over supports and shall be staggered one half panel length from adjacent panels. Provide 1/8 inch space at panel ends and edges.
6. All plywood flooring shall be 3/4 inch "APA, Structural I Rated Sheathing", 48/24 span rating, Exposure 1. Install with long dimension of panel across three or more supports. All panels shall be nailed with 8d common nails at 6 inches on center at all ends and edges and at 12 inches on center at all intermediate supports unless noted otherwise.
7. Allowable shear capacities of framed floor diaphragms sheathed with plywood panels shall be based on the values provided in the APA panel thickness, grade and nailing schedule design tables.
8. All plywood roof sheathing shall be 19/32 inch "APA Structural I Rated Sheathing", 4/20 span rating, Exposure 1. Install with long dimension of panel across three or more supports. All panels shall be nailed with 8d common nails at 6 inches at all ends and edges and at 12 inches on center at all intermediate supports unless noted otherwise. Allowable shear capacities of framed roof diaphragms sheathed with plywood panels shall be based on the values provided in the APA panel thickness, grade and nailing schedule design tables.
9. All wall sheathing shall be 1/2 inch "APA [Structural I] Rated Sheathing", 32/16 span rating, Exposure 1. Install with long dimension of panel across three or more supports. All panels shall be nailed with 8d common nails at 6 inches at all ends and edges and at 12 inches on center at all intermediate supports unless noted otherwise. Allowable shear capacities of framed shear walls sheathed with plywood panels shall be based on the values provided in the APA panel thickness, grade and nailing schedule design tables.

15.0 DESIGN DATA

1. Governing Code: Pennsylvania Uniform Construction Code Incorporating the 2009 International Building Code and the 2009 International Residential Code.
2. Floor Live Load:
   A. Basement (Slab on Grade) 100 PSF
   B. Floors 40 PSF
   C. Decks 40 PSF
   D. Balconies 60 PSF
   E. Partition 10 PSF
3. Roof Live Load
   A. Live Load 20 PSF
   B. Snow Load:
      Pg (Ground Snow Load) 30 PSF
      Pf (Flat Snow Load) 20 PSF
      Ce (Snow Exposure Factor) 0.9
      I (Snow Load Importance Factor) 1.0
      Ct (Thermal Factor) 1.0
4. Wind Load:
   A. Basic Wind Speed 90 MPH
   B. I (Wind Importance Factor) 1 .0
   C. Wind Exposure C
   D. Internal Pressure Coefficient +/-0.18
   E. Components & Cladding Wind Pressure: As per Code
5. Earthquake Design Data:
   A. Seismic Occupancy Category II
   B. Seismic Importance Factor, I 1 .0
   C. Ss (Mapped