REPUBLIC OF THE UNION OF MYANMAR

MINISTRY OF TRANSPORT AND COMMUNICATIONS
DIRECTORATE OF WATER RESOURCES AND IMPROVEMENT OF RIVER SYSTEMS (DWIR)

AYEYARWADY INTEGRATED RIVER BASIN MANAGEMENT PROJECT (AIRBM)

PROJECT MANAGEMENT UNIT (PMU)

STRUCTURAL DRAWINGS
FOR
THREE STOREYED REINFORCED CONCRETE OFFICE BUILDING
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GENERAL NOTES

1. THESE NOTES APPLY TO ALL STRUCTURAL (FOR PILE & PILE CAP) DRAWINGS.

2. ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL DRAWINGS.

3. THE MIN. 28 DAYS COMPRESSIVE CUBE STRENGTH OF CONCRETE SHALL BE AS FOLLOW.

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4. YIELD STRENGTH OF REINFORCEMENT SHALL BE AS FOLLOW.

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<td>PILE CAP</td>
<td>55,000</td>
<td>55,000</td>
</tr>
</tbody>
</table>

5. MINIMUM CONCRETE CLEAR COVER SHALL BE AS FOLLOW.

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>MINIMUM COVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PILE CAP</td>
<td>2 in</td>
</tr>
</tbody>
</table>

6. ANCHORAGE BOND LENGTH AND LAP LENGTH

<table>
<thead>
<tr>
<th>BAR DIA. Ø (mm)</th>
<th>TENSION ANCHORAGE AND LAP LENGTH (mm)</th>
<th>1.4 X TENSION LAP LENGTH (mm)</th>
<th>COMPRESSION ANCHORAGE LENGTH (mm)</th>
<th>COMPRESSION LAP LENGTH (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>330</td>
<td>660</td>
<td>170</td>
<td>330</td>
</tr>
<tr>
<td>10</td>
<td>400</td>
<td>800</td>
<td>330</td>
<td>400</td>
</tr>
<tr>
<td>12</td>
<td>530</td>
<td>1060</td>
<td>440</td>
<td>530</td>
</tr>
<tr>
<td>16</td>
<td>600</td>
<td>1190</td>
<td>460</td>
<td>600</td>
</tr>
<tr>
<td>18</td>
<td>660</td>
<td>1320</td>
<td>540</td>
<td>660</td>
</tr>
<tr>
<td>20</td>
<td>830</td>
<td>1650</td>
<td>680</td>
<td>830</td>
</tr>
</tbody>
</table>

6.8. EFFECTIVE ANCHORAGE LENGTH OF A STANDARD HOOK OR BEND

<table>
<thead>
<tr>
<th>BAR DIA. Ø (mm)</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR HOOK, ( a = 24 ) Ø (mm)</td>
<td>192</td>
<td>240</td>
<td>288</td>
<td>384</td>
<td>480</td>
<td>592</td>
</tr>
<tr>
<td>FOR BEND, ( a = 12 ) Ø (mm)</td>
<td>96</td>
<td>120</td>
<td>144</td>
<td>192</td>
<td>250</td>
<td>306</td>
</tr>
<tr>
<td>INTERNAL RADIUS, ( r )</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>48</td>
</tr>
</tbody>
</table>

8. ANCHORAGE OF LINK

<table>
<thead>
<tr>
<th>BAR DIA. Ø (mm)</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNAL RADIUS, ( r )</td>
<td>20</td>
<td>20</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

7. ALLOWABLE PILE CAPACITY OF 200MM R.C SQUARED PILE = 30 TONS AND WORKING LOAD MUST BE TWICE OF ALLOWABLE PILE CAPACITY.

8. APPROPRIATE PILE LENGTH = 100'-0".

7. ALL LAPS SHOULD, WHEREVER POSSIBLE, BE LOCATED AT POINTS WHERE THE TENSILE OR COMPRESSIVE FORCES IN THE BAR ARE LOW.

LAP LENGTH FOR UNEQUAL SIZE BARS MAY BE BASED UPON THE SMALLER BAR.

7. EFFECTIVE ANCHORAGE LENGTH OF A STANDARD HOOK OR BEND

TENSION LAP


c) IN CASES WHERE BOTH CONDITIONS, a) AND b) APPLY, THE LAP LENGTH SHOULD BE INCREASED BY A FACTOR OF 2.0.

7. AT LAPS, THE SUM OF THE REINFORCEMENT SIZES IN A PARTICULAR LAYER SHOULD NOT EXCEED 40% OF THE BREADTH OF THE SECTION AT THAT LEVEL.
1.0 VERIFICATION OF DIMENSIONS AND LEVELS
The Contractor shall verify all dimensions and levels on site, and resolve all discrepancies with the Architect or Engineer prior to commencement of work. Drawing indicates general & typical details of construction. Where conditions area of similar character to details shown and although no specifically indicated, similar details of construction shall be used subject to review by the Engineer. Prior to commencement of works, the Contractor shall verify all dimensions and levels in the construction drawings. Discrepancies in drawings arising from such verification works shall be brought to the attention of the Architect/Engineer.

2.0 SHOP DRAWINGS
The Contractor shall be solely responsible for ensuring total coordination of all works and shall take site measurements prior to the preparation of any shop drawings or before commencing fabrication. The Contractor shall submit shop drawings for all specialist trades, such as prestressing, curtain walling, etc. for reviews/comments and prior approval by the Architect/Engineer prior to commencement of work. Such shop drawings submitted shall incorporate all necessary connection details to the structural members such as cast-in inserts, embedded plates, etc.

3.0 INCORPORATION OF M & E REQUIREMENTS IN THE STRUCTURE
The Contractor shall be solely responsible for ensuring total coordination of Structural, M & E, and architectural drawings and services. He shall submit such shop drawings to the Architect/Engineer for reviews and approval prior to commencement of work. These shop drawings shall incorporate all mechanical, electrical and sanitary works to be embodied in concrete and all openings for all pipe or duct works, based on the requirements of M & E drawings in his possession. He shall check the requirements of other trades, Architectural/ID works. The Contractor shall be responsible for ensuring total coordination of all works and all details shown in accordance with Architectural/ID drawings. He shall check and resolve all discrepancies with the respective Engineer prior to placement of concrete.

4.0 LEAN CONCRETE
Unless otherwise stated, 50 mm thick lean concrete with a minimum 28 days cube strength of 20N/mm² (2900psi) shall be provided on all soil surfaces forming the underside of structural concrete members.

5.0 STRUCTURAL ELEMENTS ON GRADE
Unless otherwise stated, a single layer of 500 gauge (heavy duty) polythene sheet, or equivalent thermoplastic material, laid over a compacted 100 mm thick layer of hardcore blinded with sand to prevent grout loss from seepage into the ground shall be provided on all soil surfaces forming the underside of the slabs.

6.0 SUBGRADE UNDER STRUCTURAL ELEMENTS
Where the Contractor requires removal and subsequent backfill of subgrade prior to casting of pile cap / wall / beam / slab, he shall ensure that the backfill is of approved material and that the backfill shall be reasonably compacted to ensure that the compacted soil is able to withstand the weight of the wet concrete. The Contractor shall exercise proper skill and care to avoid damage to adjacent installed structures arising from his construction sequence.

7.0 WATERPROOFING FOR STRUCTURES
All foundation floor plate/pile cap/pile raft and retaining structures (below grade) exposed to fluid and soil shall be constructed under watertight construction with appropriate waterproofing system including waterproofing concrete unless otherwise stated. The Contractor shall submit shop drawings and method statements for the Architects'/Engineer's approval prior to commencement of work. Required shop drawing details include but are not limited to treatment of flashing, water-stop at construction joints, wall and slab penetrations. All penetrations through structural elements shall be cast-in, sleeved and provided with approved puddle flange detail. If or any reason the Contractor is unable to lay water-stop at construction joints as indicated in the Drawings, he shall at his own expenses provide adequate grout tubes for waterproof pressure grouting to ensure watertightness of the joint. All grout tubes shall be marked and protected from blockage. Backfill operations against vertical surface shall be carried out as soon as the waterproofing barrier is installed to the satisfaction of the Engineer. All concrete roof and floor must be waterproofed.

8.0 BACKFILL AGAINST BASEMENT WALL/RETAINING WALL
Backfill against basement wall shall commence only after completed ground floor system has achieved adequate strength.

9.0 CASTING LAYERS
Inclined casting layers and inclined construction joints shall be avoided. Horizontal casting layers shall no in general exceed 0.6 m thickness unless otherwise approved by the Engineer.

10.0 CONSTRUCTION JOINTS
All concrete structures shall be constructed monolithically unless otherwise specified or approved. The Contractor shall submit shop drawings for concrete casting plan showing the locations of construction joints, either in plan for horizontal floor system or in elevation for vertical elements, to the Engineer for his approval before the commencement of work. The Casting sequence shall be that no length or width of an area to be concreted exceeds 15.0m. Maximum area per casting is limited to 500 m².
Where the Contractor introduces horizontal construction joints within the design depth of pile cap and/or foundation raft, he shall provide at his own expense sufficient shear links to transmit the design horizontal shear force across the joint interface of the concretes and/or foundation raft. The Contractor shall submit plans showing proposed concrete placing sequence for prior approval.

11.0 CONSTRUCTION LOAD AND SHORING
Construction live load imposed on any single floor shall not exceed 84 psf. Unless otherwise approved by the Engineer, dead load of the top construction floor shall be supported by minimum two completed floors directly below it. Props to beams and slabs at all floors shall not be removed until the two immediate floors above that level are capable of supporting themselves as well as any loads imposed during construction. Considerations governing removal of props include but are not limited to the attainment of 28-day strength for the concrete, design load capacity of the floor under review and the completion of prestressing and grouting operations in the case of a prestressed structural floor system. Props shall be left in place for supporting the construction loads approved by the Engineer. No allowance has been made in the design of the perimeter beams/walls for the support of temporary scaffolding.

The Contractor shall engage his own Professional Engineer to design and strengthen the beams/walls at his own cost/time.
12.0 TEMPORARY WORKS AND FORMWORKS DESIGN

12.1 Formwork
The contractor shall entrust the design of formwork system to his professional engineer (temporary work) and comply with the following conditions:
A. Transfer loadings to completed floor plates below shall not exceed the design loading of floor plates.
B. If item A above cannot be complied, the construction loadings shall be supported by the completed columns directly.
C. The construction loading shall include all construction loading of transfer floor and floor plate above if construction of floor plate above transfer beams is continued without removing the formwork of transfer floor.
D. The formwork of transfer beams shall not be removed until the transfer beam has acquired sufficient strength to support the construction of transfer floor and floor plate above.
E. The erection of formwork shall be carried out by qualified scaffold contractor and certified by the contractor’s design PE of such formwork system.
F. To submit the design calculations to the Supervising QP;
G. A copy of design calculation is kept at the site.

13.0 STARTER BARS FOR WALLS AND COLUMNS

13.1 Starter bars form the structural floor system for R.C walls, and columns shall correspond in number and size to the reinforcement in the wall or column in which they are to be embedded.

13.2 Steel bar corrosion protection
All exposed bars for future construction purposes (excluding 1 month) must be coated with 2 coats of neat cement wash protecting coat or approved equivalent and provided with adequate maintenance for purpose of protection against corrosion. Prior to concreting works the cement wash coatings or other existing coatings shall be removed by mechanical tool to the satisfaction of the Engineer.

14.0 R.C STIFFENERS, TIES AND LINTELS TO BRICK WALLS
Vertical R.C stiffeners shall be provided on all floors either at not more than 5m (16.41 ft) centres or at the end of brick walls which do not terminate at a perpendicular cross wall. Typical stiffener starter bars shall be provided from R.C stiffeners, walls or columns at every alternate course of brick wall for the entire project.
Horizontal R.C lintels shall be provided on all floors above individual door and window openings. In addition, horizontal R.C ties framing into R.C stiffeners, walls or columns shall be provided as shown in the drawings for brick wall exceeding 3.0m in height.
Substitution of alternative using steel lintels/stiffeners shall be coated with approved primer and paint in accordance with the specification.
No allowance had been made in the design of R.C stiffener and ties of brick wall for the support of external cladding/curtain wall and other special trade. Contractor shall engage his own Professional Engineer to design and strengthen the stiffener and horizontal tie for the support of external cladding, curtain wall and the special trade at his own cost/time.

15.0 POUR STRIP CONSTRUCTION
1. The width and location of pour strip as shown in the drawings is the Engineer’s design intent location. Any change of the width and location of the pour strip by the Contractor to suit his planning of work shall be subject to Engineer’s approval. All cost or time implication arise due to the relocation of the pour strip shall be borne by the Contractor.
2. Formwork and falsework for the concreted portion of slab/beam adjoining to the pour strip shall be kept in place and undisturbed until the designed strength of the completed pour strip is achieved and approval has been given by the Engineer.
3. Concreting of the pour strip shall not be commenced until the adjoining floor has been concreted for 2 months.
4. The concrete face of the adjoining structures shall be kept rough to sound aggregate and provided to the Engineer’s satisfaction prior to casting of pour strip.

16.0 CODE OF PRACTICE
Where applicable, all standards for loadings, materials and workmanship shall conform to the following codes of practice:
A. Building Code Requirements for Structure Concrete and Commentary - ACI 318-05
B. Uniform Building Code 1997 - UB970
C. Code of Practice for Foundations - BS8004
D. Structural use of Concrete - BS8110
F. American Society of Civil Engineers - ASTM
G. CoHP Guidelines.

