

REINFORCING STEEL:

- REINFORCING STEEL SHALL BE DETAILED, FABRICATED, AND PLACED IN ACCORDANCE TO "ACI 318 — BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" AND "ACI 315—MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES."
- ALL REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS AND GRADES UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS:
 - SMOOTH WELDED WIRE FABRIC—ASTM A185
 - ALL OTHER REINFORCEMENT—ASTM A615, GRADE 60
- REINFORCING STEEL TO BE WELDED SHALL CONFORM TO ASTM A706. WELDING OF REINFORCING STEEL SHALL CONFORM TO AWS D1.4. ALL WELDING SHALL BE DONE BY AWS CERTIFIED WELDERS USING LOW HYDROGEN E70XX ELECTRODES.
- REINFORCING STEEL SHALL BE SECURELY TIED IN-PLACE WITH #16 ANNEALED IRON WIRE. BARS IN BEAMS, SLABS, AND FOUNDATIONS SHALL BE SUPPORTED ON WELL-CURED CONCRETE BLOCKS, OR APPROVED METAL CHAIRS, AS SPECIFIED BY THE "CRSI MANUAL OF STANDARD PRACTICE," MSP-1.
- ALL REINFORCEMENT SHALL BE FREE OF LOOSE MILL AND RUST SCALE, OIL, DIRT, OR COATINGS OF ANY KIND THAT REDUCE THE BOND STRENGTH TO THE CONCRETE.
- REINFORCEMENT STEEL SHALL NOT BE DISPLACED OR ALTERED FOR THE CONVENIENCE OF OTHER TRADES UNLESS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.
- "WET SETTING" OF REINFORCING STEEL, ANCHOR RODS, EMBEDDED PLATES AND INSERTS IS NOT PERMITTED.
- ALL REINFORCEMENT SHALL BE CONTINUOUS WITH ADEQUATE LAP LENGTHS AT SPLICE LOCATIONS.
- THE FOLLOWING MINIMUM LAP SPLICE LENGTHS SHALL BE PROVIDED FOR ALL REINFORCING STEEL:

TYPICAL LAP SPLICE SCHEDULE (IN)						
BAR SIZE	4,000 PSI		4,500 PSI		5,000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	16	16	16	16	16	16
#4	20	16	19	16	19	16
#5	25	20	24	19	23	17
#6	30	24	28	23	26	21
#7	49	38	46	36	43	34
#8	62	47	58	45	55	42
#9	76	58	71	55	68	52
#10	91	71	86	67	82	64
#11	110	85	103	80	98	76

- FOR CENTER-TO-CENTER SPACING LESS THAN SHOWN BELOW MULTIPLY THE ABOVE VALUES BY THE FACTOR INDICATED:

BAR	SPACING	FACTOR
#3	< 1.875"	1.5
#4	< 2.500"	1.7
#5	< 3.125"	2.0
#6	< 3.750"	2.2
#7	< 4.875"	2.1
#8	< 4.000"	2.0
#9	< 4.125"	1.9
#10	< 4.375"	1.7
#11	< 4.500"	1.6

- TABLE VALUES APPLY FOR CLEAR COVER GREATER THAN OR EQUAL TO 1-1/2". CONTACT ENGINEER OF RECORD IF CONDITIONS VARY.
- TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BAR.
- VALUES ARE FOR UNCOATED BARS.

- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR ALL REINFORCING STEEL:

MINIMUM CONCRETE COVER (CAST-IN-PLACE)	
USE	CLEAR COVER
FORMED CONCRETE SURFACES IN CONTACT W/ EARTH OR EXPOSED TO WEATHER	2" CLEAR COVER 1.5" CLEAR COVER TO TIES
SLAB-ON-GRADE BARS	2" CLEAR COVER FROM TOP OF SLAB
CONCRETE CAST AGAINST EARTH	3"

