STRUCTURAL CONSTRUCTION DRAWINGS

IBA GIRLS HOSTEL 186.6 KWP SYSTEMS INSTALLATION

JUNE 2025

CONSULTANT:

KESTEC

INTERNATIONAL

A. GENERAL NOTES:-

1- ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECTURAL AND OTHER SERVICES DRAWINGS
2- ANY DISCREPANCY IN THE CONTRACT DOCUMENTS SHALL BE REFERRED TO THE ENGINEER FOR DECISION BEFORE PROCEEDING WITH THE WORK. THE STRUCTURAL DRAWINGS TAKE PRECEDANCE OVER THE SPECIFICATION.
3- THE CONTRACTOR IS REQUIRED TO VISIT THE SITE AND FULLY ACQUAINT HIMSELF WITH THE EXISTING SITE CONDITIONS AND IN PARTICULAR THE CLOSE PROXIMITY OF ADJACENT PROPERTIES, LT AND HT CABLES, EXISTING SERVICES OR OTHER ASPECTS LIABLE TO AFFECT CONSTRUCTION OF THE NEW WORKS, ANY CLAIMS MADE BY THE CONTRACTOR ON THE GROUNDS OF LACK OF KNOWLEDGE OF SITE CONDITIONS WILL NOT BE ENTERTAINED.
4- THE CONTRACTOR SHALL ENGAGE HIS OWN PROFESSIONAL ENGINEER TO DESIGN, PROVIDE AND REMOVE ALL NECESSARY TEMPORARY WORKS WHETHER SPECIFICALLY MENTIONED OR NOT,TO SUPPORT ADJACENT WORK/ STRUCTURES/EXCAVATION AND/OR TO PREVENT SUBSIDENCE OF ABUTTING ROADS. TEMPORARY WORKS SHALL DEEM TO INCLUDE ANY MONITORING MEASURES REQUIRED TO AVOID DAMAGE TO EXISTING PROPERTIES AS WELL AS PRE-CONSTRUCTION CONDITION SURVEY TO DOCUMENT EXISTING CONDITIONS OF ADJACENT PROPERTIES. ALL NECESSARY SAFETY MEASURES INCLUDING SHIELDING, PROVIDING ADEQUATE BARRIERS AND SIGNS, SHALL BE TAKEN DURING THE WHOLE OPERATION.
5- SETTING-OUT DIMENSIONS AND SIZES OF STRUCTURAL MEMBERS SHALL NOT BE OBTAINED BY SCALING THE STRUCTURAL DRAWINGS.
6- ANY SETTING-OUT DIMENSION SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE VERIFIED ON SITE AND WITH THE ARCHITECTURAL DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS.
7- WHERE EXCAVATION WORK IS TO BE CARRIED OUT THE EXACT LEVEL OF THE UNDERSIDE OF THE FOUNDATION SHALL BE OBTAINED PRIOR TO EXCAVATION. UNDERPINNING AND SHORING OF THE STRUCTURE SHALL BE CARRIED OUT AS NECESSARY AND ADJOINING STRUCTURE SHALL BE MAINTAINED IN A STABLE AND SOUND CONDITION.
8- ADEQUATE TEMPORARY DRAINAGE SYSTEM INCLUDING DEWATERING SYSTEMS, DRAIN CHANNELS, SUMPS SHALL BE PROVIDED TO ENSURE DRY SITE CONDITIONS AND THE STABILITY OF THE BASE OF THE EXCAVATION AT ALL TIMES. THE DESIGN OF SUCH DRAINS AND DISCHARGE POINTS MUST BE APPROVED BY THE ENGINEER. DESIGN, INSTALLATION, OPERATION & MAINTENANCE OF PROPER DEWATERING SYSTEM SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. A NETWORK OF TEMPORARY CUT-OFF DRAINS, INCLUDING SILT TRAPS AND WASH BAYS SHALL BE PROVIDED BY THE CONTRACTOR TO ADEQUATELY DRAIN THE SITE AND CONTROL MUD/SILT FROM FLOWING INTO ADJOINING PREMISES.
9- DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION. CONSTRUCTION LOADS MUST NOT EXCEED THE CAPACITY OF THE STRUCTURE AT THE TIME OF LOADING. REFER TO KEY PLANS FOR DESIGN LOADS.
10- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT EDITIONS, INCLUDING AMENDMENTS, OF THE RELEVANT ACI STANDARDS (WHERE APPLICABLE).
11- REFER TO ARCHITECTURAL DRAWINGS FOR BRICK AND BLOCK WALL THICKNESSES WHERE NOT MENTIONED ON THESE DRAWINGS AND FOR FALLS IN SLABS, EXTRA PACKINGS, WATER-PROOFING MEMBRANES, CONTRACTION JOINT FILLING MATERIALS AND ALL ARCHITECTURAL FEATURES SUCH AS DRIP GROOVES, POUR BREAKS IN OFF-FORM CONCRETE, FILLETS, ETC.
12- ALL CONCRETE SURFACES EXPOSED TO PUBLIC VIEW MUST BE CONSTRUCTED TO FAIRFACED TOLERANCES.

B. FOOTINGS:-

1- ALL FOOTING EXCAVATIONS SHALL BE CLEANED OF LOOSE MATERIAL AND WATER.
2- ALL FOUNDATION MATERIAL SHALL BE INSPECTED BY THE CONSULTING ENGINEER BEFORE ANY CONCRETE IS PLACED.
3- WHERE VERIFIED FOUNDATION MATERIAL IS FOUND LOWER THAN THE UNDERSIDE OF FOOTINGS AS DETAILED, BACKFILL THE SPACE BETWEEN FOUNDING MATERIAL AND FOOTING SOFFIT WITH LEAN CONCRETE.
4- ALL WALLS AND COLUMNS SHALL BE CONCENTRIC WITH SUPPORTING FOOTINGS UNLESS OTHERWISE NOTED ON THE DRAWINGS.
5- UNLESS APPROVED BY THE CONSULTING ENGINEER, EXCAVATIONS SHALL NOT EXTEND BELOW A LINE DIPPING AT 45 DEGREES AND AWAY FROM THE NEAREST UNDERSIDE CORNER OF ANY FOOTING.
6- THE CONTRACTOR SHALL SUBMIT HIS PROPOSED METHODS STATEMENT FOR THE CONSTRUCTION OF RETAINING WALLS, AND FOUNDATION PRIOR TO THE COMMENCEMENT OF WORK, FOR ENGINEER'S APPROVAL/RECORD.
7- SOIL BEARING CAPACITY FOR ISOLATED/ COMBINED FOOTINGS HAS TAKEN AS 1.0 TSF AT 5'-0" BELOW E.G.L.

C. CONCRETE:-

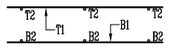
1- PRIOR TO CONSTRUCTION OF ANY LEVEL, THE CONTRACTOR IS TO SUBMIT A PROPOSAL DEPICTING LOCATION OF CONSTRUCTION JOINTS AND SEQUENCE OF CONSTRUCTION TO SUIT THEIR CONCRETING PROGRAMME TO THE ENGINEER FOR APPROVAL.
2- CONSTRUCTION JOINTS OR POUR BREAKS, WHERE NOT SHOWN ON PLANS OR DETAILS, SHALL BE LOCATED AND FORMED TO THE APPROVAL OF THE ENGINEER.
3- WATERSTOPS SHALL BE PROVIDED AT ALL CONSTRUCTION JIONTS OF WALLS OR SLABS EXPOSED TO THE THE GROUND, WEATHER OR WATER, SUCH AS RETAINING WALLS, OPEN AREAS AND MECHANICAL FLOORS ETC. WHETHER SHOWN ON DRAWINGS OR NOT.
4- NO PENETRATIONS, RECESSES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE ENGINEER.
5- ALL OPENINGS FOR PIPING AND CONVEYANCE SHALL BE FORMED IN POSITION BEFORE CASTING CONCRETE.
6- CAMBER TO SUSPENDED SLABS AND BEAMS TO BE 1/4" FOR EVERY 6'-6" OF SPAN UNLESS NOTED OTHERWISE. CANTILEVERS SHALL BE CAMBERED 3/8" FOR EVERY 6'-6" OF SPAN.
7- UNLESS SPECIFIED OTHERWISE ALL REINFORCED CONCRETE SHALL HAVE A MINIMUM CYLINDER STRENGTH OF 3000 PSI. AT 28 DAYS AS FOLLOWS :
   (A) ALL COLUMNS 4000 PSI
   (B) FOOTINGS 3000 PSI
8- CONCRETE SHALL BE CONSOLIDATED BY VIBRATION. CURING OF ALL CONCRETE SURFACES SHALL BE DONE AS PER SPECIFICATIONS. ALL CONCRETE SURFACES EXPOSED TO WEATHER MUST BE COATED WITH AN APPROVED SILICONE IMPREGNATING PRIMER.
9- SAMPLING AND TESTING CONCRETE SHALL BE IN ACCORDANCE WITH ACI-318 (LATEST EDITION) UNLESS NOTED OTHERWISE.
10- BLOCK WORK SHALL NOT BE ERECTED ON CONCRETE SLABS OR BEAMS UNTIL FORMWORK SUPPORTING THE SAME HAS BEEN REMOVED.
11- SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
12- BEAM SIZES ARE WRITTEN IN THE FORM OF WIDTH X DEPTH AND INCLUDE SLAB THICKNESS WHERE SLAB IS PLACED INTEGRALLY WITH THE BEAM.
13- A BOND BREAKING MATERIAL IS TO BE PLACED BETWEEN SURFACES IN CONTACT AT PERMANENT JOINTS UNLESS NOTED OTHERWISE.
14- NO PENETRATIONS, RECESSES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE CONSULTING ENGINEER.
15- ALL OPENINGS FOR PIPING AND CONVEYANCE SHALL BE FORMED IN POSITION BEFORE CASTING CONCRETE.
16- ALL NON-LOAD BEARING WALLS SHALL BE KEPT CLEAR OF THE UNDERSIDE OF SLABS AND BEAMS BY 3/4", UNLESS NOTED OTHERWISE. THE GAP SHALL BE APPROPRIATELY SEALED WITH A COMPRESSIVE FILLER. AND SEALED TO ARCHITECT'S SPECIFICATIONS/APPROVAL. SIMILARLY VERTICAL INTERFACES BETWEEN RC COLUMNS/WALLS AND NON LOAD BEARING WALLS SHALL BE TREATED WITH APPROPRIATE JOINT DETAILS/SEALANTS ACCORDING TO ARCHITECT'S DETAILS. SPECFICATIONS AND APPROVALS. SUFFICIENT TIES TO ARCHITECT'S DETAILS/SPECIFICATIONS MUST BE USED ACROSS THESE JOINTS TO PROVIDE RESTRAINT TO NON LOAD BEARING WALLS.
17- UNLESS OTHERWISE NOTED, A MINIMUM 3" THICK LEAN CONCRETE LAYER SHALL BE PROVDED ON ALL SOIL SURFACES FORMING THE UNDERSIDE OF ANY REINFORCED CONCRETE BEAMS, SLABS, SUMP PITS, FOOTINGS, ETC.