17.0 MATERIAL STRENGTHS

17.1 Concrete
The minimum 28-day compressive cube strength of concrete for specified structural elements shall be as follow unless otherwise stated. The Cement type shall be Ordinary Portland Cement (OPC) unless otherwise stated.
Plastered structures at building perimeter are non-sheltered structures.

<table>
<thead>
<tr>
<th>Main Buildings</th>
<th>Concrete Grade</th>
<th>Concrete Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lean concrete</td>
<td>15 N/mm² [2175psi]</td>
<td>25 N/mm² [3625psi]</td>
</tr>
<tr>
<td>Non-suspended slab</td>
<td>35 N/mm² [5000psi]</td>
<td>35 N/mm² [5000psi]</td>
</tr>
<tr>
<td>R.C Beam / Slab</td>
<td>35 N/mm² [5000psi]</td>
<td>35 N/mm² [5000psi]</td>
</tr>
<tr>
<td>R.C Wall, Core Wall</td>
<td>35 N/mm² [5000psi]</td>
<td>35 N/mm² [5000psi]</td>
</tr>
<tr>
<td>R.C Column</td>
<td>35 N/mm² [5000psi]</td>
<td>35 N/mm² [5000psi]</td>
</tr>
<tr>
<td>Shear Wall</td>
<td>35 N/mm² [5000psi]</td>
<td>40 N/mm² [5800psi]</td>
</tr>
<tr>
<td>Stiffeners, Lintels for Brick Wall</td>
<td>25 N/mm² [3625psi]</td>
<td>25 N/mm² [3625psi]</td>
</tr>
<tr>
<td>Foundation, Pile Cap, Raft Footing</td>
<td>40 N/mm² [5800psi]</td>
<td>40 N/mm² [5800psi]</td>
</tr>
<tr>
<td>Tie Beam, Capping Beam</td>
<td>35 N/mm² [5000psi]</td>
<td>35 N/mm² [5000psi]</td>
</tr>
</tbody>
</table>

External Works/Civil Works
Drain, Culvert, Sump, Manhole, Encasement, etc.

<table>
<thead>
<tr>
<th>Miscellaneous</th>
<th>Concrete Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Plinth</td>
<td>25 N/mm² [3625psi]</td>
</tr>
<tr>
<td>Mortar Bedding</td>
<td>25 N/mm² [3625psi]</td>
</tr>
<tr>
<td>R.C Water Tank</td>
<td>35 N/mm² [5000psi]</td>
</tr>
<tr>
<td>Others</td>
<td>25 N/mm² [3625psi]</td>
</tr>
</tbody>
</table>

17.2 Reinforcement
The minimum yield strength of steel bar reinforcement shall be as follows:

| Mild Steel Plain Bar | 250 N/mm² [3625psi] |
| High Tensile Type II Deformed Bar | 380 N/mm² [5500psi] |
| Wire Fabric         | 485 N/mm² [70343psi] |
18.0 STIRRUP, LINKS AND TIES
All stirrups, links and ties in beams, columns and walls respectively shall terminate not more than 75mm from the face of any adjacent structural members.

19.0 SPACER BARS
All spacer bars between 2 or more layers of reinforcement shall D25 or bar diameter (whichever is greater) at ≥1.6m c/c.

20.0 STRUCTURAL LEVEL FOR FOOTINGS, STRIP FOUNDATION AND NON-SUSPENDED SLAB
A. Formation level shall be taken down to sound undisturbed soil with a design bearing capacity of minimum 100 KN/m² unless otherwise approved by the Engineer.
B. Over-excavation shall be filled with min. D25 concrete.
C. Plate bearing shall be conducted at formation level to verify the design bearing capacity.

21.0 SHINKAGE CRACKS
The surface of concrete shall be adequately and continuously cured to Specification to prevent formation of shrinkage cracks.
All cracks at all structures exposed to fluid and soil shall be sealed and rectified accordingly prior to commencement of subsequent construction activities.

22.0 SPECIALIZED TRADE
The Contractor shall be solely responsible for ensuring the total coordination of all specialized trade such as skylight, curtain wall, glass panel, metal roof, roof screen wall, all barriers (including fixing), etc., and shall take site measurement or place necessary inserts prior to the preparation of any shop drawing, fabrication of subframe and casting of concrete.
The Contractor shall engage his own Professional Engineer to design and supervise the construction works such specialized trade.
The Contractor shall take note that all brick walls are not erected / designed to support all the specialized trade.

23.0 STRUCTURAL STEELWORK (Refer to structural steelwork specification/drawings for other requirement)

23.1 A. Quality of structural steel shall conform to relevant Code of practice and STANDARD stipulated in the Structural Steelsworks Specification and shall be obtained from an approved manufacturer.
B. All welding shall be in accordance with relevant Code of practice and STANDARD stipulated in the Structural Steelsworks Specification.
C. No site welding is allowed except where approved.
D. The Contractor shall propose the erection procedures at their own expense including stability system and calculations for the Engineer to review and comment before proceeding with the erection. The Contractor shall to plan, design and supervise any necessary temporary supports to ensure the structural steelwork is stable throughout the construction, paying attention to the safe erection of structural steelwork.
E. It will be responsibility of the Contractor to provide adequate shoring and bracing during construction to take care of wind load and other loads imposed during construction.
F. The Contractor shall verify all the dimensions by measuring them at the site and resolve all the discrepancies with the Architect and the Engineer before commencement of work.
G. All dimensions indicated are in millimetres unless otherwise stated.
H. Shop drawings and calculation are to be prepared and submitted for approval prior to the fabrication works.
I. All welded connections, comprising fillet weld or full penetration butt weld, shall be subjected to Non Destructive Tests to be conducted by third party independent qualified inspection agency to prove the soundness of welds at the discretion of the Engineer in the following manner.
   i) All welded connections shall be subjected to magnetic particle tests or other approved methods.
The Contractor shall submit all original weld test reports to the Engineer for review prior to erection of steel members.

J. Full capacity of member shall be used for redesigning connections.
Design calculations shall be endorsed by the Contractor's PE and submitted for Engineer's review prior to fabrication.
The Contractor's PE shall be responsible to carry out such design work and supervise the construction works.
K. Splicing should not be done at maximum stress locations of members. The Contractor shall indicate the exact locations of splicing and details of splicing in his shop drawings for the approval the Engineer prior to commencement of fabrication.
L. All bolts shall be Grade 8.8 High Strength Bolts to BS 3629 tightened to a snug tight fit unless otherwise stated.
M. The Contractor shall take necessary site measurements prior to fabrication of connecting steel brackets, sub-frames, etc. for other trades.
N. Unless otherwise specified all steelwork shall be primed with one coat of epoxy zinc rich primer (interpolate NLA112/NLA066 from International paint) and one coat of high build epoxy micaceous iron oxide (EPA 001/EPA 740 from International paint). An equivalent type paint may be used subject to the approval of the Engineer.
O. All welding to be 6mm fillet weld unless otherwise stated.
P. Provide 6mm thick end plate for hollow section members.
Q. Approved non-shrink cementsitious grout of minimum compressive strength of 45 N/mm² shall be used for bedding steel bases or bearing plates on concrete base and/or filling up the gaps between base plate and columns/walls by pressure grouting method.
R. To provide fire protection system as per specification to all steelworks. In the case of steelworks exposed to weather, the fire protection material shall be weather-proof materials.
S. All CHS, RHS and RHS shall be hot-formed product.

24.0 EXTERNAL WORK
Contractor shall take the precaution / preventive measures to protect the existing drain. In the case the existing drain is damaged by construction activity, the contractor is fully responsible to re-construct / re-tar the drain, at his own cost and time to respect competent authority's requirements / satisfaction.
Contractor shall provide adequate temporary safety hoarding to protect the public and implement erosion control measure for his construction works.

25.0 PRECAST CONSTRUCTION
25.1 Full props shall be provided for the construction / erection of precast elements until the structures has acquired sufficient strength. Contractor shall submit shop drawings and method statement of the precast construction for prior Engineer's approval.

25.2 The Contractor shall be responsible for providing qualified personnel and employing methods and equipment that are safe and adequate for the satisfactory completion of the permanent structure to the requirements of these specification vis-a-vis stability, performance, durability and appearance. It shall be the sole responsibility of the Contractor to design & provide all necessary temporary propping & bracing in connection therewith.

25.3 Standards & Code of Practice
A. The Contractor shall ensure that all starter bars are provided on relevant precast units for joining of in-situ and / or precast slabs / beams / walls. The location and positions of all starter bars shall be checked and confirmed by the Contractor prior to casting of the precast units.
B. All in-situ joints shall be properly grouted to ensure watertightness. Approved sealant shall be applied on all vertical and horizontal joints where applicable.
C. The Contractor shall be solely responsible for the design and detailing of all connections / joints of precast units.
The precast details shown on the drawings are only indicative and not final.
26.0 DETAILS FOR NON-STRUCTURAL RC ELEMENTS
The Contractor shall provide the followings for all non structural RC elements shown on the
Architectural’s drawings:
   i) minimum steel of 1% of concrete area for longitudinal bars in both directions
   ii) ties or links of T 10-200 through

27.0 NON-STRUCTURAL STEEL WORK
All non-structural steel works and its subframe shall be to Contractor's specialist details. The shop drawing for all these
work shall be submitted to the Architect / Engineer for review prior to construction.

28.0 ANCHOR BOLTS
28.1 General
   A. Heavy duty mechanical anchor shall be used for all structural connection.
   B. Use anchor bolts from approved specialist / manufacturer only.
   C. Anchor bolts shall be zinc-electroplated or stainless steel.
   D. Anchor bolts shall be incorporated with safety features to eliminate over-tightening or under-tightening
      effect on bolt.
      Torque wrenches tightening method is subject to the Engineer's review/approved.

28.2 Submission prior to commencement of installation works
   Submit the following items to Engineer for prior approval:
   A. Design resistance / capacity of anchor bolts.
   B. Approved design resistance / capacity of anchor bolts for fire resistance to
      Standard temperature / time curve.
   C. Design resistance / capacity for dynamic loading

28.3 Defective Works
   Remove and replace the substandard or malfunction bolts immediately at the contractor's cost and time.

29.0 DRILLED-IN REINFORCING BARS
29.1 General
   Use foil pack / cartridge from approved specialist / manufacturer for installation of drilled-in reinforcing bars

29.2 Submission prior to commencement of installation works
   Submit the following items to Engineer for prior approval:
   A. Design values and physical characteristics of drilled-in bars in the consideration of long-term creep
      in deviated temperature.
   B. Evidence for adequate bond distribution over splice length of installed bars with cast-in place bars,
      i.e. splice splitting test.
   C. Approved design values for fire resistance.
   D. Design values for dynamic loading.
   E. Shelf life and storage conditions of injection materials.

29.3 Quality Control Procedure
   Submit the following items to Engineer for prior approval:
   A. Specialist / manufacturer's installation instruction procedure.
   B. Safety procedure for installation works.
   C. Evidence showing storage of foil pack/cartridges in accordance with specialist / manufacturer's
      recommendation.

29.4 Defective works
   Remove and replace the misplaced, substandard or malfunction bars immediately at the contractor's own cost and time.

30.0 COVER & FRAME FOR M&E SUMP PITS, DRAW PITS AND UNDERGROUND TANKS
   Approved type of Heavy Duty Covers shall be provided for all M & E sump pits, drawpits and underground tanks located at the driveway,
   fire engine accessway, loading bays etc and capable to withstand all vehicular loads.

31.0 MATERIAL STANDARDS AND SPECIFICATIONS
31.1 Materials Standards
   All materials were in compliance with but not limited to the following standards and codes:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C 150</td>
<td>Specification for Portland Cement</td>
</tr>
<tr>
<td>ASTM C 33</td>
<td>Specification for Concrete Aggregates</td>
</tr>
<tr>
<td>ASTM C 39</td>
<td>Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens</td>
</tr>
<tr>
<td>ASTM A 615</td>
<td>Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.</td>
</tr>
<tr>
<td>ASTM A 706</td>
<td>Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.</td>
</tr>
<tr>
<td>ASTM A 82</td>
<td>Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.</td>
</tr>
<tr>
<td>ASTM A 496</td>
<td>Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.</td>
</tr>
</tbody>
</table>
TECHNICAL SPECIFICATIONS AND INPUT PARAMETERS

(1) General
(a) All structural drawings shall be read in conjunction with relevant architectural, mechanical, electrical, plumbing and other services drawings and specifications.
(b) All dimensions measured on site shall be checked and confirmed with relevant architectural, MEP and structural drawings.
(c) Any discrepancies between drawings shall be brought to the attention of architect, structural engineer and MEP engineer prior to ordering of material and the commencement of works.
(d) The contractor/builder shall incorporate all mechanical, sanitary and electrical work, to be embedded in the concrete or openings for pipes or duct works, based on the requirement of MEP services drawings. He shall check the drawings and resolve discrepancies, if any, with the engineer before concreting.
(e) Any deviations in the structural works due to services requirements shall be brought to structural engineer to check structural adequacy and stability.
(f) Appropriate waterproofing system shall be applied to basement walls and roof slabs. Contractor shall submit specification and method statement to engineer for approval before construction.
(g) At slab edge to beam/wall location, the slab reinforcement to be hooked into the beam/wall with a minimum length of standard hook anchorage.
(h) For slab edge and perimeter for facade connection, refer to the requirement from facade installation. See facade and architectural drawings.