- CONTINUE HORIZONTAL WALL BARS THROUGH PILASTERS, COLUMNS AND INTERSECTING WALLS.
- PROVIDE HOOKED FOOTING DOWELS OF THE SAME SIZE AND SPACING AS THE VERTICAL WALL REINFORCEMENT. LAP SPLICE DOWELS TO THE VERTICAL WALL REINFORCEMENT AND TERMINATE WITH STANDARD 90 DEGREE HOOK INTO THE FOOTING. HOOK SHALL LAY IN-PLANE WITH BOTTOM REINFORCEMENT.
- AT SLAB AND WALL OPENINGS, PROVIDE A MINIMUM OF TWO #5 BARS OVER, UNDER, AND AT THE SIDES OF THE OPENING. EXTEND THESE BARS A LAP DISTANCE (OR A MINIMUM OF 2'-0") PAST THE OPENING ON ALL SIDES.
- PROVIDE ONE #5 FOR SINGLE LAYER, AND TWO #5 FOR DOUBLE LAYER REINFORCING, 4'-0" LONG, DIAGONALLY AT EACH CORNER OF ALL WALL AND SLAB OPENINGS.
- REFERENCE TYPICAL DETAILS FOR THE DISPOSITION OF REINFORCEMENT AT WALL CORNERS, WALL INTERSECTIONS, AND FOR BARS IN SMALL WALL SECTIONS.
- PROVIDE #5 CARRIER BAR AT 3'-0" MAX SPACING FOR ALL SLAB, JOIST, AND WALL REINFORCING NOT SUPPORTED BY OTHER TRANSVERSE REINFORCEMENT.
- PROVIDE CORNER BARS AT CORNERS AND INTERSECTIONS FOR WALLS AND FOUNDATIONS EQUAL IN SIZE, NUMBER, AND SPACING TO HORIZONTAL REINFORCING. SIZE CORNER BARS TO PROVIDE A FULL LAP WITH HORIZONTAL REINFORCEMENT ON EACH LEG.

SHORING AND RE-SHORING:

- SHORING AND RE-SHORING IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL CONFORM TO ACI 347-04 AND ACI 347.2R-05.
- SHORING AND SUPPORTING FORMWORK SHALL NOT BE REMOVED FROM HORIZONTAL MEMBERS BEFORE THE CONCRETE STRENGTH HAS REACHED AT LEAST 70 PERCENT OF THE SPECIFIED DESIGN STRENGTH AS DETERMINED FROM FIELD CURED CYLINDERS. IN ADDITION, SHORING SHALL NOT BE REMOVED SOONER THAN THE FOLLOWING:

SHORING AND RE-SHORING		
ELEMENT	MINIMUM REMOVAL TIME	COMMENTS
WALLS, COLUMNS, AND BEAM SIDES	12 HR. CUMULATIVE WITH 50 DEGREES FARENHEIT SURROUNDING TEMPERATURE	WHERE FORMS ALSO SUPPORT FORMWORK FOR SLABS OR SOFFITS, THE REMOVAL TIME OF THE LATTER GOVERNS

CONCRETE ACCESSORIES:

- DEFORMED BAR ANCHORS (D.B.A.) SHALL BE NELSON TYPE D2L (ICC ESR-2907) OR APPROVED EQUAL.
- HEADED SHEAR STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS (ICC ESR-2856) OR APPROVED EQUAL.
- HEADED SHEAR STUDS AND DEFORMED BAR ANCHORS SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURER'S STANDARD EQUIPMENT AND IN ACCORDANCE WITH THE ASSOCIATED ICC REPORTS.
- PERMANENTLY EXPOSED EMBEDDED PLATES AND ANGLES SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION. EMBEDDED ITEMS SHALL NOT BE LOADED, NOR SHALL WELDS BE APPLIED, FOR A MINIMUM OF 7-DAYS AFTER CASTING OF CONCRETE.
- PROVIDE WATERSTOPS AT ALL HORIZONTAL AND VERTICAL CONCRETE JOINTS WHERE INDICATED ON DRAWINGS AND DETAILS. WATERSTOPS INDICATED TO BE HYDROPHLLIC STRIP WATERSTOP SHALL MAINTAIN A MINIMUM CLEAR COVER OF 3 INCHES. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR ADDITIONAL INFORMATION.
- APPROVED POST-INSTALLED ANCHORS ARE AS FOLLOWS:

APPROVED POST-INSTALLED CONCRETE ANCHORS		
TYPE	ANCHOR	ICC REPORT
CONCRETE SCREW	SIMPSON TITEN HD	ICC ESR-2713
	HILTI KWIK HUS-EZ	ICC ESR-3027
EPOXY ADHESIVE	SIMPSON SET-XP	ICC ESR-2508
	HILTI HIT-RE 500V3	ICC ESR-2322
EXPANSION	SIMPSON STRONG-BOLT II	ICC ESR-3814
	HILTI KWIK BOLT TZ	ICC ESR-1917

- ALL ANCHORS SHALL BE INSTALLED IN STRICT CONFORMANCE TO THE APPLICABLE ICC REPORT.
- REINFORCEMENT SHALL NOT BE CUT IN NEW, OR EXISTING CONCRETE DURING INSTALLATION OF POST-INSTALLED ANCHORS.
- ANCHORS THAT ARE LEFT EXPOSED TO WEATHER SHALL BE STAINLESS STEEL OR HOT-DIPPED GALVANIZED.