D. REINFORCEMENT:-

1- ALL REINFORCEMENT SHALL CONFORM TO ASTM615 WITH A MINIMUM fy = 60,000 PSI.
2- PROVIDE BAR SUPPORTS OR SPACERS TO GIVE THE FOLLOWING CONCRETE COVER TO ALL REINFORCEMENT UNLESS NOTED OTHERWISE ON DRAWINGS. (COVER IS THE CLEAR DISTANCE FROM THE CONCRETE SURFACE TO THE NEAREST EDGE OFANY REINFORCEMENT)

ELEMENT		TOP	BOTTOM	SIDES
SLABS		3/4"	3/4"	-
BEAMS		1½"	1½"	1"
COLUMNS		-	-	N/A
	MORE THAN 8" WIDE	-	-	1½"
WALLS	EXTERNAL FACE	-	-	1½" EXT.FACE
	INTERNAL FACE	-	-	3/4" EXT.FACE
RETAINING WALLS		-	-	N/A
FOOTINGS		2"	3"	2"

3- ALL REINFORCEMENT TO BE FIRMLY SUPPORTED ON APPROVED CHAIRS GENERALLY AT NOT GREATER THAN 2'-6" CENTRES BOTHWAYS. BARS TO BE TIED AT ALTERNATE INTERSECTIONS. ONLY APPROVED PLASTIC BAR CHAIRS/SPACERS WILL BE ACCEPTABLE, NO MORTAR BLOCKS ARE PERMITTED.
4- SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN. ON THE DRAWINGS. FOR LAP LENGTHS, REFER TO TABLE I .
5- FIX REINFORCEMENT AS SHOWN ON DRAWINGS. THE TYPE AND GRADE IS INDICATED BY A SYMBOL AS SHOWN BELOW. ON THE DRAWINGS THIS IS FOLLOWED BY A NUMERAL WHICH INDICATES THE SIZE OF BAR IN INCHES.
   #- DENOTES HIGH YIELD DEFORMED BAR
   ø- DENOTES MILD STEEL PLAIN ROUND BAR
   THE NOTATION 30 # 4@8"c/c MEANS 30 BARS OF 1/2" ø HIGH YIELD DEFORMED BARS. SPACED AT 8" c/c.
   THE NOTATION 2-3/8" ø @12"c/c MEANS (TWO SETS) 3/8" ø MILD STEEL PLAIN ROUND LINKS SPACED AT 12"c/c.
   IN SLABS, THE SUBSEQUENT LAYERS OF REINFORCEMENT ARE NOTED THUS:
   B1 = BOTTOM LAYER LAID FIRST
   B2 = BOTTOM LAYER LAID SECOND
   T1 = TOP LAYER LAID LAST
   T2 = TOP LAYER LAID SECOND LAST



6- BARS SHOWN STAGGERED ON PLAN SHALL BE PLACED ALTERNATELY.
7- BARS SHOULD BE EVENLY DISTRIBUTED OVER THE EXTENT INDICATED, UNLESS NOTED OTHERWISE. DISTRIBUTION REINFORCEMENT AT RIGHT ANGLE TO MAIN REINFORCEMENT SHALL BE AS SHOWN BELOW, UNLESS NOTED OTHERWISE ON PLANS. THE MAIN REINFORCEMENT SHALL NOT BE LESS THAN DISTRIBUTION REINFORCEMENT.

SLAB THICKNESS	DISTRIBUTION REINFORCEMENT
5"	#3@10"c/c
6"	#3@10"c/c
7"	#3@9"c/c
8"	#3@8"c/c
10"	#4@9"c/c
12"	#4@9"c/c
14"	#4@8"c/c

8- BARS CONFLICTING WITH SMALL HOLES OR OTHER MINOR COMPLICATIONS SHALL BE DISPLACED AS DIRECTED ON SITE.

E. FORMWORK REMOVAL AND SHORING

1- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE DESIGN, CONSTRUCTION AND SAFETY OF THE FORMWORK AND SHORING.
2- THE REMOVAL OF FORMWORK FOR MULTISTORY CONSTRUCTION SHALL BE A PART OF A PLANNED PROCEDURE CONSIDERING THE TEMPORARY SUPPORT OF THE WHOLE STRUCTURE AS WELL AS THAT OF EACH INDIVIDUAL MEMBER. SUCH A PROCEDURE SHALL BE WORKED OUT AND SUBMITTED BY THE CONTRACTOR AND SHALL BE BASED ON A STRUCTURAL ANALYSIS TAKING INTO ACCOUNT THE FOLLOWING ITEMS, AS A MINIMUM :-
   (a) THE STRUCTURE SYSTEM THAT EXISTS AT THE VARIOUS STAGE OF CONSTRUCTION AND THE CONSTRUCTION LOAD CORRESPONDING THOSE STAGES;
   (b) THE STRENGTH OF CONCRETE AT THE VARIOUS AGES DURING CONSTRUCTION;
   (c) THE INFLUENCE OF DEFORMATION OF THE STRUCTURE AND SHORING SYSTEM ON THE DISTRIBUTION OF DEAD LOAD AND CONSTRUCTION LOADS DURING THE VARIOUS STAGES OF CONSTRUCTION;
   (d) THE STRENGTH AND SPACING OF SHORES OR SHORING SYSTEM USED, AS WELL AS THE METHOD OF SHORING, BRACING, SHORE REMOVAL AND RESHORING INCLUDING THE MINIMUM TIME INTERVALS BETWEEN THE VARIOUS OPERATIONS;
   (e) ANY OTHER LOADING OR CONDITION THAT AFFECTS THE SAFETY OR SERVICEABILITY OF THE STRUCTURE DURING CONSTRUCTION.
   (f) THE STRENGTH OF THE CONCRETE DURING THE VARIOUS STAGES OF CONSTRUCTION SHALL BE SUBSTANTIATED BY FIELD CURED TEST SPECIMENS OR OTHER APPROVED METHODS.
3- NO CONSTRUCTION LOAD EXCEEDING THE CONSTRUCTION OF SUPERIMPOSED DEAD LOAD PLUS SPECIFIED LIVE LOAD SHALL BE SUPPORTED AN ANY UNSHORED PORTION OF THE STRUCTURE UNDER CONSTRUCTION, UNLESS ANALYSIS INDICATES ADEQUATE STRENGTH TO SUPPORT SUCH ADDITIONAL LOADS.

TABLE I : LAP LENGTHS & ANCHORAGE LENGTHS FOR BARS IN TENSION

LOCATION	fc' = 4000 psi			
	LAP LENGTH		ANCHORAGE LENGTH	
	#6 & SMALLER	#7 & LARGER	#6 & SMALLER	#7 & LARGER
BOTTOM BARS	50db	62db	38db	48db
TOP BARS *	64db	80db	50db	62db
COLUMNS/WALLS VERTICAL BARS	48db	48db	-	-

* TOP BARS: HORIZONTAL REINFORCEMENT WITH MORE THAN 12" OF FRESH CONCRETE BENEATH THE BAR.

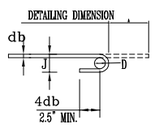
TABLE II : LAP LENGTHS & ANCHORAGE LENGTHS FOR BARS IN TENSION

LOCATION	fc' = 3000 psi			
	LAP LENGTH		ANCHORAGE LENGTH	
	#6 & SMALLER	#7 & LARGER	#6 & SMALLER	#7 & LARGER
BOTTOM BARS	58db	72db	44db	55db
TOP BARS	75db	94db	58db	72db
COLUMNS/WALLS VERTICAL BARS	48db	48db	-	-

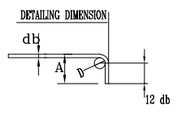
* TOP BARS: HORIZONTAL REINFORCEMENT WITH MORE THAN 12" OF FRESH CONCRETE BENEATH THE BAR.

TABLE III: STANDARD HOOKS TO MAIN BARS

BAR SIZE	INTERNAL BEND DIAMETER D (IN.)	180° HOOK A (IN.)	180° HOOK J (IN.)	90° HOOK A (IN.)
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	1'-0"
#7	5¼"	10"	7"	1'-2"
#8	6"	11"	8"	1'-4"
#9	9½"	1'-3"	11¾"	1'-7"
#10	10¾"	1'-5"	1'-1¾"	1'-10"



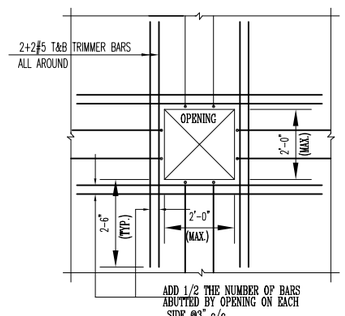
180° HOOK



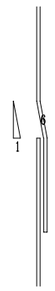
90° HOOK

TABLE IV: STANDARD HOOKS TO STIRRUPS AND TIES

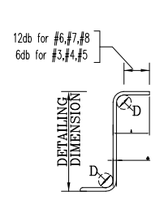
BAR SIZE	INTERNAL BEND DIAMETER D (IN.)	90° HOOK A	135° HOOK A	135° HOOK H (APPROX.)
#3	1½"	4"	4¼"	3"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"



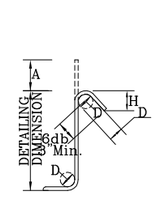
TYPICAL DETAIL AT SLAB OPENING
(UNLESS NOTED OTHERWISE ON PLAN)



TYPICAL COLUMN/WALL VERTICAL CRANK DETAIL



90° HOOK



135° HOOK

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

STRUCTURAL ENGINEERING

DRAWING TITLE :

STRUCTURAL GENERAL

DESIGNED	CHECKED	DRAWING NO
HJ	SUH	SGN-01
DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	00

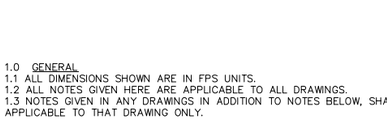
1.0 GENERAL
1.1 ALL DIMENSIONS SHOWN ARE IN FPS UNITS.
1.2 ALL NOTES GIVEN HERE ARE APPLICABLE TO ALL DRAWINGS.
1.3 NOTES GIVEN IN ANY DRAWINGS IN ADDITION TO NOTES BELOW, SHALL BE APPLICABLE TO THAT DRAWING ONLY.

2.0 MATERIALS
2.1 ALL W & WT SECTIONS SHOWN SHOULD COMPLY WITH ASTM A36 STANDRAD WITH MINIMUM YIELD STRENGTH OF 36 KSI.
2.2 ALL TUBE SECTIONS SHOWN SHOULD COMPLY WITH ASTM A500 STANDARD WITH MINIMUM YIELD STRENGTH OF 46 KSI.
2.3 ALL CHANNEL SECTIONS,ANGLE SECTIONS AND CONNECTION PLATES SHOULD COMPLY WITH ASTM A36 STANDARD WITH MINIMUM YIELD STRENGTH OF 36 KSI.
2.4 ALL CONNECTIONS BOLTS SHALL COMPLY WITH ASTM A325 STANDARD WITH MINIMUM STRENGTH IN TENSION (Fnt) OF 90 KSI AND SHEAR (Fnv) OF 48 KSI.
2.5 ALL ANCHOR RODS SHOWN ARE FULLY THREADED STRAIGHT RODS THAT SHOULD COMPLY WITH ASTM F1554 GRADE 55 STANDARD WITH MINIMUM YIELD STRENGTH ON 55 KS.
2.6 ALL GRATING BARS SHOWN SHALL COMPLY WITH ASTM A1011 GRADE 36 STANDARDWITH A MINIMUM YIELD STRENGTH OF 36 KSI.
2.7 ALL STAIR PANS SHOWN SHALL BE MADE UP OF STEEL SHEETS COMPLYING WITH ASTM A570 WITH A MINIMUM YIELD STRENGTH OF 33 KSI.
2.8 CONCRETE FOR PAN FILLED STAIR TREADS SHALL HAVE A MINIMUM CYLINDRICAL COMPRESSIVE STRENGTH OF 3000 PSI AT THE AGE OF 28 DAYS AND SHALL INCLUDE A MIX OF ALUMINUM OXIDE AND SILICONE CARBIDE GRIT PARTICLES AS REQUIRED TO PRODUCE NON SLIP TREAD SURFACE.MAXIMUM AGGREGATE SIZE SHALL BE LIMITED TO ASTM C33,SIZE NO 8 ($\frac{3}{8}$ ").
2.9 BASE PLATE GROUT SHALL BE OF FLOWABLE TYPE AND SHALL COMPLY WITH THE REQUIREMENTS OF ASTM C1107 STANDARD FOR NON SHRINK & NON METALLIC GROUT.
2.10 ALL DRILLED HOLES SHALL BE FILLED WITH STRUCTURAL GRADE ADHESIVE COMPLYING WITH ASTM C881 STANDARDS.
2.11 SADDLE CLIPS TO BE USED FOR FASTENING OF BAR GRATINGS TO FLOOR JOISTS SHALL COMPLY WITH THE REQUIREMENTS OF ASTM STANDARD FOR MECHANICAL FASTENERS.
2.12 CHANNEL SECTION C13X50 SHALL COMPLY WITH ASTM A992 STANDARD WITH A MINIMUM YIELD STRENGTH OF 50 KSI.