(2) Material Strengths
Specified compressive design cylinder strength of concrete \( f_{c'} = 4000 \text{ psi} \) for all members

Specified yield strength of steel, (psi) \( f_y = 55000 \text{ psi for main bars,} \)
\[ 55000 \text{ psi for ties and stirrups} \]

Note: (a) Assumed Maximum Size of Aggregate is 1’.
(b) Only deformed reinforcement shall be used except that plain bars and plain wires may be used as ties or stirrups if \( f_y \geq 40000 \text{ psi} \).
**Slope for Different Beam Depth**

Slope = 1:6 (or) ≤ 2h

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Min. Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>3&quot;</td>
</tr>
<tr>
<td>(2)</td>
<td>2&quot;</td>
</tr>
<tr>
<td>(3)</td>
<td>1.5&quot;</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Min. Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>3&quot;</td>
</tr>
<tr>
<td>(2)</td>
<td>2&quot;</td>
</tr>
<tr>
<td>(3)</td>
<td>1.5&quot;</td>
</tr>
</tbody>
</table>

**Material Properties for Superstructure**

- $f_c = 4,000$ psi
- $f_y = 55,000$ psi
- $f_y = 36,000$ psi
- $f_y = 58,000$ psi
- $f_y = 120,000$ psi

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Cast Against and Permanently Exposed to Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Cast to Earth or Weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>No.6 through No.8 bars</td>
</tr>
<tr>
<td></td>
<td>No.5 bars, W31 or D31 wire, and smaller</td>
</tr>
<tr>
<td></td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Not Exposed to Weather or in Contact with Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>Slabs, Walls, Joints</td>
</tr>
<tr>
<td></td>
<td>No.14 and No.18 bars</td>
</tr>
<tr>
<td></td>
<td>Smaller than No.14 bars</td>
</tr>
<tr>
<td></td>
<td>0.75&quot;</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Not Exposed to Weather or in Contact with Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>Primary Reinforcement, Ties, Stirrups, Spirals</td>
</tr>
<tr>
<td></td>
<td>1.5&quot;</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Not Exposed to Weather or in Contact with Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>Shells, Folded Plate Members</td>
</tr>
<tr>
<td></td>
<td>No.6 bars and larger</td>
</tr>
<tr>
<td></td>
<td>No.5 bars, W31 or D31 wire, and smaller</td>
</tr>
<tr>
<td></td>
<td>0.75&quot;</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Not Exposed to Weather or in Contact with Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>Main bars as shown in beam schedule</td>
</tr>
</tbody>
</table>

**Concrete Protection for Reinforcement**

The following minimum concrete cover shall be provided for reinforcement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Concrete Not Exposed to Weather or in Contact with Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>Main bars as shown in beam schedule</td>
</tr>
</tbody>
</table>
Standard Hook (for main bars)

4 db ≥ 2f

D = Minimum inside diameter of bend
= 6 db for No. 3 through 8
= 8 db for No. 9, 10 and 11
= 10 db for No. 14 and 18

Standard Hook (for stirrups and ties)

6 db, 3' min.

135°

D = Minimum inside diameter of bend
= 4 db for No. 5 and smaller
= 6 db for No. 6, 7 and 8

Cover

* Provide a clear cover of 1.5" for beams, 0.75" for slabs and 3" for footings, if not otherwise mentioned.

Splice

Splice in tension (Plain Bars)

Splice in tension (Deformed Bars)

Splice in compression (Both Plain and Deformed)

Splice Length (in)

<table>
<thead>
<tr>
<th>Bar Dia. db</th>
<th>Plain Bars</th>
<th>Tension</th>
<th>Compression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>f_y = 40 ksi</td>
<td>f_y = 60 ksi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f_y = 60 ksi</td>
<td>f_y = 40 ksi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f_y = 50 ksi</td>
<td>f_y = 60 ksi</td>
</tr>
<tr>
<td>D10</td>
<td>18</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>D12</td>
<td>24</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>D16</td>
<td>30</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>D20</td>
<td>36</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>D22</td>
<td>42</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>D25</td>
<td>48</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

Note

* Splice the lower bars within a distance of (clear span) / 4 from the support, if splice is necessary.
* Splice the upper bars within a middle third of clear span, if splice is necessary.
* Do not splice any bar within the cantilever span.
* Compression splice length may be reduced by 25%, if f_y ≥ 3,000 psi
* Do not splice more than 50% of total at any section.
Anchorage (Beam - Column Connections)

The following minimum anchorage lengths shall be provided, if not otherwise mentioned.

Plain Bars

Anchorage Length in inches

<table>
<thead>
<tr>
<th>Bar Dia. (d_b)</th>
<th>Plain Bars</th>
<th>Deformed Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(L_{d1})</td>
<td>(L_{d2})</td>
</tr>
<tr>
<td></td>
<td>(L_{d1})</td>
<td>(L_{d2})</td>
</tr>
<tr>
<td>D10</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>D12</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>D16</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>D20</td>
<td>23</td>
<td>18</td>
</tr>
<tr>
<td>D22</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>D25</td>
<td>40</td>
<td>32</td>
</tr>
</tbody>
</table>

Deformed Bars

Anchorage Length in inches

<table>
<thead>
<tr>
<th>Bar Dia. (d_b)</th>
<th>Plain Bars</th>
<th>Deformed Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(L_{d1})</td>
<td>(L^*)</td>
</tr>
<tr>
<td></td>
<td>(L_{d1})</td>
<td>(L_{d1})</td>
</tr>
<tr>
<td>D10</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>D12</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>D16</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>D20</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>D22</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>D25</td>
<td>40</td>
<td>37</td>
</tr>
</tbody>
</table>

* Provide standard extension length beyond \(L_{d2}\)

Steel Cut off Point for Beam

\[ \geq \frac{L}{3} \]

\[ \leq \frac{L}{8} \]
Splice Detailing (for beam) Top Steel

Splice Length

Splice zone at center (between the middle third of the clear span)

Splice Length

Splice Detailing (for beam) Bottom Steel

Splice Length

Splice zone

( ≥ 2h , between L/4 from the support)

Bar Dia. \( d_i \) | Splice Length
---|---
D10 | 16"
D12 | 18"
D16 | 24"
D20 | 27"
D22 | 41"
D25 | 46"

Bar Dia. \( d_i \) | Splice Length
---|---
D10 | 16"
D12 | 18"
D16 | 21"
D20 | 27"
D22 | 31"
D25 | 36"
Transverse Reinforcement Requirements

The Length of \( L_0 \) shall not be less than:
- Larger of \( C_1 \) or \( C_2 \)
- Clear span / 6
- 18"

\[
S \leq 0.25 \times \left( \text{smaller of } C_1 \text{ or } C_2 \right) \times 6 \times \text{longitudinal bar diameter}
\]

Longitudinal Reinforcement Requirements

\[ 0.01 \leq \rho_g \leq 0.06 \]

Tension lap splice within center half of member length enclosed with transverse reinforcement.

\[ 6 \times \text{longitudinal bar diameter} \]

\[ S \leq \begin{cases} 6' & \\
0.25 \times (\text{smaller of } C_1 \text{ or } C_2) & \\
6 \times \text{longitudinal bar diameter} & \end{cases} \]

\[ 4' \leq S_v = 4 + \left[ \frac{14 - h_x}{3} \right] \leq 6' \]

\[ h_x = \text{max. value of } x \times x \text{ on all column faces} \]

\[ x \leq 14'' \text{ on center} \]
Typical section of Slab top level difference

Typical section of Beam top level difference

Typical section of Slab top level difference

Typical section of Beam top level difference
Typical Reinforcing at Slab Openings

- Add reinforcement equal to that interrupted by opening (either top or bottom or both) at both sides of opening spaced at 3".
- Follow bar extension rules for the interrupted bars but extend additional bars a minimum of 24" beyond edge of opening.
- Add 2-D16 top and bottom each side as minimum.

Terminate interrupted bars with a standard hook

b = Add 2-D16 diagonal bar top and bottom at each corner.

Max. B or D ≤ 2'-0"

Typical Detail of Slab with Partition Wall above

2-D16 (T&B) additional bars. Run from support to support

Typical Concrete Lintel Detail

2-D10 T&B with D6 @ 6" stirrups
Type 1
For opening width ≤ 7"

2-D12 T&B with D6 @ 9" stirrups
Type 2
For opening width > 7" up to 12"

Typical Elevation
STIRRUP, HOOP AND CROSS TIE
(FOR USE IN PLASTIC HINGE REGION)

Minimum Extension Length for Stirrup, Hoop and Cross Tie

<table>
<thead>
<tr>
<th>Bar Dia. (mm)</th>
<th>D (mm)</th>
<th>A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D10</td>
<td>40</td>
<td>90°</td>
</tr>
<tr>
<td>D13</td>
<td>52</td>
<td>90°</td>
</tr>
<tr>
<td>D16</td>
<td>64</td>
<td>90°</td>
</tr>
<tr>
<td>D20</td>
<td>114</td>
<td>90°</td>
</tr>
<tr>
<td>D25</td>
<td>150</td>
<td>90°</td>
</tr>
<tr>
<td>D10</td>
<td>75</td>
<td>135°</td>
</tr>
<tr>
<td>D13</td>
<td>78</td>
<td>135°</td>
</tr>
<tr>
<td>D16</td>
<td>96</td>
<td>135°</td>
</tr>
<tr>
<td>D20</td>
<td>228</td>
<td>135°</td>
</tr>
<tr>
<td>D25</td>
<td>300</td>
<td>135°</td>
</tr>
</tbody>
</table>

STIRRUP AND TIE
(FOR USE IN NON PLASTIC HINGE REGION)

Minimum Extension Length for Stirrup, Hoop and Cross Tie

<table>
<thead>
<tr>
<th>Bar Dia. (mm)</th>
<th>D (mm)</th>
<th>A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D10</td>
<td>40</td>
<td>90°</td>
</tr>
<tr>
<td>D13</td>
<td>52</td>
<td>90°</td>
</tr>
<tr>
<td>D16</td>
<td>64</td>
<td>90°</td>
</tr>
<tr>
<td>D20</td>
<td>114</td>
<td>90°</td>
</tr>
<tr>
<td>D25</td>
<td>150</td>
<td>90°</td>
</tr>
</tbody>
</table>

TYPICAL R.C BEAM TO R.C WALL / COLUMN DETAIL

Largest Long. Bar Ø of Beam
(Normal Wt. Concrete) 20 Ø

Blockout Cavities to be completely Pressure Filled with Non-Shrink Grout (Concrete GP or Equivalent) of $f_{cu}$ equal to Concrete Grade of Wall

Beam (See Respective Beam Details) Top of Beam

Provide Bent-Out Bars (100% Top & 50% Bottom of Beam's Reinforcement) Typ. Min. U.O.S

Beam bars to be pushed hard into back of rebate

Wall Blockout to Match Beam Depth & Width

Core Wall Reinforcement (See Core Wall Reinforcement Details)
GENERAL REQUIREMENTS AND TRANSVERSE REINFORCEMENT REQUIREMENTS
FOR JOINTS NOT CONFINED BY STRUCTURAL MEMBERS

- Standard Hook

- 20 x Largest Long. Bar Ø of Beam (Normal Wt. Concrete)
- 26 x Largest Long. Bar Ø of Beam (Normal Wt. Concrete)

- \( S \leq 0.25 \times (\text{Smaller of } C_1, C_2) \)
- \( S \leq 6 \times \text{Long Bar Diameter} \)
- \( f_y \times DB \times \sqrt{6/x} \) for lightweight concrete, multiply \( f_y \) by 1.25
- \( f_y \) for epoxy-coated bars, multiply \( f_y \) by 1.25

TRANSVERSE REINFORCEMENT REQUIREMENTS
FOR JOINTS CONFINED BY STRUCTURAL MEMBERS

- \( C_1 \geq 3C_1/4 \)
- \( C_2 \geq 3C_2/4 \)

Transverse Beams Not Shown for Clarity
TRANSVERSE REINFORCEMENT REQUIREMENTS
FOR LONGITUDINAL BEAM REINFORCEMENT OUTSIDE A CONFINED COLUMN CORE

PLAN

\[ S = 0.25 \times (\text{Smaller of } C_1, C_2) \]

6 x Long Bar Diameter

\[ S \leq \frac{h}{50} \]

ELEVATION

PLACEMENT OF COLUMNS MAIN REINFORCEMENT

But not less than shall be as shown on reinforcement more than 2% additional ties for columns

Notes:
1. For \( A/h_b < 1/6 \) main bars may be bend directly type (a):
   The corner bars shall be bend diagonally.
2. For \( A/h_b > 1/6 \) shall follow type (b) or (c) with considering the anchorage length needed.
LOCATION OF SPLICE FOR MAIN BEAM IN RELATION WITH PERPENDICULAR BEAMS

See Anchorage Detail for Modification of This Detail

Perpendicular Beam

Middle of Span (l_{n1}/2)

25d_{n}

l_{i}

l_{o}

Tale the biggest

0.33l_{n2}

0.33l_{n1}

0.33l_{n1}

25d_{b}

See Anchorage Detail for Modification of This Detail

Perpendicular Beam

Perpendicular Beam

25d_{n}

25d_{n}

l_{i}/4

l_{i}/2

l_{i}/4

l_{i}

0.33l_{n1}

l_{i}

l_{i}

l_{i}

l_{i}

l_{i}

Tale the biggest

Tale the biggest

Tale the biggest

25d_{b}

25d_{b}

25d_{b}

25d_{b}
1. **DIFFERENCE IN LEVEL**

**TOP FLOOR**
- \(2h / 3\text{Min.}\)
- \(8"\) Max.

**INTERMEDIATE FLOOR**
- \(2h / 3\text{Min.}\)
- \(8"\) Max.

2. **DIFFERENCE IN PLAN**

- Anchorage into Column

**COLUMN REINFORCEMENT AT BEAM / COLUMN JUNCTION**
- If \(D > Lst\), \(H = 12"\) min.
- If \(D < Lst\), Bar should be cranked to \(Lst\) (or)
- \(H = 12"\) min. Whichever is Greater

**TYPICAL TRANSFER COLUMN ON BEAM DETAILS**
- Roughened Kicker Surface
- Provide Starter Bars same Nos, Type and Size as per Column reinforcement
- Column Reinforcement
- Beam Depth (D)
Note:
1. SB = Special Boundary Element
2. Opening here must be opening larger than 3.3 ft² (e.g. Door or Window Opening)
3. See Structural Drawing for Coupling Beam Detail
4. Opening here must be opening larger than 3.3 ft² (e.g. Door or Window Opening)
5. Lap splice of pier reinforcement shall be permitted right above floor.