EPOXY REPAIR ADHESIVE:

- EPOXY REPAIR ADHESIVE SHALL CONFORM TO ASTM C881 AND SHALL BE A TWO-COMPONENT, LIQUID EPOXY WITH NON-SAG CONSISTENCY AND LONG POT LIFE. THE EPOXY ADHESIVE SHALL BE SUITABLE FOR USE ON DRY OR DAMP SURFACES.
- ADHESIVE SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
 - 14 DAY BOND STRENGTH (SLANT SHEAR) = 1690 PSI
 - 7 DAY TENSILE STRENGTH = 7150 PSI
 - 7 DAY COMPRESSIVE STRENGTH = 12000 PSI
 - LINEAR COEFFICIENT OF SHRINKAGE = 0.008 (MAX VALUE)
- HOLE SIZES AND INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE REQUIREMENTS SET FORTH IN THE APPROVED ICC EVALUATION REPORT.
- REINFORCEMENT SHALL NOT BE CUT OR DAMAGED IN EITHER NEW OR EXISTING CONCRETE DURING INSTALLATION.

PRE-ENGINEERED METAL BUILDING (PEMB):

- THE PRE-ENGINEERED BUILDING SUPPLIER SHALL FURNISH THE FRAME REACTIONS TO THE ENGINEER OF RECORD, PRIOR TO COMMENCEMENT OF FOUNDATION CONSTRUCTION. THE REACTIONS FURNISHED SHALL BE THE MAXIMUM, WORST-CASE REACTIONS RESULTING FROM LOAD CASES.
- SUBMIT ENGINEERED AND CHECKED SHOP DRAWINGS AND CALCULATIONS TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS AND CALCULATIONS SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER IN THE LOCAL JURISDICTION. SUBMITTALS SHALL INCLUDE PLANS LOCATING AND DEFINING ALL ELEMENTS FURNISHED BY THE MANUFACTURER, WITH ALL MAJOR OPENINGS SHOWN, SECTIONS AND DETAILS SHOWING CONNECTIONS, BASEPLATES, WALL CONDITIONS AND ROOF CONDITIONS OF THE PRE-ENGINEERED BUILDING. ALL SUBMITTAL MATERIAL MUST BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION AND INSTALLATION.
- THE PRE-ENGINEERED BUILDING SUPPLIER SHALL FURNISH ANCHOR ROD INFORMATION TO THE FOUNDATION CONTRACTOR. ANCHOR ROD PATTERNS SHOWN ON THE FOUNDATION DETAILS ARE SCHEMATIC ONLY. THE GENERAL CONTRACTOR SHALL FURNISH AND SUPPLY THE ANCHOR RODS FOR INSTALLATION IN FOUNDATIONS.
- ALL ANCHOR RODS SHALL BE F1554 GRADE 36. EMBED ANCHOR RODS 18" INTO CONCRETE PIERS & 8" INTO FOOTINGS.
- ALL STEEL SHALL BE FACTORY PRIMED.
- PRE-ENGINEERED METAL BUILDING STEEL SHALL BE AS FOLLOWS:
 - RIGID CLEAR SPAN FRAMES: I-SHAPED FRAME SECTIONS FABRICATED FROM SHOP-WELDED, BUILT-UP STEEL PLATES OR STRUCTURAL-STEEL SHAPES. INTERIOR COLUMNS WHERE SHOWN SHALL BE FABRICATED FROM ROUND STEEL PIPES OR TUBES, OR SHOP-WELDED, BUILT-UP STEEL PLATES.
 - FRAME CONFIGURATION: SINGLE GABLE.
 - EXTERIOR COLUMN: TAPERED.
 - RAFTER: TAPERED.
 - END-WALL FRAMING: MANUFACTURER'S STANDARD PRIMARY END-WALL FRAMING FABRICATED FOR FIELD-BOLTED ASSEMBLY TO COMPLY WITH THE FOLLOWING:
 - END-WALL RAFTERS: C-SHAPED, COLD-FORMED, STRUCTURAL-STEEL SHEET; OR I-SHAPED SECTIONS FABRICATED FROM SHOP-WELDED, BUILT-UP STEEL PLATES OR STRUCTURAL-STEEL SHAPES.