3.0 WELDING
3.1 ALL WELDING WORKS SHALL CONFIRM TO AMERICAN WELDING SOCIETY D1.1 LATEST VERSION.
3.2 ALL WELDING WORKS SHALL BE PERFORMED BY WELDERS QUALIFIED IN ACCORDANCE WITH AMERICAN WELDING SOCIETY.
3.3 ALL WELDING WORKS SHOWN ARE DESIGNED CONSIDERING E70XX ELECTRODE.
3.4 ONE SIDE FILLET WELDS SHALL BE DETAILED AS GIVEN IN DRAWING OR AS PER AISC TABLE J2.4.
3.5 WELD SIZES SHALL BE CONSIDERED AS GIVEN IN DRAWINGS.
3.6 WELDING SHALL NOT BE DONE
- WHEN THE AMBIENT TEMPERATURE IS LOWER THAN 0'F (−20'C)
- WHEN SURFACES ARE WET OR EXPOSED TO RAIN, SNOW, OR (3) HIGH WIND VELOCITIES, OR
- WHEN WELDING PERSONNEL ARE EXPOSED TO INCLEMENT CONDITIONS.

NOTE: ZEROOF DOES NOT MEAN THE AMBIENT ENVIRONMENTAL TEMPERATURE, BUT THE TEMPERATURE IN THE IMMEDIATE VICINITY OF THE WELD. THE AMBIENT ENVIRONMENTAL TEMPERATURE MAY BE BELOW 0'F (−20'C), BUT A HEATED STRUCTURE OR SHELTER AROUND THE AREA BEING WELDED COULD MAINTAIN THE TEMPERATURE ADJACENT TO THE WELDMENT AT 0'F (−20'C) OR HIGHER

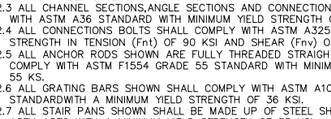
3.7 SURFACES ON WHICH WELD METAL IS TO BE DEPOSITED SHALL BE SMOOTH, UNIFORM, AND FREE FROM FINS, TEARS, CRACKS, AND OTHER DISCONTINUITIES WHICH WOULD ADVERSELY AFFECT THE QUALITY OR STRENGTH OF THE WELD. SURFACES TO BE WELDED,AND SURFACES ADJACENT TO A WELD, SHALL ALSO BE FREE FROM LOOSE OR THICK SCALE, SLAG, RUST, MOISTURE, GREASE, AND OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING OR PRODUCE OBJECTIONABLE FUMES.
3.8 REENTRANT CORNERS AT CUTS, COPES AND WELD ACCESS HOLES SHALL FORM A RADIUS OF NOT LESS THAN 3/8 IN. (10 MM) BY PREDRILLING OR SUBPUNCHING AND REAMING A HOLE, OR BY THERMAL CUTTING TO FORM THE RADIUS OF THE CUT. IF THE RADIUS PORTION IS FORMED BY THERMAL CUTTING, THE CUT SURFACE SHALL BE GROUND TO A BRIGHT METAL
SURFACE.
3.9 THE PARTS TO BE JOINED BY FILLET WELDS SHALL BE BROUGHT INTO AS CLOSE CONTACT AS PRACTICABLE. THE ROOT OPENING SHALL NOT EXCEED 3/16 IN.
3.10 THE SEPARATION BETWEEN FAYING SURFACES OF PLUG AND SLOT WELDS, AND OF BUTT JOINTS LANDING ON A BACKING, SHALL NOT EXCEED 1/16 IN. (2 MM).
3.11 ACCEPTABLE AND UNACCEPTABLE WELD PROFILES SHALL BE CONSIDERED AS FOLLOWS,



(A) DESIRABLE FILLET WELD PROFILES (B) ACCEPTABLE FILLET WELD PROFILES

NOTE: CONVEXITY, C, OF A WELD OR INDIVIDUAL SURFACE BEAD WITH DIMENSION W SHALL NOT EXCEED THE VALUE OF THE FOLLOWING TABLE:

WIDTH OF WELD FACE OR INDIVIDUAL SURFACE BEAD, W	MAX CONVEXITY, C
W ≤ 5/16 in. (8 mm)	1/16 in. (2 mm)
W > 5/16 in. (8 mm) TO W < 1 in. (25 mm)	1/8 in. (3 mm)
W ≥ 1 in (25 mm)	3/16 in. (5 mm)



(C) UNACCEPTABLE FILLET WELD PROFILES

3.12 TESTING CRITERIA FOR WELDING
CONTRACTOR SHALL PERFORM THE TESTING ON WELD IN ACCORDANCE WITH SECTION 6.14 OF AWS D1.1.
3.13 ACCEPTANCE CRITERIA FOR WELDING
WELDING WORKS SHOULD COMPLY TO VISUAL ACCEPTANCE CRITERIA IN ACCORDANCE WITH AWS D1.1 SECTION 431.1 & 431.2 AS FOLLOWS,
- THE TACK WELD SHALL PRESENT A REASONABLY UNIFORM APPEARANCE AND SHALL BE FREE OF OVERLAP, CRACKS, AND UNDERCUT EXCEEDING 1/32 IN. THERE SHALL BE NO POROSITY VISIBLE ON THE SURFACE OF THE TACK WELD.
- THE FRACTURED SURFACE OF THE TACK WELD SHALL SHOW FUSION TO THE ROOT, BUT NOT NECESSARILY BEYOND, AND SHALL EXHIBIT NO INCOMPLETE FUSION TO THE BASE METALS OR ANY INCLUSION OR POROSITY LARGER THAN 3/32 IN. (2.5 MM) IN GREATEST DIMENSION.

4.0 BOLTING
4.1 PARTS OF BOLTED MEMBERS SHALL BE PINNED OR BOLTED AND RIGIDLY HELD TOGETHER DURING ASSEMBLY. USE OF A DRIFT PIN IN BOLT HOLES DURING ASSEMBLY SHALL NOT DISTORT THE METAL OR ENLARGE THE HOLES. POOR MATCHING OF HOLES SHALL BE CAUSE FOR REJECTION

4.2 BOLT HOLES SHALL COMPLY WITH THE PROVISIONS OF THE RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, SECTION 3.3 EXCEPT THAT THERMALLY CUT HOLES SHALL BE PERMITTED WITH A SURFACE ROUGHNESS PROFILE NOT EXCEEDING 1,000 _IN(25 _M) AS DEFINED IN ASME B46.1. GOUGES SHALL NOT EXCEED A DEPTH OF 1/16 IN(2 MM).

4.3 FULLY INSERTED FINGER SHIMS, WITH A TOTAL THICKNESS OF NOT MORE THAN 1/4 IN. (6 MM) WITHIN A JOINT, ARE PERMITTED IN JOINTS WITHOUT CHANGING THE STRENGTH (BASED UPON HOLE TYPE) FOR THE DESIGN OF CONNECTIONS. THE ORIENTATION OF SUCH SHIMS IS INDEPENDENT OF THE DIRECTION OF APPLICATION OF THE LOAD.

4.4 ALL FIELD BOLTS SHALL CONFIRM TO ASTM A325 STANDARDS.
4.5 COMPRESSIBLE MATERIALS SHALL NOT BE PLACED WITHIN THE GRIP OF THE BOLT
4.6 ALL BOLT HOLES SHALL BE ALIGNED TO PERMIT INSERTION OF THE BOLTS WITHOUT UNDUE DAMAGE TO THE THREADS
4.7 FAYING SURFACES AND SURFACES ADJACENT TO THE BOLT HEAD AND NUT SHALL BE FREE OF DIRT AND OTHER FOREIGN MATERIAL.
4.8 FAYING SURFACES ARE PERMITTED TO BE COATED,UNCOATED OR GALVANIZED.
4.9 BURRS THAT EXTEND 1 /16 IN. OR LESS ABOVE THE SURFACE ARE PERMITTED TO REMAIN ON THE FAYING SURFACES OF PRETENSIONED JOINTS. BURRS THAT EXTEND OVER 1 /16 IN. ABOVE THE SURFACE SHALL BE REMOVED FROM ALL JOINTS.
4.10 BOLT HOLE SIZES SHALL BE CONSIDERED AS GIVEN BELOW,

Nominal Bolt Diameter, d_b, in.	Nominal Bolt Hole Dimensions[a,b], in.			
	Standard (diameter)	Oversized (diameter)	Short-slotted (width × length)	Long-slotted (width × length)
½	9/16	5/8	9/16 × 11/16	9/16 × 1 1/4
5/8	11/16	13/16	11/16 × 7/8	11/16 × 1 9/16
¾	13/16	15/16	13/16 × 1	13/16 × 1 7/8
7/8	15/16	1 1/16	15/16 × 1 1/8	15/16 × 2 3/16
1	1 1/16	1 1/4	1 1/16 × 1 5/16	1 1/16 × 2 1/2
≥ 1 1/8	d_b + 1/16	d_b + 5/16	(d_b + 1/16) × (d_b + 3/8)	(d_b + 1/16) × (2.5d_b)

[a] The upper tolerance on the tabulated nominal dimensions shall not exceed 1/16-in. Exception: In the width of slotted holes, gouges not more than 1/8-in. deep are permitted.
[b] The slightly conical hole that naturally results from punching operations with properly matched punches and dies is acceptable.

4.11 MINIMUM BOLT PRE−TENSION SHOULD BE CONSIDERED AS GIVEN IN TABLE BELOW,

Nominal Bolt Diameter d_b, in.	Specified Minimum Bolt Pretension T_m, kips[a]	
	ASTM A325 and F1852 Bolts	ASTM A490 Bolts
½	12	15
5/8	19	24
¾	28	35
7/8	39	49
1	51	64
1 1/8	56	80
1 1/4	71	102
1 3/8	85	121
1 1/2	103	148

[a] Equal to 70 percent of the specified minimum tensile strength of bolts as specified in ASTM Specifications for tests of full-size ASTM A325 and A490 bolts with UNC threads loaded in axial tension, rounded to the nearest kip.

4.12 NUT ROTATION SHALL BE CONSIDERED AS GIVEN IN TABLE BELOW,

Bolt Length[a]	Disposition of Outer Face of Bolted Parts		
	Both faces normal to bolt axis	One face normal to bolt axis, other sloped not more than 1:20[c]	Both faces sloped not more than 1:20 from normal to bolt axis[d]
Not more than $4d_b$	1/3 turn	1/2 turn	2/3 turn
More than $4d_b$ but not more than $8d_b$	1/2 turn	2/3 turn	5/6 turn
More than $8d_b$ but not more than $12d_b$	2/3 turn	5/6 turn	1 turn

[a] Nut rotation is relative to bolt regardless of the element (nut or bolt) being turned. For required nut rotations of ½ turn and less, the tolerance is plus or minus 30 degrees; for required nut rotations of ⅔ turn and more, the tolerance is plus or minus 45 degrees.
[b] Applicable only to joints in which all material within the grip is steel.
[c] When the bolt length exceeds 12d_b, the required nut rotation shall be determined by actual testing in a suitable tension calibrator that simulates the conditions of solidly fitting steel.
[d] Beveled washer not used.

4.13 TESTING CRITERIA FOR BOLTS

TENSION CALIBRATOR SHALL BE USED WHERE BOLTS ARE TO BE INSTALLED IN PRETENSIONED
JOINTS TO:

- CONFIRM THE SUITABILITY OF THE COMPLETE FASTENER ASSEMBLY, INCLUDING LUBRICATION, FOR PRE−TENSIONED INSTALLATION; AND,
- CONFIRM THE PROCEDURE AND PROPER USE BY THE BOLTING CREW OF THE PRE−TENSIONING METHOD TO BE USED.

THE ACCURACY OF THE TENSION CALIBRATOR SHALL BE CONFIRMED THROUGH CALIBRATION ATLEAST ANNUALLY.

A REPRESENTATIVE SAMPLE OF NOT FEWER THAN THREE COMPLETE FASTENER ASSEMBLIES OF EACH COMBINATION OF DIAMETER, LENGTH, GRADE AND LOT TO BE USED IN THE WORK SHALL BE CHECKED AT THE SITE OF INSTALLATION IN A TENSION CALIBRATOR TO VERIFY THAT THE PRE−TENSIONING METHOD DEVELOPS A PRETENSION THAT IS EQUAL TO OR GREATER THAN 1.05 TIMES THAT OF MINIMUM PRE−TENSION OF BOLTS.