**SPECIAL REINFORCED CONCRETE STRUCTURAL WALL (SB)**

- **SECTION A1-A1**
  - Vertical Wall Reinforcement
  - Horizontal Wall Reinforcement
- **SECTION A2-A2**
  - Vertical Wall Reinforcement
  - Horizontal Wall Reinforcement

**PIER DETAIL**

- Unless specially detailed crossties shall be placed every two bars each way on both faces

** spas s**

- **SECTION A1-A1**
  - Vertical Wall Reinforcement
  - Horizontal Wall Reinforcement
- **SECTION A2-A2**
  - Vertical Wall Reinforcement
  - Horizontal Wall Reinforcement

**Note:**
1. h = Height of Wall
2. b = Length of Wall
3. h₁ = Height of Special Boundary Element Needed
4. b₁ = Length of Special Boundary Element
5. sₚ = Spacing of Horizontal Reinforcement in Wall
6. sᵥ = Spacing of Vertical Reinforcement in Wall
7. sₚ = Spacing of Pier Reinforcement parallel to length of wall must be provided
8. h = Web Thickness of Wall
9. d' ≤ 14" if not crossties parallel to length of wall must be provided
10. sₚ ≤ 3h
11. lₜ/3
12. 450mm (or) Spacing as indicated on wall detail
13. lₜ/5
14. 450mm (or) Spacing as indicated on wall detail
15. Lap splice of pier reinforcement shall be permitted right above floor.

**Note:**
1. SB = Special Boundary Element
2. OB = Ordinary Boundary Element
3. h = Height of Wall
4. b = Length of Wall
5. h₁ = Height of Special Boundary Element Needed
6. b₁ = Length of Special Boundary Element
7. P = Pier
8. S = Spandrel or Coupling Beam

**See Boundary Element Detail on Structural Drawing**

**See Pier Detail**
Special Reinforced Concrete Structural Wall (OB)

Note:
1. x ≤ 14'
2. h = Web Thickness of Wall
3. s = Spacing of Horizontal Reinforcement in Wall
4. s ≤ \( \frac{3h}{l_w/3} \)
   450mm (or)
   Spacing as indicated on wall detail
5. s = Spacing of Vertical Reinforcement in Wall
6. s ≤ \( \frac{3h}{l_w/5} \)
   450mm (or)
   Spacing as indicated on wall detail
7. a ≤ \( l_w \) if straight bar development
   is used
   \( l_w \) if Hooked bar development
   is used
8. Pier reinforcement shall be permitted right above floor.

Reinforcing Detail of Horizontal Reinforcement for Flanged Shear Wall

Typical Connection of Beam and Shear Wall
TYPICAL SLAB TO R.C WALL DETAILS

CONTINUOUS PERIMETER WALL

Wall Reinforcement

D12 @ 12" c/c Starter Bars U.O.S

Lst

Floor Level

D12 Anchor Bar (T & B)

Lst

Floor Level

1.2" Rebate

Wall Reinforcement

CONTINUOUS PERIMETER WALL WITH REBATE

Wall Reinforcement

D12 @ 12" c/c Starter Bars U.O.S

Lst

Floor Level

Wall Reinforcement

INTERNAL WALL BELOW

Wall Reinforcement

Floor Level

Lst

Floor Level

1.2" Rebate

Wall Reinforcement

INTERNAL WALL OVER

Wall Reinforcement

Floor Level

Lst

Lst

Temporary props may be required. Refer to engine.

CONTINUOUS INTERNAL WALL

Wall Reinforcement

Floor Level

Lst

Lst

Wall Reinforcement

PERIMETER WALL BELOW

Wall Reinforcement

Floor Level

Lst

Wall Reinforcement

TYPICAL NIB DETAIL FOR LIFT DOOR OPENING

Wall Reinforcement

Refer to Schedule

D12 @ 8" c/c

Add D12 @ 8" c/c

Refer Slab Bar

Note: Dimension of Sill to M&E Lift Drawing Details

TYPICAL DOWN HANG WALL (HW) DETAILS

Wall Reinforcement

Floor Level

Lst

U-Bars ½

Mark

HW1

HW2

T

Reinforcement

D10 @ 10" c/c

D10 @ 8" c/c

D12 @ 8" c/c

2-D16

2-D16

Note: Wall details only apply when specified on plan.

Note: Details apply unless otherwise shown on the drawings.

2. Refer also to general notes.
COLUMNS SUPPORTING DISCONTINUOUS SHEAR WALL
OR STIFF MEMBER

Development Length of Largest Longitudinal Column Reinforcement

Opening in Shear Wall not exceed 2/3 Wall Height

Shear Wall Reinforcement not shown for Clarity

Confinement reinforcement must be over full height of column and extend shear wall or stiff member as far as length as shown above.

TYPICAL R.C PARAPET WALL DETAILS

Note:
T = 8” (for Pedestrian, Car Park Area, access Ramp and Other Vehicular Areas)
T = 4” (for Other Areas)
T = 6” (for Pedestrian)
Refer architectural drawing for actual location.

T10 @ 10’ c/c (for T = 6’)
T10 @ 6’ c/c (for Vehicular Area only)
T12 @ 4’ c/c (for T = 8’)
T10 @ 4’ c/c (for T = 8’)
T10 @ 10’ c/c (for Vehicular Area only)
T10 @ 6’ c/c (for Vehicular Area only)

Lst

D10 @ 10’ c/c (for T = 6’)
D12 @ 4’ c/c (for T = 8’)
D10 @ 4’ c/c (for T = 8’)
D10 @ 10’ c/c (for Vehicular Area only)
D10 @ 6’ c/c (for Vehicular Area only)

D10 @ 5’ c/c

D10 @ 5’ c/c

Wall or Beam

Slab

48" (Max.)

48" (Max.)

5”
ANCHORAGE AND LAPPED SPLICE OF SPIRAL TIE

Minimum of 1.5 Turns without Separating Spiral

\[ L_{(\text{Min.})} = 48 \text{ d} > 300 \text{mm} \]

Note:
1. At end section provide 1.5 additional turns and 135° hook with minimum hook length of EL as shown.
2. For lapped splice, minimum splice length shall be 48 d and greater than 300mm.
3. The spiral spacer shall be used for maintaining the proper pitch.

EMBEDMENT OF PILE REINFORCEMENT IN PILE CAP

1. Where \( L_{\text{value}} \) for tension:
   \[ 1.3 \frac{l}{d} \]
   take the biggest \( 40 \text{ d} \)

2. \( L_{\text{value}} \) for compression:
   \[ \frac{l}{d} \]
   take the biggest \( 40 \text{ d} \)

2. Membrane waterproofing around pile

ANCHORAGE OF COLUMN REINFORCEMENT IN PILE CAP

If \( a < h/2 \) then column or boundary element of shear wall transverse reinforcement must be extend into pile cap

Hooked bars must be oriented towards the centre of the column

Note:
1. \( d = \) Footing Depth
   \[ l_a \geq \left\{ \begin{array}{ll} \frac{d}{450} & \text{Take the biggest} \\ \frac{l_a}{450} & \text{Take the biggest} \end{array} \right. \]

2. If \( a > h/2 \) extension of transverse reinforcement is not needed.
CONSTRUCTION JOINT, WATER STOP AND SHEET MEMBRANE

Sheet Membrane Waterproofing as specified
- Water Stop as specified
- Construction Joint

Sheet Membrane Waterproofing as specified
- Lean Concrete
- Water Stop as specified

Note: Reinforcing shall follow slab drawing.

Pipe Location
- Ø12" UPVC DRAINAGE PIPE HANGER DETAIL
  (HANGERS AT 4'-0" c/c)

M & E Box
- Ø12" UPVC DRAINAGE PIPE HANGER DETAIL
  (HANGERS AT 4'-0" c/c)

Note: a = Additional reinforcing equal to that interrupted by opening or dis whichever greatest.
**TYPICAL NON-SUSPENDED STAIRCASE DETAILS**

(U.O.S)

- 2" Thk. Lean Concrete
- 6" Thk. Well Compacted Hardcore
  Filled with Quarry Dust

Refer to Architectural Finish

**TYPICAL CONCRETE DRIVEWAY DETAILS**

- 9" Thk. Concrete (Grade 35)
  with Two Layers of WSFR B8
- 8" Thk. Graded Granite Aggregate

**TYPICAL JOINT DETAIL BETWEEN SUSPENDED / NON-SUSPENDED SLAB**

- 3.5" Thk. Type 'A' Concrete paving Blocks
- Joint Filling Sand
- 2" Thk. Sand Base

**INTERLOCKING CONCRETE PAVING BLOCKS**

DETAILS FOR CAR PARK LOTS

- 7" Thk. Graded Granite Aggregate
- 6" Thk. Sub-Base
- Subgrade
CONSTRUCTION JOINT IN SUSPENDED FLOOR

1.7" T/4 (Min. 1.5")

1st Placement of Concrete
2nd Placement of Concrete

JOINT IN SLAB

Note:
1) For multiple span beam the location and type of construction joint shall be approved by the engineer.
2) Refer also to general notes.

Thoroughly Scrabbled Vertically Joint in Middle Third of Span only
Reinforcement continuous through Joint, or a min. of 2-D20 x 60° long in top

JOINT IN BEAM

L/3 L/3 L/3

Thoroughly Scrabbled Vertically Joint in Middle Third of Span only
Reinforcement continuous through Joint, or a min. of 2-D20 x 60° long in top

L

TYPICAL DETAIL OF SCUPPER DRAIN AT EDGE OF SLAB / RAMP

Heavy Duty Grating
Drain

Lap Length
1.5D

1.5D

Drain
Beam

Lap Length
1.5D

Lap Length
1.5D

Sloped, where applicable

B E A M  & S L A B  W I T H  R E C E S S

Top Reinforcement
Bottom Reinforcement

Similar as Top Reinforcement
Similar as Bottom Reinforcement

Drain width

L
d (Typ.)

L

L

L

L

Note: d = Beam & Slab Depth

TYPICAL ADDITIONAL LINKS DETAILS FOR BEAM WIDER THAN COLUMN

Add D16 @ 4" c/c
Over Column Length

48Ø Lap

Beam Links from Details / Schedule
Column

Beam Links from Details / Schedule

ADD ITSELF
Refer to M&E Dwgs.

Tension Anchorage

Beams’ Bottom Reinforcement

Refer to M&E Dwgs.

FOR BEAM / SLAB (TYPE 1)

Note: A+B ≧ Depth of Beam / Slab

Pipe Location and Invert Level

Refer to M&E Dwgs.

Tension Anchorage

FOR BEAM (TYPE 2)

Pipe Ø

Use Similar Beam Bottom Bars

HORIZONTAL PENETRATION / EMBEDMENT OF PIPE

Note:
1. Embedded pipe shall be within middle third of slab’s thickness.
2. If h ≦ 5”, no penetration / embedment of pipe is allowed.

FOR BEAM (TYPE 3)

Vertical penetration shall be within middle third of width.

TYPICAL PENETRATION / EMBEDMENT OF PIPE THROUGH BEAM / SLAB

Notes:
1. The Contractor shall coordinate locations and nos. of pipes required and submit coordinated penetration drawing to engineer for prior review and approval.
2. Sections showing the penetration / embedded pipe shall be included in the submission.
3. Contractor shall demonstrate how the penetration sleeve / embedded pipes are secured at correct location / levels and not dislocated during casting.
4. Strengthening details shown are indicative only. Contractor shall engage qualified PE to check / design the strengthening works of proposed penetration / embedded pipes and submit the endorsed calculation to engineer for prior review / approval.

Supports (Column or Beam)

PLAN

FOR BEAM (TYPE 3)

Note: Vertical penetration shall be within middle third of width.