 - SECONDARY FRAMING: MANUFACTURER'S STANDARD SECONDARY FRAMING, INCLUDING PURLINS, GIRTS, EAVE STRUTS, FLANGE BRACING, BASE MEMBERS, GABLE ANGLES, CLIPS, HEADERS, JAMBS, AND OTHER MISCELLANEOUS STRUCTURAL MEMBERS. UNLESS OTHERWISE INDICATED, FABRICATE FRAMING FROM EITHER COLD-FORMED, STRUCTURAL-STEEL SHEET OR ROLL-FORMED, METALLIC-COATED STEEL SHEET, PREPAINTED WITH COIL COATING, TO COMPLY WITH THE FOLLOWING:
 - PURLINS: C- OR Z-SHAPED SECTIONS; FABRICATED FROM BUILT-UP STEEL PLATES, STEEL SHEET, OR STRUCTURAL-STEEL SHAPES; MINIMUM 2-1/2-INCH- (64-MM-) WIDE FLANGES.
 - GIRTS: C- OR Z-SHAPED SECTIONS; FABRICATED FROM BUILT-UP STEEL PLATES, STEEL SHEET, OR STRUCTURAL-STEEL SHAPES. FORM ENDS OF Z-SECTIONS WITH STIFFENING LIPS ANGLED 40 TO 50 DEGREES FROM FLANGE, WITH MINIMUM 2-1/2-INCH- (64-MM-) WIDE FLANGES.
 - EAVE STRUTS: UNEQUAL-FLANGE, C-SHAPED SECTIONS; FABRICATED FROM BUILT-UP STEEL PLATES, STEEL SHEET, OR STRUCTURAL-STEEL SHAPES; TO PROVIDE ADEQUATE BACKUP FOR METAL PANELS.
 - FLANGE BRACING: MINIMUM 2-BY-2-BY-1/8-INCH (51-BY-51-BY-3-MM) STRUCTURAL-STEEL ANGLES OR 1-INCH- (25-MM-) DIAMETER, COLD-FORMED STRUCTURAL TUBING TO STIFFEN PRIMARY-FRAME FLANGES.
 - SAG BRACING: MINIMUM 1-BY-1-BY-1/8-INCH (25-BY-25-BY-3-MM) STRUCTURAL-STEEL ANGLES.
 - BASE OR SILL ANGLES: MANUFACTURER'S STANDARD BASE ANGLE, MINIMUM 3-BY-2-INCH (76-BY-51-MM), FABRICATED FROM ZINC-COATED (GALVANIZED) STEEL SHEET.
 - PURLIN AND GIRT CLIPS: MANUFACTURER'S STANDARD CLIPS FABRICATED FROM STEEL SHEET. PROVIDE GALVANIZED CLIPS WHERE CLIPS ARE CONNECTED TO GALVANIZED FRAMING MEMBERS.
 - FRAMING FOR OPENINGS: CHANNEL SHAPES; FABRICATED FROM COLD-FORMED, STRUCTURAL-STEEL SHEET OR STRUCTURAL-STEEL SHAPES. FRAME HEAD AND JAMB OF DOOR OPENINGS AND HEAD, JAMB, AND SILL OF OTHER OPENINGS.
 - BRACING: PROVIDE ADJUSTABLE WIND BRACING AS FOLLOWS:
 - RIGID PORTAL FRAMES: FABRICATED FROM SHOP-WELDED, BUILT-UP STEEL PLATES OR STRUCTURAL-STEEL SHAPES TO MATCH PRIMARY FRAMING; OF SIZE REQUIRED TO WITHSTAND DESIGN LOADS.

DATE: 01.23.24
 DRAWN BY: EK
 SCALE: 1/2" = 1'-0"
 REVIEWED BY: CAM
 PROJECT NO.: 22-2496
 FILE:

DELAWARE ENGINEERING, P.C.
 CIVIL AND ENVIRONMENTAL ENGINEERING
 28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
 55 SOUTH MAIN ST., ONEONTA, NY 13820 - 607.432.8073
 16 EAST MARKET ST., RED HOOK, NY 12571 - 518.452.1290
 548 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777
 223 MAIN ST., GOSHEN, NY 10924 - 845.615.9322



NO.	DATE	DESCRIPTION

RHINEBECK WTP
 IMPROVEMENTS
 VILLAGE OF RHINEBECK
 DUTCHESS COUNTY, NY

GENERAL STRUCTURAL
 NOTES

SHEET:
S002