5.0 COATING OF STRUCTURAL STEEL
5.1 5.1 PREPARE STEEL BY ABRASIVE BLAST CLEANING TO "NEARWHITE" METAL CONDITION AS DEFINED IN SSPC−SP 10. USE SSPC VIS 1 AS AN AID IN ESTABLISHING CLEANLINESS.
5.2 AFTER ABRASIVE BLAST CLEANING, ENSURE THE SURFACE PROFILE MEETS THE REQUIREMENTS OF THE COATING MANUFACTURER'S PRODUCT DATA SHEET. DETERMINE THE SURFACE PROFILE IN ACCORDANCE WITH ASTM D4417, METHOD B OR C.
5.3 PERFORM ALL ABRASIVE BLAST CLEANING WITHIN A CONTAINMENT SYSTEM TO ENSURE CONFINEMENT OF ALL PARTICULATES.
5.4 DESIGN THE CONTAINMENT SYSTEM TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS
5.3 ALL ABRASIVE BLAST CLEANING SHOULD BE PERFORMED WITHIN A CONTAINMENT SYSTEM TO ENSURE CONFINEMENT OF ALL PARTICULATES.
5.4 DESIGN THE CONTAINMENT SYSTEM TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS
5.5 ENSURE THE ABRASIVE BLAST CLEANING DOES NOT PRODUCE HOLES, CAUSE DISTORTION, REMOVE METAL, OR CAUSE THINNING OF THE SUBSTRATE.
5.6 THE CONTRACTOR WILL SELECT THE ABRASIVE TO BE USED BASED ON THE SPECIFIED ANCHOR PATTERN. THE CHOSEN ABRASIVE SHOULD BE FREE OF TOXIC HEAVY METALS SUCH AS LEAD, CHROMIUM, AND CADMIUM AND SHOULD NOT CONTAIN ANY FREE SILICA (SAND) EITHER.
5.7 PRIOR TO DELIVERY OF THE FIRST LOAD OF ABRASIVE, CONTRACTOR SHOULD SUBMIT A SIEVE ANALYSIS FROM THE ABRASIVE SUPPLIER.
5.7 ABRASIVE SHOULD BE STORED IN A DRY ENVIRONMENT AND SHOULD BE CLEAN, UNIFORM, AND FREE OF ANY SIGN OF MOISTURE.
5.8 THE BLASTING PRESSURE SHOULD BE AT LEAST 620 KPA (90 PSI); ANY LESS THAN THIS CAN RESULT IN A LOWER ANCHOR PATTERN AND IN SLOWER PRODUCTION.
5.9 THE ANCHOR PATTERN NEEDS TO BE CHECKED TO ENSURE THAT PROPER PAINT ADHESION WILL OCCUR. PROFILE INSPECTION REQUIRES THE USE OF A MICROMETER AND REPLICA IMPRESSION TAPE.
5.10 ABRASIVE BLAST CLEAN SHOULD BE USED TO REMOVE AND CLEAN ALL OF THE EXISTING COATING AND CORROSION IN STRUCTURE AS DEFINED IN SECTION 5.0.
5.11 IT SHOULD BE VERIFIED THAT THE EDGES OF THE EXISTING COATING ARE INTACT BY PROBING WITH A DULL PUTTY KNIFE IN ACCORDANCE WITH SSPC SP 2.
5.12 EXISTING COATING SHOULD BE ROUGHENED IN THE FEATHERED AREA TO ENSURE PROPER ADHESION OF NEW COATING.
5.13 ENSURE ALL SURFACES TO BE COATED ARE CLEAN, DRY, AND FREE FROM OIL, GREASE, DIRT, DUST, SOLUBLE SALTS, CORROSION, PEELING COATING, CAULKING, WELD SPATTER, MILL SCALE AND ANY OTHER SURFACE CONTAMINANTS.
5.14 SURFACE PREPARATIONS AND COATING OPERATIONS SHOULD BE SEQUENCED SO THAT FRESHLY APPLIED COATINGS WILL NOT BE CONTAMINATED BY DUST OR FOREIGN MATTER.
5.15 EQUIPMENT AND ADJACENT SURFACES NOT TO BE COATED SHOULD BE PROTECTEDFROM SURFACE PREPARATION OPERATIONS.
5.16 WORKING MECHANISMS SHOULD BE PROTECTED AGAINST INTRUSION OF ABRASIVE. IN THE EVENT THAT ANY RUSTING OR CONTAMINATION OCCURS AFTER THE COMPLETION OF THE SURFACE PREPARATION, PREPARE THE SURFACES AGAIN TO THE INITIAL REQUIREMENTS.
5.17 SURFACE PREPARATION WORK SHOULD BE PERFORMED ONLY WHEN THE TEMPERATURE OF THE STEEL SURFACE IS AT LEAST 50 F ABOVE THE DEW POINT TEMPERATURE.
5.18 APPLY EACH COAT INCLUDING A STRIPE COAT IN A COLOR THAT CONTRASTS WITH THE SUBSTRATE OR PRECEDING COAT. FOR EXTERIOR SURFACES, APPLY A FINISH COAT COLOR MEETING FED−STD−595, SHADE 36622, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.
5.19 DO NOT SPRAY COATING WHEN THE MEASURED WIND SPEED IN THE IMMEDIATE COATING AREA IS ABOVE 15 MILES PER HOUR.
5.20 DO NOT APPLY COATINGS WHEN CONTAMINATION FROM RAINFALL IS IMMINENT OR WHEN THE AMBIENT AIR TEMPERATURE, RELATIVE HUMIDITY, DEW POINT TEMPERATURE, OR TEMPERATURE OF THE STEEL IS OUTSIDE LIMITS OF THE COATING MANUFACTURER'S PRODUCT DATA SHEET
5.21 USE COATING APPLICATION EQUIPMENT AND APPLY COATINGS AS PER THE COATING MANUFACTURER'S PRODUCT DATA SHEET. APPLICATION WITH BRUSHES MAY BE PERMITTED FOR MINOR TOUCHUP OF SPRAY APPLICATIONS, STRIPE COATS, OR WHEN OTHERWISE APPROVED BY THE ENGINEER.
5.22 USE AN ALUMINUM EPOXY MASTIC THAT IS AT LEAST 80% SOLIDS BY VOLUME. APPLY A STRIPE COAT AFTER THE PRIME COAT, BUT PRIOR TO APPLYING THE INTERMEDIATE COAT. ALSO, APPLY A STRIPE COAT AFTER THE INTERMEDIATE COAT BUT PRIOR TO THE FINISH COAT. APPLY THE STRIPE COAT PER THE MANUFACTURERS PUBLISHED PRODUCT DATA SHEET BUT NO LESS THAN 3 MILS DRY FILM THICKNESS.
5.23 APPLY BOTH STRIPE COATS TO ACHIEVE COMPLETE COVERAGE ON WELDS, CORNERS, CREVICES, SHARP EDGES, BOLTS, NUTS, RIVETS, AND ROUGH OR PITTED SURFACES. A STRIPE COAT OF TRANSLUCENT COATINGS IS NOT REQUIRED. DO NOT APPLY SUBSEQUENT COATS UNTIL THE PREVIOUS STRIPE COAT HAS CURED PER THE MANUFACTURER'S PRODUCT DATA SHEET FOR RECOATING.
5.24 APPLY COATINGS TO THE THICKNESS AS IDENTIFIED IN THE MANUFACTURER'S PRODUCT DATA SHEET. AFTER APPLICATION OF EACH COAT, THOROUGHLY INSPECT THE SURFACES AND MEASURE THE DRY FILM THICKNESS (DFT) IN ACCORDANCE WITH SSPC−PA 2. AS AN EXCEPTION TO SSPC−PA2, THE DFT OF THE PRIME COAT SHALL NOT BE LESS THAN THE MINIMUM SPECIFIED BY THE MANUFACTURER'S PRODUCT DATA SHEET.
5.25 APPLY COATINGS WITHIN THE TIME SPECIFIED BY THE COATING MANUFACTURER'S PRODUCT DATA SHEET FOR DRYING AND RECOATING.
5.26 APPLY EACH COAT FREE OF RUNS, SAGS, BLISTERS, BUBBLES, AND MUD CRACKING; VARIATIONS IN COLOR, GLOSS, OR TEXTURE; HOLIDAYS; EXCESSIVE FILM BUILDUP; FOREIGN CONTAMINANTS; ORANGE PEELING; AND OVERSPRAY.
5.27 CLEAN AND COAT ALL WELDS, RIVETS, BOLTS, AND ALL DAMAGED OR DEFECTIVE COATING AND RUSTED AREAS. UPON APPROVAL BY THE ENGINEER, ALUMINUM MASTIC MAY BE USED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ALUMINUM MASTIC MUST CONTAIN ALUMINUM PIGMENT AND MINIMUM 80% VOLUME SOLIDS.

6.0 HANDLING AND SHORING
6.1 DURING , DAMAGE TO EDGES AND TO SURFACES BY THE USE OF SHARP−TOOTHED CLAMPS MUST BE AVOIDED BY TAKING PRECAUTIONARY MEASURES, SUCH AS THE USE OF LIFTING DEVICES WITH SOFT RENEWABLE CONTACT SURFACES OR PROPERLY DESIGNED LIFTING CLEATS.
6.2 SHORING WHERE REQUIRED SHALL BE PROVIDED ON SITE.
6.3 SPLICE PLATES SHALL BE REPAIRED AFTER INSTALLATION OF NEW PLATES AS SHOWN IN DRAWINGS.
6.4 NOT MORE THAN ONE BOLT SHOULD BE DRILLED OUT AT ANY TIME, REPLACEMENT SHALL BE DONE ONE AFTER ANOTHER.

7.0 PAINTING
7.1 PAINTING SHOULD NOT BE PERFORMED IN EXCESSIVE HIGH OR LOW TEMPERATURES AS PRESENCE OF SURFACE MOISTURE, INCLUDING FROST, CAN HAVE A NEGATIVE EFFECT ON PAINT FILMS.
7.2 MAXIMUM PERMISSIBLE RELATIVE HUMIDITY IS COMMONLY LIMITED TO 85% DURING PAINTING OPERATIONS.
7.3 THE TEMPERATURE OF THE STEEL SHOULD BE AT LEAST 3 C (5'F) HIGHER THAN THE DEW POINT TO ENSURE THAT NO MOISTURE EXISTS ON STEEL AT THE TIME OF PAINTING.
7.4 THE SURFACE TEMPERATURE OF THE STEEL SHOULD NOT EXCEED 52'C (125'F) DURING THE PAINTING PROCESS.
7.5 PAINT SHOULD BE APPLIED THROUGH SPRAY GUN TECHNIQUE.
7.6 THE SPRAY GUN SHOULD BE HELD PERPENDICULAR TO THE WORK SURFACE AND APPROXIMATELY 45 EM (18 IN.) AWAY FROM THE WORK SURFACE.
7.7 ALL UNSIGHTLY RUNS, DRIPS, OR PINHOLES SHOULD BE REPAIRED IMMEDIATELY.
7.8 WET FILM AND DRY FILM THICKNESS CHECK SHOULD BE PERFORMED AS PER APPENDIX B FHWA PAINT INSPECTION MANUAL.

8.0 FABRICATION
8.1 THE FABRICATOR SHALL BE ABLE TO DEMONSTRATE BY A WRITTEN PROCEDURE AND BY ACTUAL PRACTICE A METHOD OF MATERIAL IDENTIFICATION, VISIBLE AT LEAST THROUGH THE "FIT−UP" OPERATION, FOR THE MAIN STRUCTURAL ELEMENTS OF EACH SHIPPING PIECE.
8.2 THERMALLY CUT EDGES SHALL MEET THE REQUIREMENTS OF AWS D1.1, SECTIONS 5.15.1.2, 5.15.4.3 AND 5.15.4.4 WITH THE EXCEPTION THAT THERMALLY CUT FREE EDGES THAT WILL BE SUBJECT TO CALCULATED STATIC TENSILE STRESS SHALL BE FREE OF ROUND−BOTTOM GOUGES GREATER THAN 3/16 IN. (5 MM) DEEP AND SHARP V−SHAPED NOTCHES. GOUGES DEEPER THAN 3/16 IN. (5 MM) AND NOTCHES SHALL BE REMOVED BY GRINDING OR REPAIRED BYWELDING.
8.3 PLANNING OR FINISHING OF SHEARED OR THERMALLY CUT EDGES OF PLATES OR SHAPES IS REQUIRED IF INCLUDED IN A STIPULATED EDGE PREPARATION FOR WELDING
8.4 DIMENSIONAL TOLERANCES SHALL BE IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.
8.5 MEMBERS AND PARTS TO BE GALVANIZED SHALL BE DESIGNED, DETAILED AND FABRICATED TO PROVIDE FOR FLOW AND DRAINAGE OF PICKLING FLUIDS AND ZINC AND TO PREVENT PRESSURE BUILD−UP IN ENCLOSED PARTS.