CANTILEVER BEAM / SLAB

Supports (Column or Beam)

ELEVATION
(Slab / Beam)

FOR BEAM / SLAB (TYPE 1)

Note: A+B ≥ Depth of Beam / Slab

Add 1-D12 EF (for Beam Width < 20”)
Add 2-D12 EF (for Beam Width ≥ 20”)
Add 3-D12 EF (for Beam Width ≥ 32”)
Add 4-D12 EF (for Beam Width ≥ 48”)

Add 1x2-D12 EF (for Beam Width < 20”)
Add 2x2-D12 EF (for Beam Width ≥ 20”)
Add 3x2-D12 EF (for Beam Width ≥ 32”)
Add 4x2-D12 EF (for Beam Width ≥ 48”)

Add 2-D16 T & B (for Beam Width < 20”)
Add 4-D16 T & B (for Beam Width ≥ 20”)
Add 6-D16 T & B (for Beam Width ≥ 32”)
Add 8-D16 T & B (for Beam Width ≥ 48”)

Pipe Location and Invert Level

Refer to M&E Dwgs.

Supports (Column or Beam)

Add 1-D12 EF (for Beam Width < 20”)
Add 2-D12 EF (for Beam Width ≥ 20”)
Add 3-D12 EF (for Beam Width ≥ 32”)
Add 4-D12 EF (for Beam Width ≥ 48”)

Add 1x2-D12 EF (for Beam Width < 20”)
Add 2x2-D12 EF (for Beam Width ≥ 20”)
Add 3x2-D12 EF (for Beam Width ≥ 32”)
Add 4x2-D12 EF (for Beam Width ≥ 48”)

Add 2-D16 T & B (for Beam Width < 20”)
Add 4-D16 T & B (for Beam Width ≥ 20”)
Add 6-D16 T & B (for Beam Width ≥ 32”)
Add 8-D16 T & B (for Beam Width ≥ 48”)

FOR BEAM (TYPE 2)

Notes: For Beam (Type 1 and 2)
1. Notation Ø = Ø 1 or Ø 2, whichever is greater.
2. D ≥ 3Ø, L= 3Ø (Min.)
   H ≥ 6”, Ø ≤ 8”
3. If D < 3Ø, L< 3Ø or Ø > 8”
   It shall be to engineer’s approval.
4. If H < 6”, beam had to be hunched
   If H < 4”, slab had to be hunched
TYPICAL DETAIL OF PERIMETER BEAM SUPPORTING CURTAIN WALL

Max. 2" recess for curtain wall fittings

Note: Refer fittings locations to curtain wall's specialist

BITUMINOUS PAVEMENT DETAILS
ON R.C SLAB

1" Asphalitic Wearing Course
3" Asphalitic Base Course

Concrete R.C Slab

TILED PAVEMENT DETAILS
ON R.C SLAB

Cement Sand Screed / Bedding to Arch's Details
Tiles / Finish to Arch's Details

Building System to Contractor's Specialist's Details Approved by Architect

RAVEL LIGHTNING EARTH PIT DETAILS
AT BASEMENT LEVEL

Note: For inspection pit size, refer to M&E dwgs.

SLAB SUPPORTED BY UPTURNED BEAMS

Same size & spacing as bottom reinforcing unless noted otherwise
TYPICAL DETAIL OF EMBEDDED RWDP / WASTE PIPE

1) RWDP location and invert refer to architectural dwgs.
2) Waste pipe location and invert refer to M&E drawings.

TYPICAL REINFORCEMENT INTERFACE BETWEEN SLAB SYSTEMS

Note: $l_n$ is the greater of 2 adjacent span $l_1$ & $l_2$ or 45Ø whichever is greater

COUPLING BEAM REQUIREMENTS

Bars to be developed for tension in wall

SECTION A-A

Avh ≥ 0.0015 $bs_2$

$s_2 ≤ d/5, 12''$

Avh ≥ 0.0025 $bs_1$

$s_1 ≤ d/5, 12''$

Ash ≥ $0.3 bs_2 [Ag/(Ach_i)] (f_c/f_yt)$

Ash ≥ $0.09 bs_2 f_c/f_yt$

$0.25 x [ min. core dimension + (2 x cover per 7.7)]$

$s ≤ 6 x longitudinal bar diameter$

$s_i$, where $4'' ≤ s_i = 4 + [(14-hx)/3] ≤ 6''$

ELEVATION
ANCHORAGE LENGTH REQUIREMENT FOR SLAB WITH BEAM REINFORCEMENT

EXTERIOR SLAB WITH BEAM REINFORCEMENT ANCHORAGE INTO BEAM

INTERIOR SLAB WITH BEAM REINFORCEMENT ANCHORAGE INTO BEAM AT MIDDLE STRIP

SLAB REINFORCEMENT DETAIL FOR SPLIT LEVEL

A) 2ts > ts1 > ts

B) ts1 > 2ts

Max. 0.15L

Min. Cover

Min. 6"

Max. Slope of Bent Bar 1:6

Half total bottom reinforcement shall be splice at core min. 6".

Notes:

* D12 or slab reinforcement whichever greater.

If ts1 > ts, reinforcement detail shall be determined separately.
THREE STOREYED PMU BUILDING

OWNER/APPLICANT: MOTHER CONSTRUCTION COMPANY LIMITED
No.56, SAT SAYA U TUN ROAD, INDUSTRIAL ZONE (4), SHWE PYI THAR TOWNSHIP, YANGON.
TEL: 618203, 618385, 618386, 618387.
Email: mmotherconstruction @gmail.com

DIMENSION: B-in
SCALE: AS SHOWN
DATE: 21.03.2017

DESIGNED BY: Y&Y
CHECKED BY: DCC

OWNER/APPLICANT

NOTE

TYPICAL JUNCTION DETAIL OF FLEXIBLE PAVEMENT AT SUSPENDED SLAB END

TYPICAL PLANTER WALL DETAILS
REFER TO ARCHITECTURAL/HARDSCAPE DRAWINGS FOR LOCATION AND DETAIL OF PLANTERS

TYPICAL PLANTER ON SLAB

TYPICAL PLANTER ON GRADE

SPECIFICATION DETAIL AS SHOWN

DWIR-3STY-PMU-SPEC28

DRAWN BY: WNW

REVISED BY: L.S

ORIGINAL DWG NO.

NOTE

TYPICAL DETAIL OF BOUNDARY WALL WITH FOOTING

TYPICAL HOUSE DRAIN SECTION THRO' THE SLUMP INSPECTION CHAMBER

BOUNDARY WALL ON RC SLAB

NOTES,
LOCATION AND DETAILS OF HUMP LAYOUT AND CHANGING FREEBOARD

TYPICAL FOUNDATION DETAIL OF FLEXIBLE PAVEMENT AT SUSPENDED SLAB END

TYPICAL 1½" HIGH FENCING FOR GATE POST

TYPICAL CHAIN LINK FENCING

TYPICAL FOOTING DETAILS FOR GATE POST

NOTE

1/ FOR LOCATION / DIMENSIONS REFER ARCHITECTURAL
CUSTOMS SHOWN ARE MODULAR ONLY, CONTRACTOR SHALL ENGAGE QUALIFIED SPECILIST INCLUDING A PROFESSIONAL ENGINEER TO DESIGN AND SUBMIT THE DETAILS OF CEMENT CAST FREEMAN SUPPORTS TO ARCHITECT / ENGINEERS FOR PREMUR APPROVAL.
OWNER/APPLICANT
MOTHER CONSTRUCTION COMPANY LIMITED
No.56, SAT SAYA U TUN ROAD, INDUSTRIAL ZONE (4), SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

FUNCTIONS OF SLOPES, LOCATIONS & SIZES OF OPENINGS TO BE COMBINED & APPROVED BY BOTH STRUCTURAL ENGINEER & ME ENGINEER.

LEAD IN PIPE OPENINGS

NOTES

- THE LAST LAYER OF 2" OF SUBBASE MATERIAL SHALL HAVE A MINIMUM DRY DENSITY OF 95% AND SHALL BE COMPACTED TO MINIMUM OF 95% OF MAXIMUM DRY DENSITY. THE MINIMUM COMPACTED DENSITY FOR SUBBASE MATERIAL SHALL BE 95% AND FOR THE BASE MATERIAL DENSITY USING THE MODIFIED ASHLIARD COMPACTED TEST OR TEST 13 OF BS 1377.

DETAIL OF DRIVEWAY CURB PLAN

NOTE

1. DR 8" ASPHALT WEARING COURSE
2. THK ASPHALTIC BASE COURSE
3. THK SUBLBASE MATERIAL
4. WELL COMPACTED SUBMBASE
5. WELL COMPACTED SUBMBASE

NOTES

1. CURB & FRAMES ARE TO BE SHOP FABRICATED AND ALL WELD SLUG REMOVED.
2. THE COMPLETE ASSEMBLY EXCEPT FRAMES ARE TO BE GAVANIZED BY HOT-DIP GALVANISING PROCESS IN ACCORDANCE WITH BS 1139.
3. CURB & FRAMES TO BE WELDED TO MG ANGLE FRAME TO BE IMBEDDED IN CONCRETE.
4. ALL THE FLATS AND ANGLES ARE TO BE 6" FILLET WELDED THROUGH-OUT UNLESS OTHERWISE STATED.

EXAMPLE OF M.S. GRATING DETAILS (REMOVABLE)
PROJECT: DWIR-3STY-PMU-SPEC32
OWNER/APPLICANT: THREE STOREYED PMU BUILDING (72'-4" x 73'-4" x 57'-0")
OWNER: MOTHER CONSTRUCTION COMPANY LIMITED.
Address: No.56, SAT SAYA U TUN ROAD, INDUSTRIAL ZONE (4), SHWE PYI THAR TOWNSHIP, YANGON.
Tel: 618203, 618385, 618386, 618387.
Email: mmotherconstruction@gmail.com

DESIGNED BY-

SPECIFICATION DETAIL

AS SHOWN

DIMENSION: BIM

SCALE: AS SHOWN

DATE: 21.03.2017

REVISION:

DWG NO. DWIR-3STY-PMU-SPEC32
DRAWN BY: Y&Y

CHECKED BY: DCC

NOTE

OWNER

PROJECT

SUBJECT

BLOCK NO.

LOT NO.

TOWNSHIP

SCALE

DATE

DRAWN BY

CHECKED BY

NOTE

WATERPROOFING DETAILS FOR RETAINING WALL, SLAB

WATERPROOFING DETAILS FOR SLUMP PITS AGAINST SOIL

SUCH AS PUMP BUMP, GREASE TRAP, HATCH BORE, ETC.

TYPICAL WATERPROOFING DETAILS (INTEGRATED SYSTEM) U/G

LEGEND

REFERENCE TO INTEGRATED SPECIFICATION FOR WATEPROOFING REQUIREMENT

CONSTRUCTION JOINT AT FLOOR SLAB

NO.56, SAT SAYA U TUN ROAD, INDUSTRIAL ZONE (4), SHWE PYI THAR TOWNSHIP, YANGON.

TEL: 618203, 618385, 618386, 618387.

Email: mmotherconstruction@gmail.com

OWNER

SERVICE NOTES FOR WATEPROOFING

THE CEMENT CONTENT OF THE CONCRETE SHALL BE NO LESS THAN 300 kg/m3.

THE CONCRETE SHALL CONTAIN A COMPATIBLE SUPER PLASTICIZER TO BE APPROVED BY ARCHITECT/ENGINEER AND APPROVED FOR USE IN OTHER WAREHOUSES SUCH THAT THE FREE WATER CEMENT RATIO SHALL NOT EXCEED 0.6.

THE CONCRETE SHALL CONTAIN A HIGH PERFORMANCE POLYMER BONDING AGENT AND ANY OTHER ADDITIVES IN STRICT ACCORDANCE WITH MANUFACTURER'S DETAILED TECHNICAL SPECIFICATIONS.

PRIOR TO CONSTRUCTION, THE MIXES ARE TO BE CONDUCTED UNDER THE SUPERVISION OF THE ARCHITECT/ENGINEER ON THE PROJECT SITE AND WITH IN-MANUFACTURER PRESENT TO CONFIRM THAT THE PROPOSED MIX CONFORMS STRENGTH, WATER CEMENT RATIO, SLUMP AND OTHER REQUIREMENTS.

THE TRIAL MIX CONCRETE SHALL FURTHER HAVE A CORRECTED 30 MINUTES WATER ABSORPTION OF NOT GREATER THAN 3% AND SHALL NOT EXCEED 3% OF THE TOTAL WATER ADDITION AS MEASURED BY BS 1881: PART 162: 1986 EXCEPT THAT THE MAX TEST SHALL BE 3 DAYS.

THE TRIAL MIX CONCRETE SHALL FURTHER HAVE AN AVERAGE WARE STABILITY COEFFICIENT WHEN TESTED AT 28 DAYS OF NOT GREATER THAN 14.0 KG/M EA MEASURED BY JQ TEST METHOD CONSIDERATED TO BE EFFECTIVE UP TO 180 DAYS ON AN AVERAGE PENETRATION DEPTH NOT GREATER THAN 20MM AS MEASURED BY D.M. TEST (PART 5: 1987).

DURIS CONSTRUCTION, THE ABDUCTION SAMPLES ON EACH CASTING SHALL BE TAKEN AT THE SAME TIME AS SAMPLES FOR COMPREHENSIVE STRENGTH TESTING. TWO OF THE SAMPLES SHALL BE TESTED AS ABOVE AND SHALL CONFORM WITH THE ABSORPTION REQUIREMENT.