9.0 DRILLING
9.1 PRIOR TO INITIATION OF DRILLING WORKS, EXISTING REINFORCEMENT IN CONCRETE MEMBERS SHALL BE LOCATED THROUGH GPR TESTING TO AVOID PROBABLE DAMAGES THAT MAY CAUSE BY DRILLING INTO EXISTING REBARS.
9.2 WHERE REQUIRED ANCHOR BOLTS IN CONCRETE SHALL BE RELOCATED AS DIRECTED ON DRAWINGS TO AVOID CONFLICT WITH EXISTING REINFORCING BARS.
9.3 HOLES SHOULD BE DRILLED STRAIGHT USING HAMMER DRILLS.
9.4 PRECAUTIONS SHOULD BE TAKEN DURING DRILLING TO AVOID DAMAGE TO THE SURROUNDING CONCRETE.
9.5 DRILLED HOLES SHOULD BE CLEANED USING SEQUENTIAL FLUSHING OF WATER UNTIL CLEAN WATER EXITS.
9.7 DRILLED HOLES THEN FURTHER BE CLEANED USING COMPRESSED AIR TO REMOVE DEBRIS AND WATER.
9.8 DRILLED HOLES AFTER CLEANING SHOULD BE TREATED WITH WIRE BRUSH TO MECHANICALLY SCOUR THE HOLE WALL.

10.0 PRECAUTIONS FOR ADHESIVE INJECTION
10.1 ADHESIVE'S CURING TIME SHOULD BE CONSIDERED WHILE INJECTING ADHESIVE IN DRILLED HOLES.
10.2 IT SHOULD BE ENSURED THAT TIME CONSUMED IN INJECTING OPERATION SHOULD NOT EXCEED THE WORKING TIME OF ADHESIVE THAT MAY RESULT IN PARTIAL SETTLING OF ADHESIVE PRIOR TO INSTALLATION OF REBARS RESULTING IN INADEQUATE ANCHORAGE OF POST INSTALLED REBAR DOWELS.

11.0 INSTALLATION OF ANCHOR RODS AND GROUTING
11.1 ANCHOR BOLT HOLE LOCATION TOLERANCE IS +/− 1/16 ON CONCRETE FLOOR. HOLE SHALL BE PLUMB TO WITHIN 1 DEGREE OF THE VERTICAL
11.2 ANCHOR BOLT HOLE DEPTH TOLERANCE IS MINUS 0 INCHES TO PLUS ¼ .
11.3 BEFORE PLACING OF GROUT NUTS SHOULD BE TIGHTEN WITH A TORQUE OF 175 LB−FT.
11.4 GROUT SHALL BE MIXED OUTSIDE THE VACCUM AREAS AD APPLIED IN A MANNER TO MINIMIZE CONTAMINATION.
11.5 THE UNDERSIDES OF ALL BASE PLATES SHALL BE CLEAN. THE CONCRETE SURFACE SHALL BE STRIPPED OF SEALANT, ROUGHENED AND DAMPENED PRIOR TO PLACING GROUT.
11.6 AT BASE PLATE LOCATIONS WHICH ARE REQUIRED TO BE SCARIFIED, INDENTATIONS IN THE CONCRETE SHALL BE A MINIMUM OF 1/8 INCH.
11.7 GROUT SHALL BE MIXED, PLACED AND CURED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. CARE SHALL BE TAKEN DURING GROUT INSTALLATION TO AVOID VOIDS IN THE GROUT PAD (PROPER VENT HOLES, VIBRATION, ETC.)
11.8 CURING SHALL CONTINUE FOR A MINIMUM OF 7 DAYS PER THE MANUFACTURER'S SPECIFICATIONS.
11.9 QUALITY CONTROL INSPECTION SHALL BE DOCUMENTED TO ENSURE THE FOLLOWING:
- MATERIALS CONFORM TO THIS SPECIFICATION.
- HOLES ARE DRILLED WITH PROPER EQUIPMENT THEREBY ACHIEVING PROPER DIAMETER.
- HOLE DEPTH CONFORMS TO ANCHOR MANUFACTURER'S REQUIREMENTS AND THIS SPECIFICATION.
- HOLE IS CLEANED.
- ROD IS EMBEDDED TO SPECIFIED REQUIREMENT.
- NUTS ARE PRELOADED TO SPECIFIED TORQUE.
- GROUT IS MIXED, PLACED, CURED AND TESTED PER GROUT MANUFACTURER'S REQUIREMENTS.

12.0 INSTALLATION OF METAL STAIRS
12.1 METAL STAIRS AND RAILINGS SHALL BE FABRICATED IN A MANNER THAT THERE SHALL BE NO EXPOSED SCREWS, BOLTS, AND FASTENERS IN THE FINISHED WORK.
12.2 BEARING PLATES THAT IS SUPPOSED TO RECEVIE CONCRETE SHALL BE LEVELED BY MEANS OF ADJUSTMENT NUTS.
12.3 THE CONTRACTOR SHALL SUPERVISE AND ENSURE THAT ANCHORS AND RELATED ITEMS ARE PROPERLY SET IN CONCRETE DURING THE PROGRESS OF THE WORK.
12.4 AFTER INSTALLATION, EXPOSED PAINTED SURFACES, FIELD WELDS, AND OTHER ABRADED OR DAMAGED PRIMED SURFACES SHALL BE TOUCHED UP WITH AN ADDITIONAL COAT OF THE SAME PRIMER FOR FERROUS SURFACES AND ALL TOUCH UP SURFACES SHOULD BE SPRAY PAINTED.
12.5 CONCRETE FOR PAN−FILLED STAIRS SHALL BE PLACED, COMPACTED, FINISHED, AND CURED IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF ACI 301.
12.6 TREADS AND LANDINGS SHALL RECEIVE A "TROWELED FINISH" IN COMBINATION WITH A "NONSLIP FINISH WITH ?VERY FLAT TOLERANCES AS SPECIFIED IN ACI 301 AND ACI 117.

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

STRUCTURAL ENGINEERING

DRAWING TITLE :

STRUCTURAL GENERAL

DESIGNED	CHECKED	DRAWING NO
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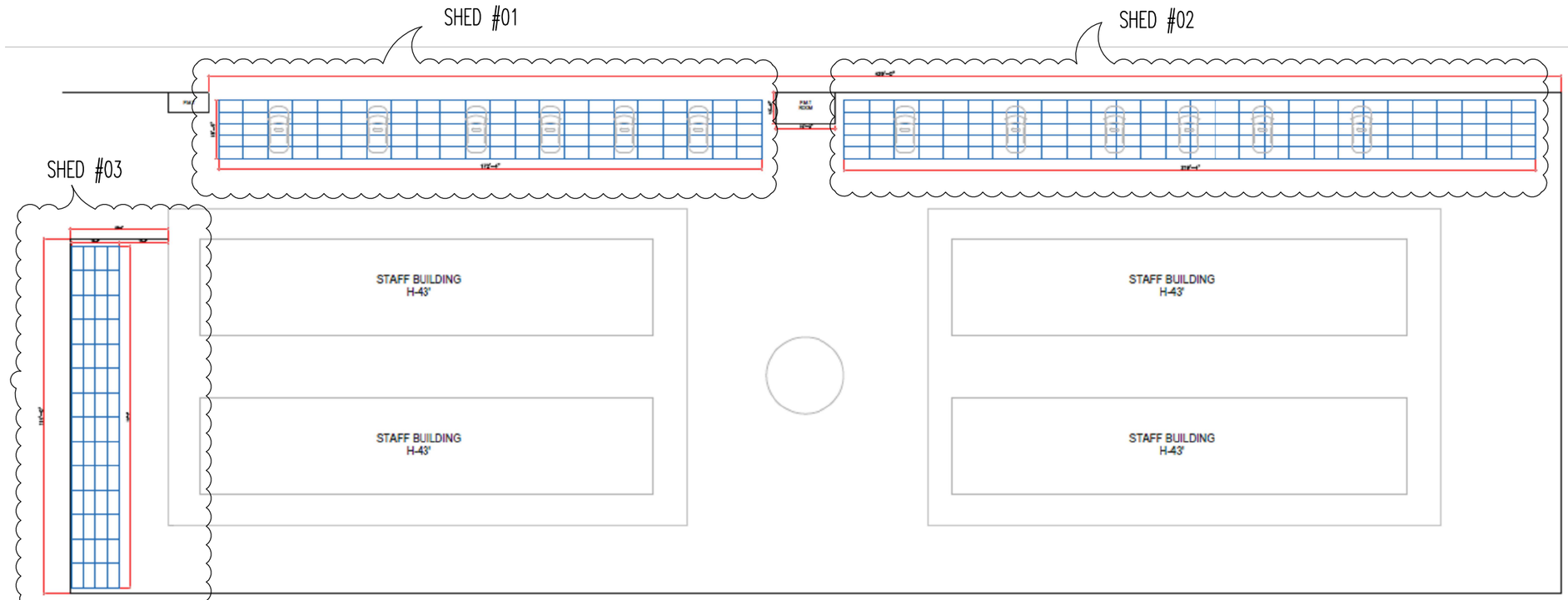
DRAWN: MY	APPROVED: SUH	
SCALE: NTS	DATE: JUNE-2025	REVISION: 00



CARPORT 02
No of Mod:56(610W)
System Size:34,160W

SITE LAYOUT PLAN & AREA WORK

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

STRUCTURAL ENGINEERING

DRAWING TITLE :

SITE LAYOUT PLAN
&
AREA OF WORK

DESIGNED	CHECKED	DRAWING NO
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DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
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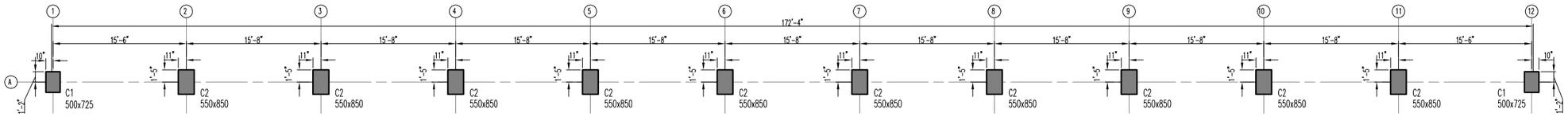
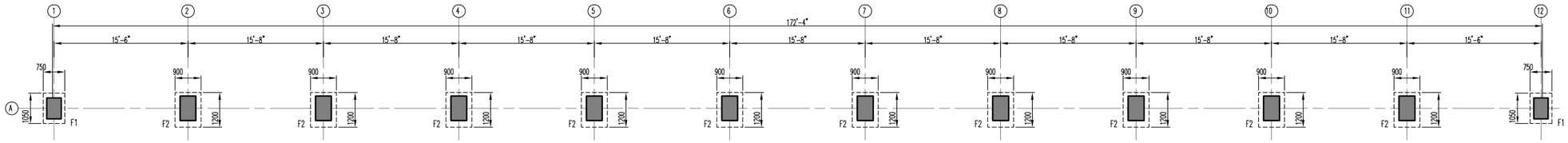


SHED #01 COLUMN LAYOUT PLAN



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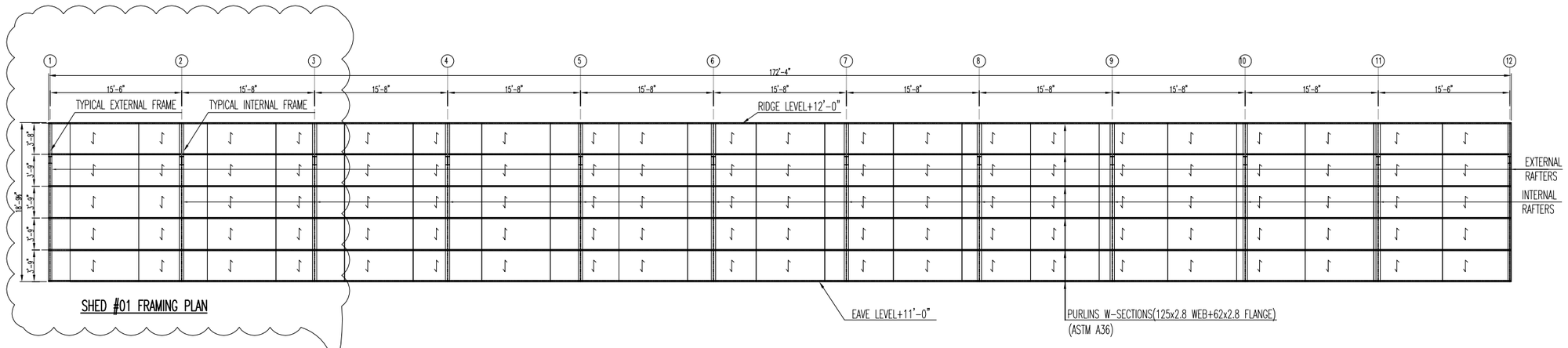

SHED #01 FRAMING PLAN

PART PLAN A
(FOR SHED#01 & #02)

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

STRUCTURAL ENGINEERING

DRAWING TITLE :

SHED #01 COLUMN,FOUNDATION
&
FRAMING PLANS

DESIGNED	CHECKED	DRAWING NO
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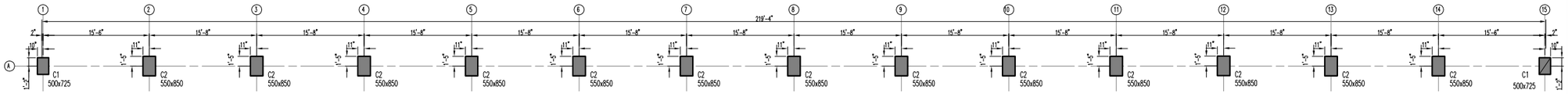
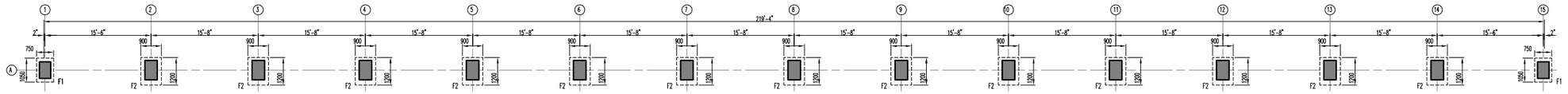
DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	00



SHED #02 COLUMN LAYOUT PLAN



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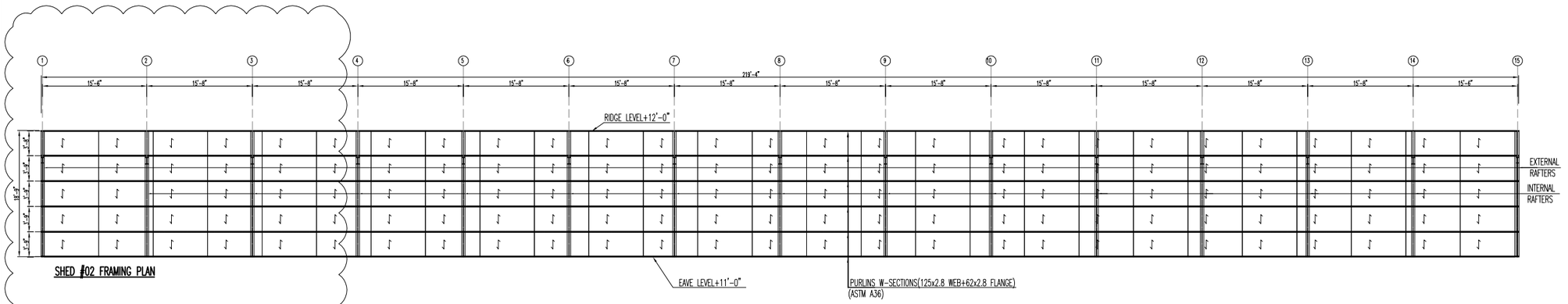


SHED #02 FRAMING PLAN

PART PLAN A
(FOR SHED#01 & #02)

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

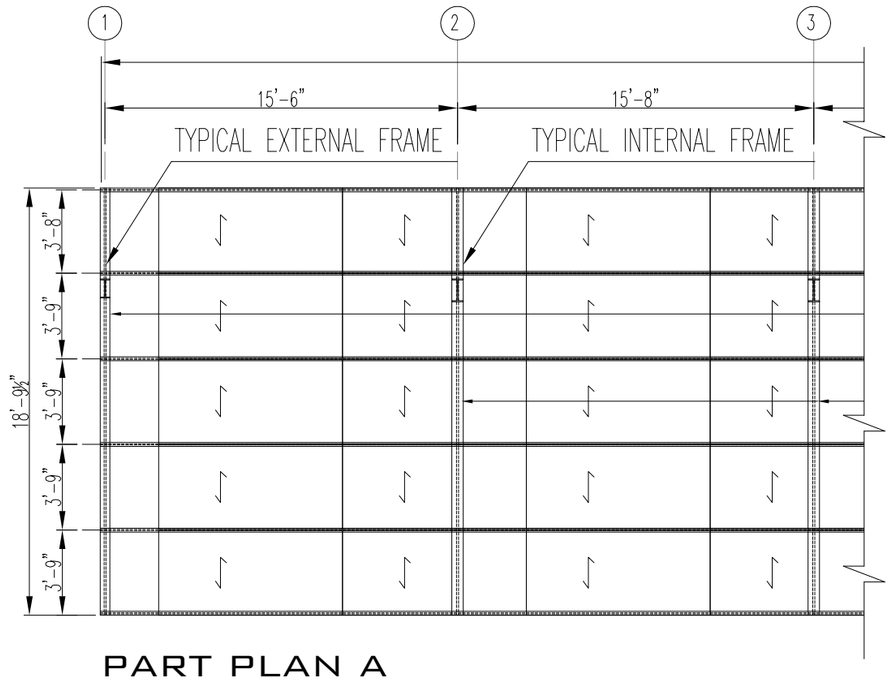
DISCIPLINE :

STRUCTURAL ENGINEERING

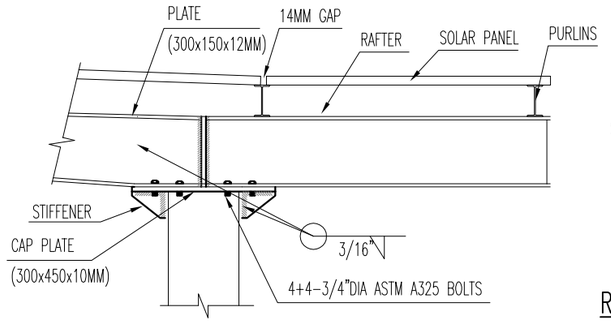
DRAWING TITLE :

SHED #02 COLUMN,FOUNDATION
&
FRAMING PLANS

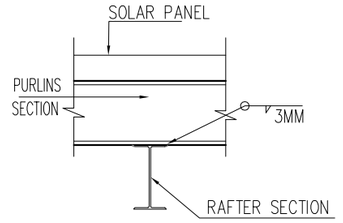
DESIGNED	CHECKED	DRAWING NO
HJ	SUH	S-03
DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	00



PART PLAN A



RAFTER-COLUMN CONNECTION DETAIL



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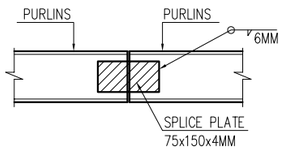

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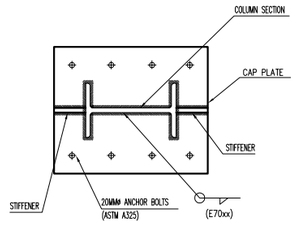
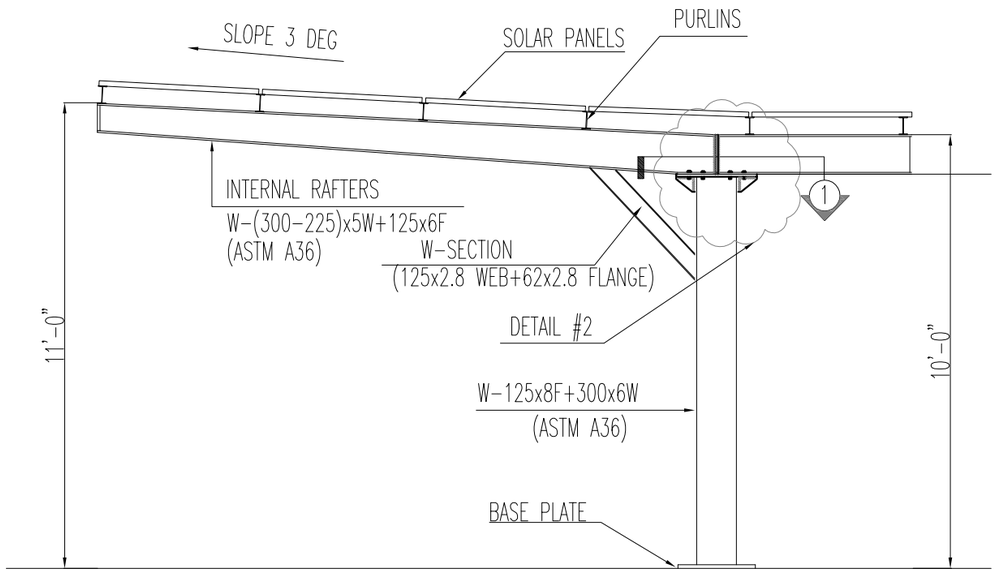
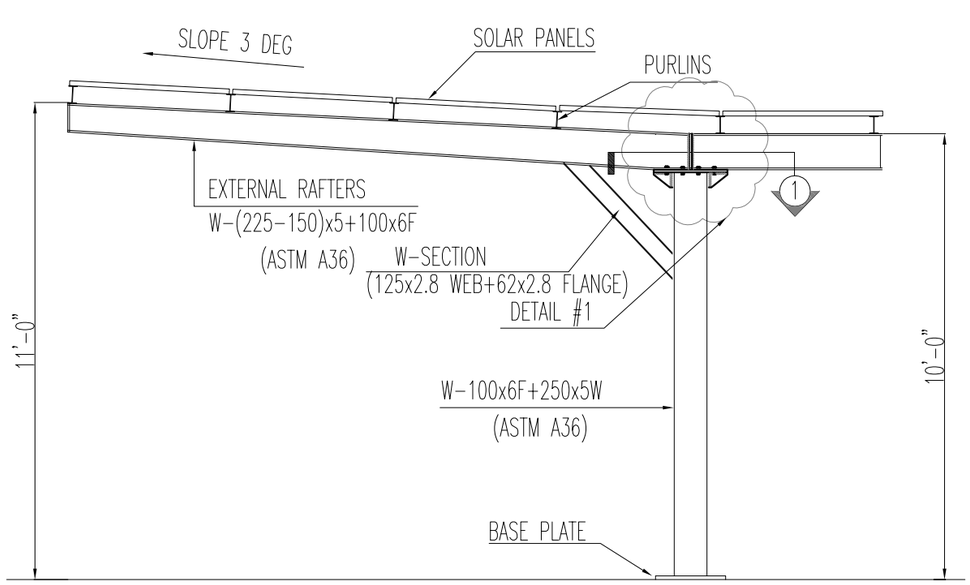


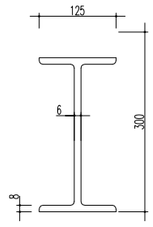
SECTION 1-1



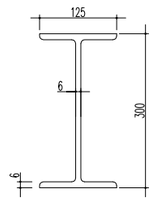
TYPICAL INTERNAL FRAME ELEVATION



TYPICAL EXTERNAL FRAME ELEVATION



COLUMN SECTION



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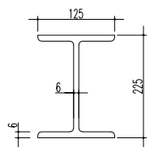