ANY ADDITIVES OTHER THAN CONCRETE ADDITIVES AS APPROVED BY THE ARCHITECT/ENGINEER, ARE CONSIDERED AS CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL PROVIDE CERTIFICATION AS REQUIRED BY THE MANUFACTURER. ADDITIVES SHALL BE TAKEN DURING CONSTRUCTION AS DIRECTED BY THE ARCHITECT/ENGINEER. THE TESTED SAMPLES SHALL BE TESTED AT THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL PROVIDE CERTIFICATION AS REQUIRED BY THE MANUFACTURER.

ADDITIONAL MIX MUST BE MINED WITHOUT ADDITIVES, THE SUPPLIER SHALL SATISFY THE ARCHITECT/ENGINEER THAT ANY ADDITIVES CONTAINED IN THE MIX USED IN THE CONTRACTOR'S WORKplace DO NOT ADVERSELY AFFECT THE STRENGTH OR OTHER PROPERTIES OF THE CONCRETE.

ALL WATERPROOFING WORKS SHALL BE CARRIED OUT UNDER THE SUPERVISION OF EXPERIENCED AND QUALIFIED PERSONAL. WATERPROOFING ACONJUNCTS SHALL BE MIXED WITH CONCRETE DURING BENDING AND PRODUCTION OF THE MIX AS TO MANUFACTURER'S SPECIFICATIONS. ALL DOUGHS AND MIX IS TO BE AS PER MANUFACTURER'S INSTRUCTIONS AND SUBMITTED BY THE WATERPROOFING SPECIALISTS REPRESENTATIVE.

ALL CONSTRUCTION JOINTS AND CUTCUT PROJECTIONS FOR WALL AND SLAB SHALL BE CITY TRIMMED AND PREPARED WITH WATERPROOFING SYSTEM COMPATIBLE WITH THE INTEGRAL WATERPROOFING SYSTEM, WHICH IS USED FOR JOIN AND PRODUCTION INTO CONSTRUCTION JOINTS SHALL ALSO BE PROVIDED WHERE APPROPRIATE, TO BE PROVIDED TO THE MANUFACTURER AND SUBMITTED BY THE WATERPROOFING SPECIALISTS REPRESENTATIVE.

CONSTRUCTION JOINTS AND CUT-OUT PROJECTIONS FOR WALL AND SLAB SHALL BE CITY TRIMMED AND PREPARED WITH WATERPROOFING SYSTEM COMPATIBLE WITH THE INTEGRAL WATERPROOFING SYSTEM, WHICH IS USED FOR JOIN AND PRODUCTION INTO CONSTRUCTION JOINTS SHALL ALSO BE PROVIDED WHERE APPROPRIATE, TO BE PROVIDED TO THE MANUFACTURER AND SUBMITTED BY THE WATERPROOFING SPECIALISTS REPRESENTATIVE.

CONSTRUCTION JOINTS AND CUT-OUT PROJECTIONS FOR WALL AND SLAB SHALL BE CITY TRIMMED AND PREPARED WITH WATERPROOFING SYSTEM COMPATIBLE WITH THE INTEGRAL WATERPROOFING SYSTEM, WHICH IS USED FOR JOIN AND PRODUCTION INTO CONSTRUCTION JOINTS SHALL ALSO BE PROVIDED WHERE APPROPRIATE, TO BE PROVIDED TO THE MANUFACTURER AND SUBMITTED BY THE WATERPROOFING SPECIALISTS REPRESENTATIVE.
Structural Steel Specification

- Structural Steel (hot rolled, plates, cold formed) is ASTM A36
- The corresponding specification of A36 is SS 400.
- Design yield strength for structural steel is 248 N/mm² (MPa)
- The tensile strength for structural steel is 400 N/mm² or 400 (MPa)
- The structural bolt is High strength bolt, ASTM A325, which has:
  Design shear strength = 248 N/mm²
  Design shear strength = 450 N/mm²
  Design tension strength = 620 Mpa

Bolt Spacing

(a) The spacing between centres of bolts in the direction of load transfer should not be less than 2.5d, where d is the nominal diameter of the bolts. This spacing can be increased as necessary for bearing capacity.

(b) The spacing between centres of standard holes measured perpendicular to the direction of load transfer should normally be 3d. This spacing may be reduced to not less than 2.5d provided that the bearing on the bolt is not more than 2/3 of Pmax (see closure).

(c) The spacing for slotted holes should be measured from the centres of its end radius or the centerline of the slot.

The maximum spacing between centres of standard holes measured either parallel of perpendicular to the direction of load transfer should be limited to the lesser of 12t or 150 mm, where t is the thickness of the thinner connected plate.

End and edge distances

The end distance is the distance from the centre of a hole to the adjacent edge in the direction in which the fastener bears. The end distance shall be sufficient to provide adequate bearing capacity. The edge distance is the distance from the centre of a hole to the adjacent edge at right angles to the direction of stress.

The distance from the centre of a standard hole to the adjacent edge or end of any part, measured either parallel or perpendicular to the direction of load transfer, should be not less than those listed in Table.

Minimum end and edge distances of holes (for standard holes)

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>At sheared and hand frame cut edge (mm)</th>
<th>At rolled edges of plates, shapes, bars or gas cut edges (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>M16</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>M18</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>M20</td>
<td>34</td>
<td>26</td>
</tr>
<tr>
<td>M22</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td>M24</td>
<td>42</td>
<td>30</td>
</tr>
<tr>
<td>M27 and over</td>
<td>1.75d</td>
<td>1.25d</td>
</tr>
</tbody>
</table>

Hole Dimensions

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Standard hole Diameter d (mm)</th>
<th>Diameter d (mm)</th>
<th>Width x Length (mm)</th>
<th>Width x Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12</td>
<td>14</td>
<td>16</td>
<td>14 x 18</td>
<td>16 x 30</td>
</tr>
<tr>
<td>M16</td>
<td>18</td>
<td>20</td>
<td>18 x 22</td>
<td>18 x 40</td>
</tr>
<tr>
<td>M18</td>
<td>20</td>
<td>22</td>
<td>20 x 24</td>
<td>20 x 45</td>
</tr>
<tr>
<td>M20</td>
<td>22</td>
<td>26</td>
<td>22 x 26</td>
<td>22 x 50</td>
</tr>
<tr>
<td>M22</td>
<td>24</td>
<td>27</td>
<td>24 x 28</td>
<td>24 x 55</td>
</tr>
<tr>
<td>M24</td>
<td>26</td>
<td>30</td>
<td>26 x 32</td>
<td>26 x 60</td>
</tr>
<tr>
<td>M27 and over</td>
<td>d+3</td>
<td>d+8</td>
<td>[d+3] x [d+10]</td>
<td>[d+3] x [2.5d]</td>
</tr>
</tbody>
</table>

Matching bolt, nut and washer standards for ordinary bolts

- Standard
- Grade
- Bolt
- Nut
- Washer

American Equivalent to 8,8

ASTM A325
ASTM A563
ASTM F436
Recommended tightening torques and approximate bolt tensions for ISO grade 8.8 bolt (Assumes bolts oiled)

<table>
<thead>
<tr>
<th>Nominal bolt diameter</th>
<th>Tightening torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16</td>
<td>55</td>
</tr>
<tr>
<td>M20</td>
<td>100</td>
</tr>
<tr>
<td>M22</td>
<td>110</td>
</tr>
<tr>
<td>M24</td>
<td>120</td>
</tr>
<tr>
<td>M27</td>
<td>135</td>
</tr>
<tr>
<td>M30</td>
<td>150</td>
</tr>
<tr>
<td>M36</td>
<td>165</td>
</tr>
<tr>
<td>M36</td>
<td>180</td>
</tr>
</tbody>
</table>

For a fillet weld along the edge of plate:
(i) If the thickness of plate is less than 6 mm, the maximum leg length should be the thickness of the plate.
(ii) If the thickness of the plate is equal to or greater than 6 mm, the maximum leg length should be the thickness of the plate minus 2 mm.

Matching filler metal requirements

<table>
<thead>
<tr>
<th>Base metal steel specification</th>
<th>SMAW</th>
<th>SAW</th>
<th>GMAW</th>
<th>FCAW</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM A 36</td>
<td>AWS A5.1 or A 5.5 E60XX or E70XX</td>
<td>AWS A5.17 or A 5.23 F6X or F7X- DXX</td>
<td>AWS A5.18 ER 70S-X</td>
<td>AWS A5.20 E6 X7-X and E7 X7-X (except 3-3, 10, 35)</td>
</tr>
</tbody>
</table>

End return
Fillet welds should not be terminated at the extreme ends or edges of members. They should either be returned continuously around the ends or edges for a length not less than 2s or, if a return is impracticable, terminated not less than s from the ends or edges.

Intermittent fillet welds
Intermittent fillet welds may be used to transmit forces across a joint or keying surface.
(a) The longitudinal spacing along any one edge of the element between effective lengths of weld should not exceed the least of
   (i) 300 mm;
   (ii) 16 times the thickness of the thinner part of compression elements; and
   (iii) 24 times the thickness of the thinner part of tension elements.
(b) A continuous fillet weld with a length of 6/7 of the width of narrower plate should be provided on each side of plate at both ends.
(c) In staggered intermittent fillet welds, the clear unconnected gap should be measured between the ends of welds on opposing sides.
(d) Intermittent fillet welds should not be used in corrosive conditions or to resist fatigue loads.

Lap Joints
The minimum lap should be 8t or 25 mm whichever is the greater, where t is the thickness of the thinner part joined.

Column base plates and slabs
Steel packings shall be supplied to allow the structure to be properly lined and leveled and of sufficient size to avoid local crushing of the concrete.

Base packings shall be placed so that they do not prevent subsequent grouting to completely fill all spaces directly under the base plates. Base packings may be left permanently in place.

Grouting
Grouting shall not be carried out under column base plates until a sufficient portion of the structure has been aligned, leveled, plumbed and adequately braced.

Immediately before grouting, the space under column base plates shall be clean and free of all extraneous matter.
PILE FOUNDATION PLAN-2 @ (±0'-0") LEVEL

SCALE: 1" = 10'-0"

LEGEND

- 200mm R.C Square Pile
- RCW1 (9" Thk; R.C Wall)
- CP4
- CP5
- CP6

NOTE

PROJECT
THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

OWNER/APPICANT
MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE ( 4 ),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

DESIGNED BY - DCC
CHECKED BY - M3T

OWNER/APPLICANT

DWIR

THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

DCC

PROJECT

PILE FOUNDATION PLAN-2
@ (±0'-0") LEVEL

scale : 1" = 10'-0"
**CP2 PILE CAP PLAN**
**SCALE: 1" = 2'-0"**

- 200mm R.C Square Pile
- CP2 48" thick, Pile Cap
- D16 @ 6" c/c (Loop)
- D16 @ 6" c/c
- CP2 48" thick, (1:3:6) Lean Concrete

---

**CP4 PILE CAP PLAN**
**SCALE: 1" = 2'-0"**

- 200mm R.C Square Pile
- CP4 48" thick, Pile Cap
- D16 @ 6" c/c (Loop)
- D16 @ 5" c/c
- 3" thick, (1:3:6) Lean Concrete

---

***Reinforcement for R.C Column not shown for clarity.***
CP5 PILE CAP PLAN
SCALE: 1" = 2'-0"

CP6 PILE CAP PLAN
SCALE: 1" = 2'-0"

CP5 PILE CAP SECTION
SCALE: 1" = 2'-0"

CP6 PILE CAP SECTION
SCALE: 1" = 2'-0"

*** Reinforcement for R.C Column not shown for clarity.
SECTION 1-1
(LIFT PIT SECTION)

SCALE: 1" = 2'-0"

1 1/2" thk; (1:2:4) Cement Concrete
Finished Floor

4 1/2" thk; (1:3:6) Lean Concrete
6" thk; Sand Filling
Hardcore Filling

3" thk; (1:3:6) Lean Concrete

B12x14

B12x16

RCW1 (9" thk; R.C Wall)

D12 @ 5" c/c (Horizontal Steel)
D10 @ 5" c/c (Vertical Steel)
D8 @ 10" c/c (Additional Link Steel)

RCW1 (9" thk; R.C Wall)

D12 @ 5" c/c (Horizontal Steel)
D10 @ 5" c/c (Vertical Steel)
D8 @ 10" c/c (Additional Link Steel)

3" thk; (1:3:6) Lean Concrete

+2'-0" G.F.L

-2'-0" Cap Top Level

MOTHER CONSTRUCTION COMPANY LIMITED
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com
COLUMN LAYOUT PLAN
(FOUNDATION – FIRST FLOOR LEVEL)
SCALE : 1" = 10'-0"

COLUMN LAYOUT PLAN
(FOUNDATION – FIRST FLOOR LEVEL)
SCALE : 1" = 10'-0"
GROUND FLOOR BEAM PLAN

SCALE : 1" = 10'-0"

NOTE

OWNER/SUPPLICANT

PROJECT

THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

BLOCK NO.

LOT NO.

TOWNSHIP

SUBJECT

GROUND FLOOR BEAM PLAN

DIMENSION: In

SCALE: As shown

DATE:

REVISION:

DRAWN BY: M3T

DESIGNED BY: DCC

CHECKED BY: DCC

OWNER/APPLICANT

MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL: 618203, 618385, 618386, 618387.
Email: mmotherconstruction@gmail.com

L.S

DESIGNED BY-

REVISION.