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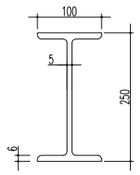

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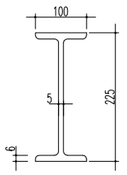

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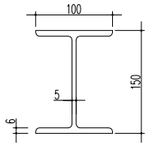

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CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

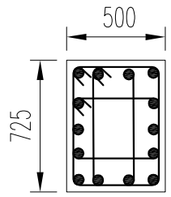
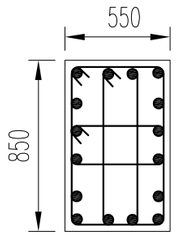
STRUCTURAL ENGINEERING

DRAWING TITLE :

SHED#01 & 02
STRUCTURE DETAILS

DESIGNED	CHECKED	DRAWING NO
HJ	SUH	S-04
DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	00

COLUMN SCHEDULE

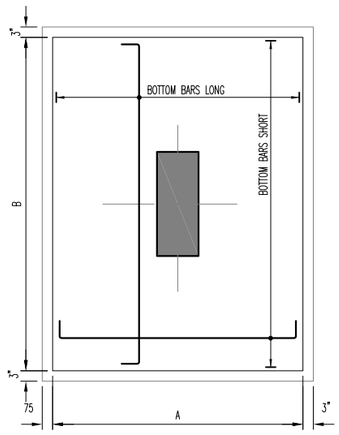
	C-1	C-2
FOUND. TO ROOF	 14T12 MAIN BARS T10@100c/c	 4T16+12T12 MAIN BARS T10@100c/c

FOOTING SCHEDULE

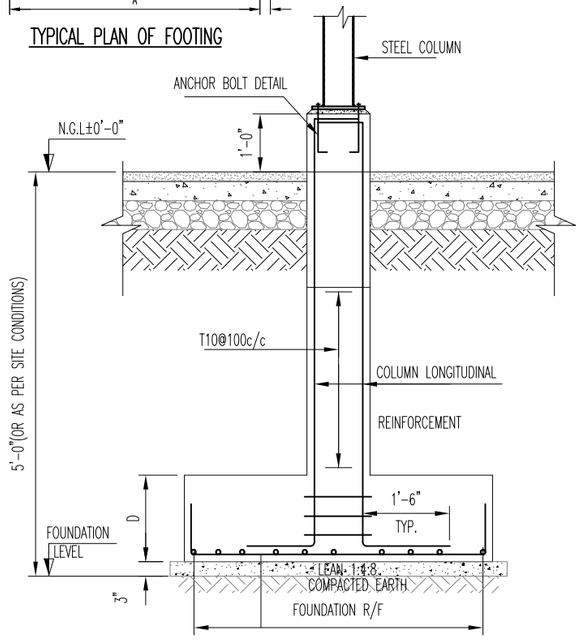
FOOTING MARKS	THICKNESS	FOOTING SIZE		REINFORCEMENT			
				BOTTOM REINFORCEMENT		TOP REINFORCEMENT	
	D	A	B	LONG	SHORT	LONG	SHORT
F1	375	1050	750	T12@200c/c	T12@200c/c		
F2	375	1200	900	T12@200c/c	T12@200c/c		

BILL OF MATERIALS (SHED#01 & 02)

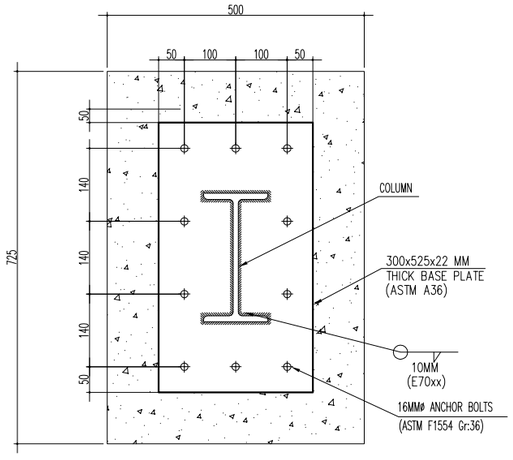
MARK	QTY	DESCRIPTION	LENGTH	WT (LB/FT)	WT (LBS)
1	4	EXTERNAL COLUMN	10'-0"	17.86	714.4
2	23	INTERNAL COLUMN	10'-0"	29.05	6681.5
3	4	EXTERNAL RAFTER	18'-9"	14.97	1122.75
4	23	INTERNAL RAFTER	18'-9"	20.36	8780.25
5	300	PURLINS	15'-8"	3.33	15644.34
6	27	PLATE		15.5	418.5
7	4	BASE PLATE EXTERNAL		62.5	250
8	23	BASE PLATE INTERNAL		129	2967
9	27	CONNECTION PLATE		10.2	275
10	27	DIAGONAL BRACE		3.57	352.8
		TOTAL WEIGHT (LBS)			37206.55



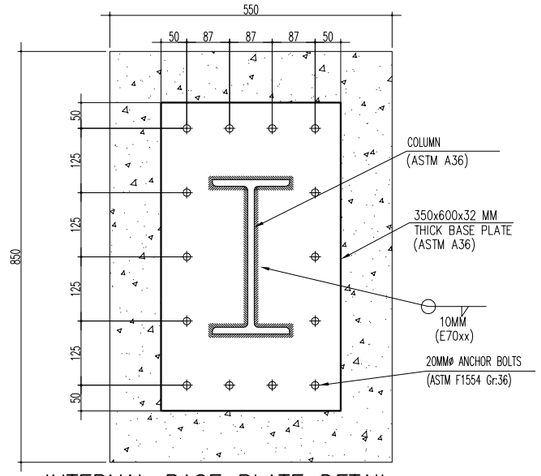
TYPICAL PLAN OF FOOTING



TYPICAL COLUMN ELEVATION DETAIL



EXTERNAL BASE PLATE DETAIL



INTERNAL BASE PLATE DETAIL

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

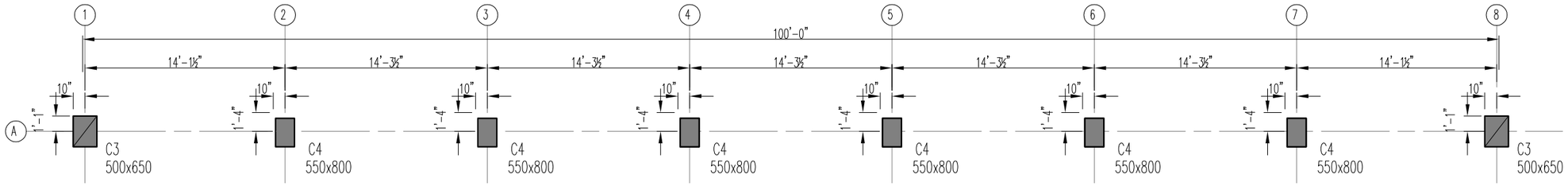
DISCIPLINE :

STRUCTURAL ENGINEERING

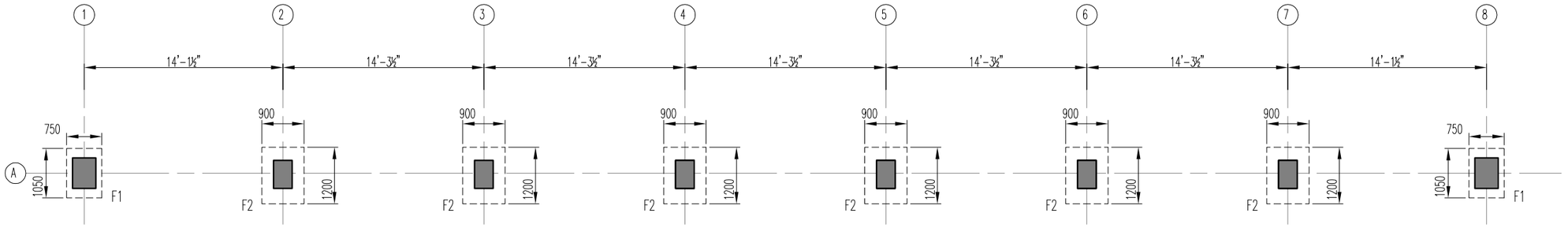
DRAWING TITLE :

SHED#01 & 02
FOUNDATION DETAILS

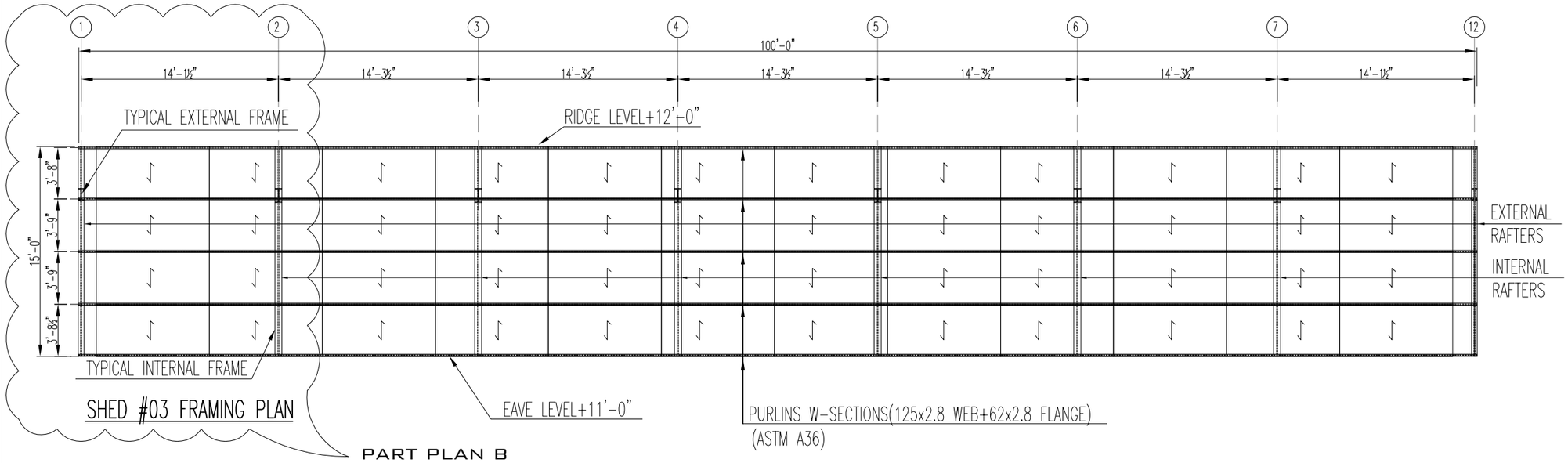
DESIGNED	CHECKED	DRAWING NO
HJ	SUH	S-05
DRAWN: MY	APPROVED: SUH	
SCALE: NTS	DATE: JUNE-2025	REVISION: 00



SHED #03 COLUMN LAYOUT PLAN



SHED#03 FOUNDATION LAYOUT PLAN AT LEVEL-5'-0"



SHED #03 FRAMING PLAN

PART PLAN B

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

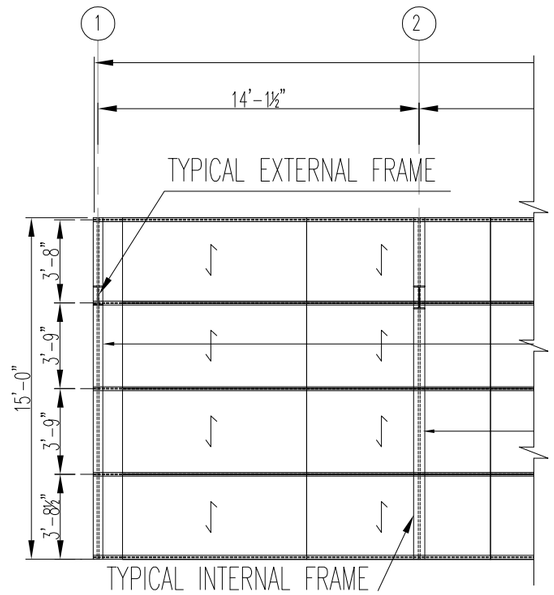
DISCIPLINE :