OWNER/APPLICANT

DWIR-3STY-PMU-S08

GROUND FLOOR BEAM PLAN

As shown
COLUMN LAYOUT PLAN
(FIRST FLOOR LEVEL – SECOND FLOOR LEVEL)
SCALE: 1" = 10'-0"

LEGEND:
- Column Above Storeyed
- Column Below & End Storeyed
- Prop Column on Beam

NOTES:
- OWNER/AGENT: DWIR
- PROJECT: THREE STOREYED PMU BUILDING (72'-4" x 73'-4" x 57'-0")
- BLOCK NO.: -
- LOT NO.: -
- TOWNSHIP: -
- SUBJECT: COLUMN LAYOUT PLAN (FIRST FLOOR LEVEL – SECOND FLOOR LEVEL)
- DIMENSION: ft-in
- SCALE: As shown
- DATE: 14.02.2017
- REVISON: DCC
- DRAWN BY: DCC
- DRAWN BY: MIST
- DESIGNED BY: DCC
- CHECKED BY: DCC
- OWNER/APPLICANT: DWIR
- DWIR-3STY-PMU-S10
- As shown

NOTE:
- PROJECT:
  - DWIR
  - 3STY-PMU
  - S10

- DWIR PROJECT:
  - DWIR-3STY-PMU-BUILDING

- DRAWING:
  - DWIR-3STY-PMU-BUILDING
  - 14.02.2017

- DIMENSION:
  - ft-in

- SCALE:
  - As shown

- DATE:
  - 14.02.2017

- REVISON:
  - DCC

- DRAWN BY:
  - MIST

- DESIGNED BY:
  - DCC

- CHECKED BY:
  - DCC

- OWNER/APPLICANT:
  - DWIR

- DWIR-3STY-PMU-BUILDING

- DWIR PROJECT:
  - DWIR-3STY-PMU-BUILDING

- DRAWING:
  - DWIR-3STY-PMU-BUILDING
  - 14.02.2017

- DIMENSION:
  - ft-in

- SCALE:
  - As shown

- DATE:
  - 14.02.2017

- REVISON:
  - DCC

- DRAWN BY:
  - MIST

- DESIGNED BY:
  - DCC

- CHECKED BY:
  - DCC

- OWNER/APPLICANT:
  - DWIR

- DWIR-3STY-PMU-BUILDING

- DWIR PROJECT:
  - DWIR-3STY-PMU-BUILDING

- DRAWING:
  - DWIR-3STY-PMU-BUILDING
  - 14.02.2017

- DIMENSION:
  - ft-in

- SCALE:
  - As shown

- DATE:
  - 14.02.2017

- REVISON:
  - DCC

- DRAWN BY:
  - MIST

- DESIGNED BY:
  - DCC

- CHECKED BY:
  - DCC

- OWNER/APPLICANT:
  - DWIR

- DWIR-3STY-PMU-BUILDING
FIRST FLOOR SLAB PLAN

SCALE: 1" = 10'-0"
STAIR CASE ROOF BEAM, LANDING BEAM & SLAB PLAN (1F ~ 2F)

SCALE: 1" = 10'-0"

+25'-6") Beam & Slab Top Level
+26'-0") Beam & Slab Top Level
+26'-6") Beam & Slab Bottom Level
+25'-6") Beam & Slab Bottom Level
COLUMN LAYOUT PLAN
(PENTHOUSE FLOOR LEVEL ~ PENTHOUSE ROOF LEVEL)
SCALE: 1" = 10'-0"
PENTHOUSE FLOOR BEAM PLAN

SCALE : 1" = 10'-0"

NOTE

OWNER/SUPPLICANT

PROJECT

THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

BLOCK NO.

LOT NO.

TOWNSHIP

SUBJECT

PENTHOUSE FLOOR BEAM PLAN

DIMENSION.

ft-in

SCALE.

As shown

DATE.

14.02.2017

REVISION.

DWIR-3STY-PMU-S19

DRAWN BY.

M3T

DESIGNED BY.

DCC

CHECKED BY.

DCC

OWNER/APPLICANT

MOTHER CONSTRUCTION COMPANY LIMITED.

No.56, SAT SAYA U TUN ROAD,

INDUSTRIAL ZONE ( 4 ),

SHWE PYI THAR TOWNSHIP, YANGON.

TEL : 618203, 618385, 618386, 618387.

Email : mmotherconstruction @ gmail.com

L.S

DESIGNED BY-

REVISION.

OWNER/APPLICANT

DWIR

THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")
PENTHOUSE ROOF PARAPET BEAM & SLAB PLAN

SCALE: 1" = 10'-0"

LEGEND
8" Thk; R.C Parapet Slab (Ramp Slab)

OWNER/RECIPIENT

PROJECT
THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0"

DATE
14.02.2017

DRAWN BY
M3T

CHECKED BY
DCC

DESIGNED BY
DCC

OWNER/APPLICANT

DWIR

THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0"

- PENTHOUSE ROOF PARAPET BEAM & SLAB PLAN

- As shown

- MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387:
Email : mmotherconstruction @ gmail.com

D:\M3T (Working Files)\DWIR PROJECTS\3-STOREY PMU BUILDING\AUTO CAD\STRU (Dwg)\DWG 11.08.2017 UPDATE\STRU (Dwg)\PMU DWG (DWIR).dwg, ISO full bleed A3 (420.00 x 297.00 MM)
A

2-D16 (Additional Steel)

2-D16 (Main Steel)

2-D16 (Additional Steel)

2-D16 (Main Steel)

2-D16 (Additional Steel)

2-D16 (Main Steel)

B12x8 PARAPET BEAM SECTION 2-2

SCALE: 1" = 2'-0"

B12x8 PARAPET BEAM SECTION 3-3

SCALE: 1" = 2'-0"

8" Thk. R.C Parapet Slab

D12 @ 6" c/c

D12 @ 6" c/c

8" Thk. R.C Parapet Slab

D10 @ 6" c/c (Stirrup)

D10 @ 8" c/c

D10 @ 8" c/c

B12x14

B12x18

PARAPET SLAB SECTION 3-3

SCALE: 1" = 2'-0"

PARAPET SLAB SECTION 4-4

SCALE: 1" = 2'-0"

PARAPET SLAB SECTION 5-5

SCALE: 1" = 2'-0"

PARAPET SLAB SECTION 6-6

SCALE: 1" = 2'-0"
MAIN STAIR SECTION & DETAIL
(from Landing Level ~ First Floor Level)
SCALE : 3" = 8'-0"

- Stair Tread = 11"
- Riser = 6"
- Waist = 6"

- D16 @ 6" c/c (Main Steel)
- D10 @ 8" c/c (Dist. Steel)

- B12x18
- B-16X18
- B12x16
- B14x18
- B12x14
- B14x20

MAIN STAIR SECTION & DETAIL
(from Ground Floor Level ~ Landing Level)
SCALE : 3" = 8'-0"

- Stair Tread = 11"
- Riser = 6"
- Waist = 6"

- D16 @ 6" c/c (Main Steel)
- D10 @ 8" c/c (Dist. Steel)

- B12x18
- B-16X18
- B12x16
- B14x20
- B12x14
- B14x20

Cement Concrete
Finished Floor
Lean Concrete
6" thk: Sand Filling
Hardcore Filling

THREE STORYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

OWNER
MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

NOTE
PROJECT
SUBJECT
BLOCK NO.
LOT NO.
TOWNSHIP
SCALE.
DATE.
DRAWN BY - MST
CHECKED BY - DCC
DESIGNED BY - DCC
REVISION.
DIMENSION.
DWG NO.
OWNER/ APPLICANT
DWIR
M3T
THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

DWIR-3STY-PMU-S27
As shown
DCC
DCC

D:\M3T (Working Files)\DWIR PROJECTS\STOYERY PMU BUILDING\AUTO CAD\STU; DWG (STU); DWG 11.08.2017 UPDATE\STU; DWG\STU; DWG (STU) (256.00 x 256.00 MM)
EMERGENCY STAIR SECTION & DETAIL
(from Landing Level ~ First Floor Level)
SCALE : 3" = 8'-0"

EMERGENCY STAIR SECTION & DETAIL
(from Ground Floor Level ~ Landing Level)
SCALE : 3" = 8'-0"
C1 COLUMN SECTION @ GRID-C

Scale: 3" = 8'-0"

*** Reinforcement for R.C beam not shown for clarity.
TIE ROD CONNECTION DETAIL-2

SCALE: 1 : 5

SECTION 9-9

SCALE: 1 : 5

20mm Thk; Mild Steel Plate

12mm Thk; Mild Steel Gusset Plate

6-M12 with 100mm Embedment Depth Expansion Anchor

12mm Thk; Mild Steel Gusset Plate

20mm Thk; Mild Steel Plate

20mm Thk; Mild Steel Plate

6-M12 with 100mm Embedment Depth Expansion Anchor

12mm Thk; Mild Steel Gusset Plate

O-101 (O-101.3Ø x 4)
DETAIL-A
(H-100 x 100 x 6 x 8) CURVE BEAM TO R.C COLUMN CONNECTION DETAIL
SCALE - 1 : 5

DETAIL-B
SIDE ELEVATION
[L-4X2 TO R.C BEAM CONNECTION DETAIL
SCALE - 1 : 5

2-M12 with 100mm Embedment Depth Expansion Anchor

2-M12 with 100mm Embedment Depth Expansion Anchor

NOTE:
For other connection
Welding (Fw = 60 ksi)
Camber (min.) = 1°
### COLUMN SCHEDULE

<table>
<thead>
<tr>
<th>Column Size</th>
<th>Main Steel Reinforcement</th>
<th>Tie Steel</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-20' x 24'</td>
<td>20 - D20</td>
<td>(4-D10 Tie Steel + 1-D10 Link Steel) @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4-D10 Tie Steel + 1-D10 Link Steel) @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-18' x 22'</td>
<td>18 - D20</td>
<td>3-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-16' x 24'</td>
<td>16 - D20</td>
<td>3-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-16' x 20'</td>
<td>16 - D20</td>
<td>3-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-16' x 16'</td>
<td>12 - D20</td>
<td>3-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-14' x 18'</td>
<td>12 - D20</td>
<td>3-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-14' x 16'</td>
<td>10 - D20</td>
<td>(2-D10 Tie Steel + 1-D10 Link Steel) @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2-D10 Tie Steel + 1-D10 Link Steel) @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-14' x 14'</td>
<td>10 - D20</td>
<td>2-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
<tr>
<td>C-12' x 12'</td>
<td>4 - D20 (Corner) + 4 - D16</td>
<td>2-D10 Tie Steel @ 4&quot; c/c spacing @ shear zone</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-D10 Tie Steel @ 6&quot; c/c spacing @ normal zone</td>
<td>-</td>
</tr>
</tbody>
</table>

### COLUMN ARRANGEMENT

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>C1</td>
<td>C-20' x 24'</td>
<td>C-20' x 24'</td>
<td>C-18' x 22'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
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<td>C2</td>
<td>C-20' x 24'</td>
<td>C-20' x 24'</td>
<td>C-18' x 22'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
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<tr>
<td>C3</td>
<td>C-20' x 24'</td>
<td>C-20' x 24'</td>
<td>C-16' x 24'</td>
<td>C-14' x 14'</td>
<td>C-12' x 12'</td>
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<td></td>
</tr>
<tr>
<td>C4</td>
<td>C-16' x 24'</td>
<td>C-16' x 24'</td>
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<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
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<td></td>
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<tr>
<td>C5</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-14' x 16'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
<td></td>
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</tr>
<tr>
<td>C7</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-14' x 16'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
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<td></td>
</tr>
<tr>
<td>C8</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
<td>C-12' x 12'</td>
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<tr>
<td>C9</td>
<td>C-16' x 16'</td>
<td>C-16' x 16'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
<td>C-14' x 14'</td>
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<tr>
<td>C10</td>
<td>C-12' x 12'</td>
<td>C-12' x 12'</td>
<td>C-12' x 12'</td>
<td>C-12' x 12'</td>
<td>C-14' x 14'</td>
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<td></td>
</tr>
<tr>
<td>PC1</td>
<td>-</td>
<td>-</td>
<td>C-16' x 20'</td>
<td>C-14' x 14'</td>
<td></td>
<td>Prop Column on Beam</td>
<td></td>
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</tbody>
</table>
### FLOOR BEAM SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (in x in)</th>
<th>Main Reinforcement (Throughout)</th>
<th>Main Reinforcement (Additional)</th>
<th>Shaping</th>
<th>Tension Steel (f) mid of depth</th>
<th>Remark</th>
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<tbody>
<tr>
<td>B20x36</td>
<td>20&quot; x 36&quot;</td>
<td>14-D20</td>
<td>6-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>4-D16</td>
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<tr>
<td>B16x30</td>
<td>16&quot; x 30&quot;</td>
<td>5-D20</td>
<td>1-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>4-D16</td>
<td></td>
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<tr>
<td>B16x22</td>
<td>16&quot; x 22&quot;</td>
<td>6-D20</td>
<td>1-D20</td>
<td>2-D10 @ 4&quot; c/c + 1-D10 Link @ 4&quot; c/c</td>
<td>4-D16</td>
<td></td>
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<tr>
<td>B16x20</td>
<td>16&quot; x 20&quot;</td>
<td>6-D20</td>
<td>1-D20</td>
<td>2-D10 @ 4&quot; c/c + 1-D10 Link @ 4&quot; c/c</td>
<td>4-D16</td>
<td></td>
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<tr>
<td>B14x24</td>
<td>14&quot; x 24&quot;</td>
<td>3-D20</td>
<td>2-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>4-D16</td>
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<tr>
<td>B14x22</td>
<td>14&quot; x 22&quot;</td>
<td>6-D20</td>
<td>1-D20</td>
<td>2-D10 @ 4&quot; c/c + 1-D10 Link @ 4&quot; c/c</td>
<td>4-D16</td>
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<tr>
<td>B14x20</td>
<td>14&quot; x 20&quot;</td>
<td>6-D20</td>
<td>1-D20</td>
<td>2-D10 @ 4&quot; c/c + 1-D10 Link @ 4&quot; c/c</td>
<td>4-D16</td>
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<tr>
<td>B14x18</td>
<td>14&quot; x 18&quot;</td>
<td>4-D20</td>
<td>2-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
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</tr>
<tr>
<td>B12x24</td>
<td>12&quot; x 24&quot;</td>
<td>4-D20</td>
<td>2-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
<td></td>
</tr>
<tr>
<td>B12x22</td>
<td>12&quot; x 22&quot;</td>
<td>3-D20</td>
<td>3-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
<td></td>
</tr>
<tr>
<td>B12x20</td>
<td>12&quot; x 20&quot;</td>
<td>4-D20</td>
<td>4-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
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</tr>
<tr>
<td>B12x18</td>
<td>12&quot; x 18&quot;</td>
<td>4-D20</td>
<td>2-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
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</tr>
<tr>
<td>B12x16</td>
<td>12&quot; x 16&quot;</td>
<td>4-D20</td>
<td>4-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
<td></td>
</tr>
<tr>
<td>B12x14</td>
<td>12&quot; x 14&quot;</td>
<td>4-D20</td>
<td>2-D20</td>
<td>2-D10 @ 4&quot; c/c</td>
<td>2-D16</td>
<td></td>
</tr>
<tr>
<td>B12x12</td>
<td>12&quot; x 12&quot;</td>
<td>3-D20</td>
<td>3-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B12x8</td>
<td>12&quot; x 8&quot;</td>
<td>See B12x8 Section</td>
<td></td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B12x8A</td>
<td>12&quot; x 8&quot;</td>
<td>2-D16</td>
<td>2-D16</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B10x16</td>
<td>10&quot; x 16&quot;</td>
<td>4-D20</td>
<td>4-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B10x14</td>
<td>10&quot; x 14&quot;</td>
<td>4-D20</td>
<td>4-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B10x12</td>
<td>10&quot; x 12&quot;</td>
<td>3-D20</td>
<td>3-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B10x10</td>
<td>10&quot; x 10&quot;</td>
<td>2-D20</td>
<td>2-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B8x14</td>
<td>8&quot; x 14&quot;</td>
<td>2-D20</td>
<td>2-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B8x12</td>
<td>8&quot; x 12&quot;</td>
<td>2-D20</td>
<td>2-D20</td>
<td>1-D10 @ 4&quot; c/c</td>
<td>1-D10 @ 4&quot; c/c</td>
<td></td>
</tr>
<tr>
<td>B8x6</td>
<td>6&quot; x 6&quot;</td>
<td>2-D12</td>
<td>2-D12</td>
<td>1-D8 @ 5&quot; c/c</td>
<td>1-D8 @ 5&quot; c/c</td>
<td></td>
</tr>
</tbody>
</table>

### R.C WALL SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Thickness</th>
<th>Steel Reinforcement (Outer Side)</th>
<th>Steel Reinforcement (Inner Side)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCW1</td>
<td>12&quot;</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
<td>D12 @ 5&quot; c/c Horizontal &amp; Vertical Link Steel</td>
</tr>
</tbody>
</table>
B16x30 (B-16"x30")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B16x22 (B-16"x22")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B14x20 (B-14"x20")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B14x18 (B-14"x18")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x24 (B-12"x24")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B20x36 (B-20"x36")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B16x30 (B-16"x30")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B16x22 (B-16"x22")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B14x24 (B-14"x24")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B14x22 (B-14"x22")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B14x20 (B-14"x20")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B14x18 (B-14"x18")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x24 (B-12"x24")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x22 (B-12"x22")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x20 (B-12"x20")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x18 (B-12"x18")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x16 (B-12"x16")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup

B12x14 (B-12"x14")
Main Steel & Stirrup Arrangement

At Support
At Mid
Stirrup
### Floor Slab Schedule

<table>
<thead>
<tr>
<th>Type</th>
<th>Thk:</th>
<th>Layer</th>
<th>Short Direction Steel</th>
<th>Long Direction Steel</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discontinuous</td>
<td>Mid Span</td>
<td>Continuous</td>
</tr>
<tr>
<td>Main Stair</td>
<td>6&quot;</td>
<td>Top</td>
<td>D16 @ 6&quot; c/c</td>
<td>-</td>
<td>D16 @ 6&quot; c/c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom</td>
<td>D16 @ 6&quot; c/c</td>
<td>D16 @ 6&quot; c/c</td>
<td>D16 @ 6&quot; c/c</td>
</tr>
<tr>
<td>Emergency Stair</td>
<td>6&quot;</td>
<td>Top</td>
<td>D16 @ 6&quot; c/c</td>
<td>-</td>
<td>D16 @ 6&quot; c/c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom</td>
<td>D16 @ 6&quot; c/c</td>
<td>D16 @ 6&quot; c/c</td>
<td>D16 @ 6&quot; c/c</td>
</tr>
<tr>
<td>Passage Way Stair</td>
<td>6&quot;</td>
<td>Top</td>
<td>D16 @ 6&quot; c/c</td>
<td>-</td>
<td>D16 @ 6&quot; c/c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom</td>
<td>D16 @ 6&quot; c/c</td>
<td>D16 @ 6&quot; c/c</td>
<td>D16 @ 6&quot; c/c</td>
</tr>
</tbody>
</table>

### Steel Member Schedules

<table>
<thead>
<tr>
<th>Type</th>
<th>Sectional Dimension (mm)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB-100X100</td>
<td>H - 100 x 100 x 6 x 8</td>
<td>H Section</td>
</tr>
<tr>
<td>[]-4X2</td>
<td>[] - 100 x 50 x 2.3</td>
<td>Rectangular Hollow Section</td>
</tr>
<tr>
<td>O-101</td>
<td>O - 101.32 x 4</td>
<td>Circular Hollow Section</td>
</tr>
</tbody>
</table>
THREE STOREYED TOILET BUILDING
(32'-0" x 16'-0" x 47'-0")
PILE FOUNDATION PLAN

LEGEND

- 200mm R.C Square Pile
- 12" x 12" RC Column

SCALE: 1" = 1'-0"
RETAINING WALL PLAN

SCALE: \( \frac{1}{4}'' = 1'-0'' \)

- 9" Thk; Brick Retaining Wall
- 3" thk; (1:3:6) lean concrete under all the ground floor beam without retaining wall
### COLUMN SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Column Size</th>
<th>Main Steel Reinforcement</th>
<th>Tie</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>C-12&quot; x 12&quot;</td>
<td>6 - D20</td>
<td>1-D10 + 1-D10 Cross Tie @ 4&quot; c/c spacing (shear zone)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-D10 + 1-D10 Cross Tie @ 6&quot; c/c spacing (normal zone)</td>
<td></td>
</tr>
</tbody>
</table>

### FLOOR BEAM SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Size (in x in)</th>
<th>Main Reinforcement (Throughout)</th>
<th>Main Reinforcement (Additional)</th>
<th>Stirrup</th>
<th>Torsion Steel (At mid of depth)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Top Bar</td>
<td>Bottom Bar</td>
<td>Top Bar</td>
<td>Bottom Bar</td>
<td>At Joint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>At Supports</td>
<td>At Mid</td>
<td>At Supports</td>
<td>At Mid</td>
<td></td>
</tr>
<tr>
<td>B-12x18</td>
<td>12&quot; x 18&quot;</td>
<td>3-D20</td>
<td>3-D20</td>
<td>-</td>
<td>-</td>
<td>1-D10 @ 4&quot; c/c</td>
</tr>
<tr>
<td>B-13x16</td>
<td>12&quot; x 16&quot;</td>
<td>4-D20</td>
<td>4-D20</td>
<td>-</td>
<td>-</td>
<td>1-D10 @ 4&quot; c/c</td>
</tr>
<tr>
<td>B-10x10</td>
<td>10&quot; x 10&quot;</td>
<td>2-020</td>
<td>2-020</td>
<td>-</td>
<td>-</td>
<td>1-D10 @ 4&quot; c/c</td>
</tr>
<tr>
<td>B-6x5</td>
<td>6&quot; x 5&quot;</td>
<td>2-012</td>
<td>2-012</td>
<td>-</td>
<td>-</td>
<td>1-D8 @ 5&quot; c/c</td>
</tr>
</tbody>
</table>

### FLOOR SLAB SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Thk;</th>
<th>Layer</th>
<th>Short Direction Steel</th>
<th>Long Direction Steel</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discontinuous</td>
<td>Mid Span</td>
<td>Continuous</td>
</tr>
<tr>
<td>S1</td>
<td>5&quot;</td>
<td>Top</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
</tr>
<tr>
<td>S2</td>
<td>5&quot;</td>
<td>Top</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
<td>D10 @ 8&quot; c/c</td>
</tr>
</tbody>
</table>
MAIN CAR PARK FOR PMU BUILDING
(80'-0" x 15'-0" x 12'-0")
CAR PARK LAYOUT PLAN

SCALE: 1" = 8'-0"

---

Three Storied PMU Building

---

ROAD

---

CAR PARK LAYOUT PLAN

OWNER: MOTHER CONSTRUCTION COMPANY LIMITED
No.56, SAT SAYA U TUN ROAD, INDUSTRIAL ZONE (4), SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

DIMENSION: 72'-4" x 73'-4" x 57'-0"

DESIGNED BY -
REVISION -
DRAWN BY -
CHECKED BY -
NOTE

PROJECT

SUBJECT

BLOCK NO.

LOT NO.

TOWNSHIP

SCALE:

DATE:

DRAWN BY:

CHECKED BY:

OWNER

MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

L.S

DESIGNED BY:

REVISION

OWNER/APPLICANT

DWIR

THREE STOREYED PMU BUILDING
(72'-4" x 73'-4" x 57'-0")

DIMENSION:

SCALE:

DATE:

REVISION

DRAWN BY:

CHECKED BY:

MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

FOOTING SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Steel Reinforcement</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>40&quot;x4&quot;</td>
<td>9&quot;</td>
<td>6-D16 Both Way</td>
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</table>

GROUND BEAM SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Main Reinforcement</th>
<th>Stipul</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB1</td>
<td>9&quot;x9&quot;</td>
<td>2-D16</td>
<td></td>
</tr>
</tbody>
</table>

M.S PIPE SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Thickness</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; M.S Pipe</td>
<td>2.2mm</td>
<td>-</td>
</tr>
<tr>
<td>1/2&quot; M.S Pipe</td>
<td>2.8mm</td>
<td>-</td>
</tr>
<tr>
<td>3/4&quot; M.S Pipe</td>
<td>3.2mm</td>
<td>-</td>
</tr>
</tbody>
</table>

COLUMN SCHEDULE

<table>
<thead>
<tr>
<th>Type</th>
<th>Column Size</th>
<th>Main Reinforcement</th>
<th>Tie Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>10&quot;x18&quot;</td>
<td>6-D16</td>
<td>6# @ 4&quot; C/C</td>
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</table>

RETAINING WALL SECTION

<table>
<thead>
<tr>
<th>Type</th>
<th>Thickness</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot;</td>
<td></td>
<td>Brick Retaining Wall</td>
</tr>
<tr>
<td>9&quot;</td>
<td></td>
<td>3&quot; thick lean concrete</td>
</tr>
</tbody>
</table>
CAR PARK ROOF TRUSS & PURLIN PLAN

DIMENSION: 14.02.2017
SCALE: As shown
DATE: 14.02.2017
REVISION: DWIR-3STY-PMU-CP-S02
DRAWN BY: MST
DESIGNED BY: DCC
CHECKED BY: DCC

MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

ROOF TRUSS & PURLIN PLAN
SCALE 1" = 1'-0"
T-2 ELEVATION
SCALE: 1/8" = 1'-0"

1 1/2" M.S Pipe (Vertical & Inclined Web Members)
2" M.S Pipe (Top & Bottom Chords)

T-3 ELEVATION
SCALE: 1/8" = 1'-0"
THREE STOREYED PMU BUILDING (72'-4" x 73'-4" x 57'-0")

14.02.2017

MOTHER CONSTRUCTION COMPANY LIMITED.
No.56, SAT SAYA U TUN ROAD,
INDUSTRIAL ZONE (4),
SHWE PYI THAR TOWNSHIP, YANGON.
TEL : 618203, 618385, 618386, 618387.
Email : mmotherconstruction @ gmail.com

CAR PARK FRAME ELEVATION
DIMENSION: ft-in
SCALE: As shown
DATE: 14.02.2017
REVISION

DOW NO.: DWIR-JSTY-PMU-CP-S04
DRAWN BY: - MST
DESIGNED BY: - DCC
CHECKED BY: - DCC

SECTION ON GRID-1
SCALE: 1/2" = 1'-0"