STRUCTURAL ENGINEERING

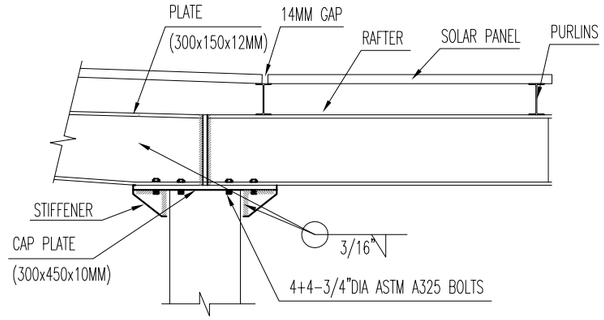
DRAWING TITLE :

SHED #03 COLUMN,FOUNDATION
&
FRAMING PLANS

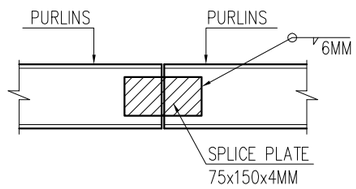
DESIGNED	CHECKED	DRAWING NO
HJ	SUH	
DRAWN	APPROVED	**S-06**
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	**00**



PART PLAN B



RAFTER-COLUMN CONNECTION DETAIL



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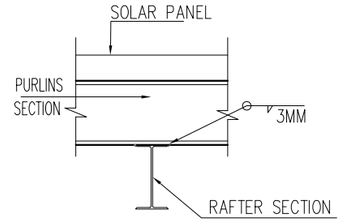

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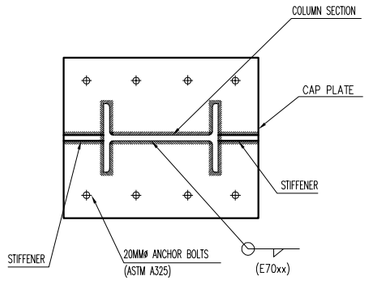
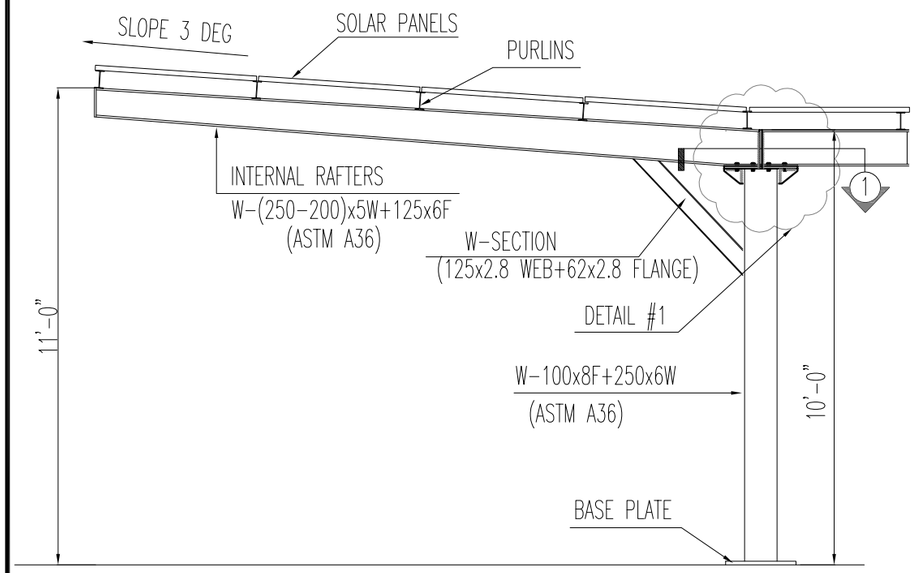
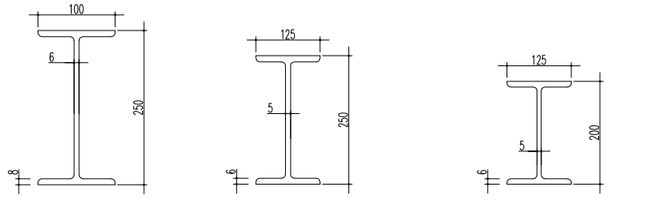


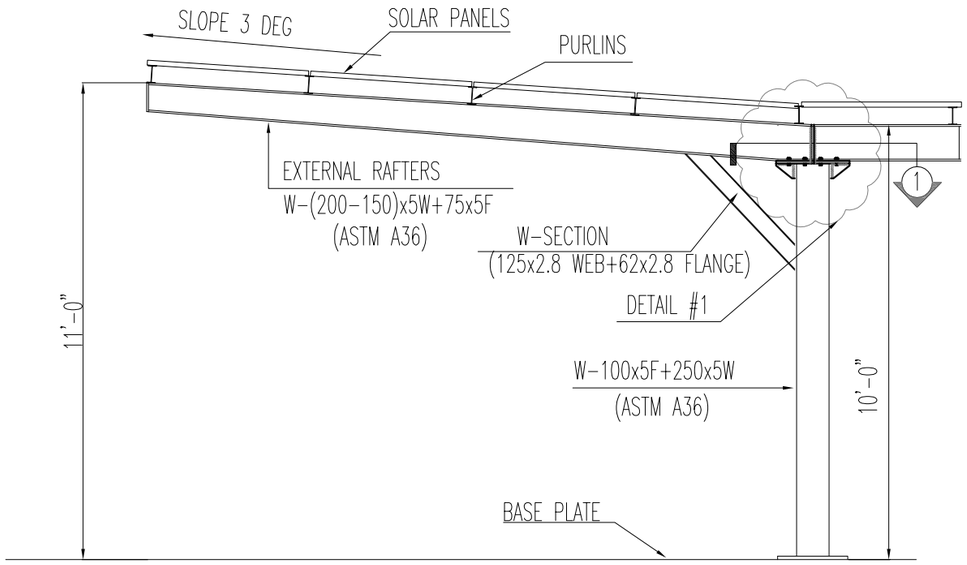
SECTION 1-1



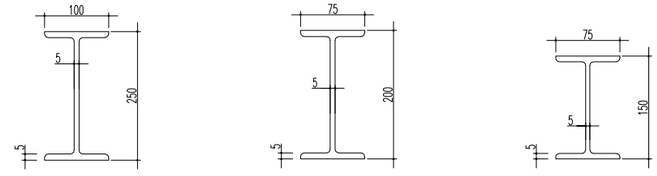
TYPICAL INTERNAL FRAME ELEVATION



COLUMN SECTION | RAFTER SECTION@START | RAFTER SECTION@END



TYPICAL EXTERNAL FRAME ELEVATION



COLUMN SECTION | RAFTER SECTION@START | RAFTER SECTION@END

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

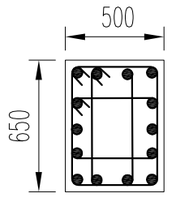
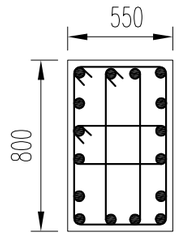
STRUCTURAL ENGINEERING

DRAWING TITLE :

SHED#03
STRUCTURE DETAILS

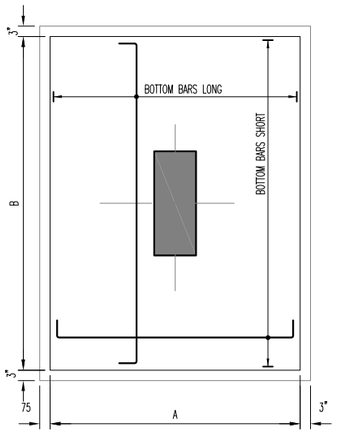
DESIGNED	CHECKED	DRAWING NO
HJ	SUH	S-07
DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	00

COLUMN SCHEDULE

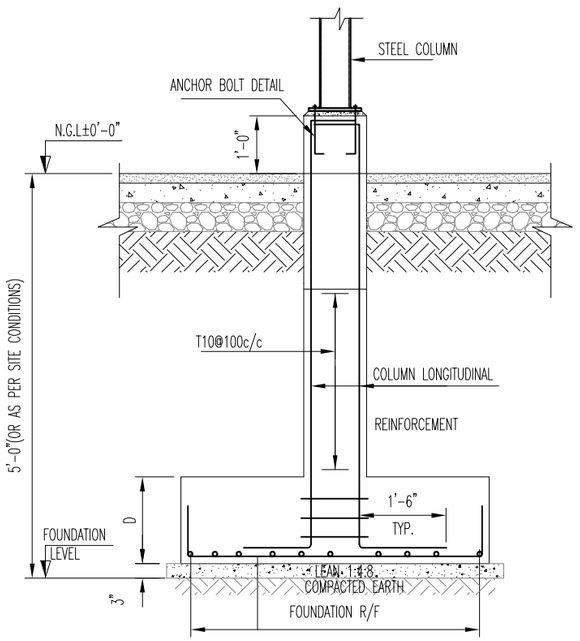
	C–3	C–4
FOUND. TO ROOF	 14T12 MAIN BARS T10@100c/c	 4T16+12T12 MAIN BARS T10@100c/c

BILL OF MATERIALS (SHED #03)

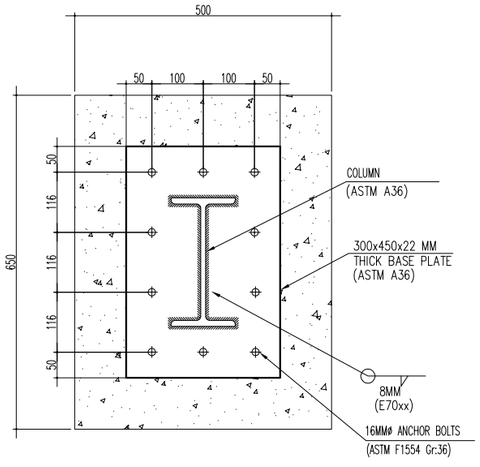
MARK	QTY	DESCRIPTION	LENGTH	WT (LB/FT)	WT (LBS)
1	2	EXTERNAL COLUMN	10'-0"	11.12	222.4
2	6	INTERNAL COLUMN	10'-0"	15.75	945
3	2	EXTERNAL RAFTER	15'-0"	7.77	233
4	6	INTERNAL RAFTER	15'-0"	13.01	1171
5	35	PURLINS	14'-3"	3.33	1660.83
6	8	CAP PLATE		22.9	183.75
7	2	BASE PLATE EXTERNAL		53.6	107.2
8	6	BASE PLATE INTERNAL		81.66	489.96
9	8	CONNECTION PLATE		10.2	81.6
10	8	DIAGONAL BRACE		3.57	104.52
		TOTAL WEIGHT (LBS)			5199.27



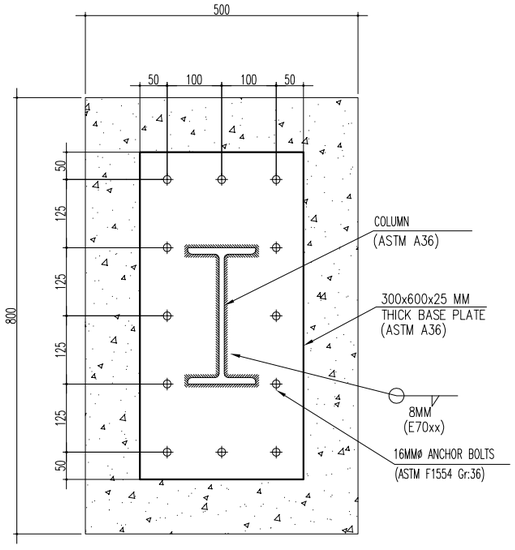
TYPICAL PLAN OF FOOTING



TYPICAL COLUMN ELEVATION DETAIL



EXTERNAL BASE PLATE DETAIL



INTERNAL BASE PLATE DETAIL

CONSULTANTS :

KESTEC INTERNATIONAL

FABRICATORS :

CLIENT :

IBA UNIVERSITY

PROJECT TITLE :

IBA GIRLS HOSTEL
186.6 KWP SYSTEM
INSTALATION

NOTES :

REVISIONS :

REV	DATE	DESCRIPTION	SIGN

REVISIONS

DISCIPLINE :

STRUCTURAL ENGINEERING

DRAWING TITLE :

SHED#03
FOUNDATION DETAILS

DESIGNED	CHECKED	DRAWING NO
HJ	SUH	S-08
DRAWN	APPROVED	
MY	SUH	
SCALE	DATE	REVISION
NTS	JUNE-2025	00