

DESIGN CRITERIA

1. APPLICABLE CODE:

EXISTING BUILDING: 1996 BOCA, 1999 CONNECTICUT STATE BUILDING CODE, AND 2004 AMENDMENT TO THE CONNECTICUT SUPPLEMENT.
 SILOS, NEW EQUIPMENT AND TANKS: 2003 INTERNATIONAL BUILDING CODE, CONNECTICUT STATE BUILDING CODE AND 2005 CONNECTICUT SUPPLEMENT.

2. REFER TO THE DRAWINGS FOR ADDITIONAL AND SPECIFIC STRUCTURE LOADINGS AND REQUIREMENTS.

3. ROOF LOADS:

EXISTING BUILDING:

GROUND SNOW LOAD (Pg) 30 PSF PLUS DRIFTING
 SNOW EXPOSURE LOAD FACTOR (Ce) 0.7
 IMPORTANCE FACTOR (I) 1.0
 ROOF SNOW LOAD 30 PSF MIN

SILO, NEW EQUIPMENT AND TANKS:

GROUND SNOW LOAD (Pg) 30 PSF PLUS DRIFTING
 SNOW EXPOSURE FACTOR (Ce) 1.0
 IMPORTANCE FACTOR (I) 1.10
 ROOF SNOW LOAD 30 PSF MIN

ROOF LIVE LOAD 20 PSF MIN

DEFLECTION CRITERIA FOR ROOF FRAMING MEMBERS:

TOTAL LOAD L / 240
 LIVE LOAD L / 360

WHERE L IS THE MEMBERS SPAN LENGTH

4. FLOOR LIVE LOADS:

CATWALKS (ACCESS ONLY) 50 PSF
 ELECTRICAL ROOM 300 PSF
 PROCESS AREA 300 PSF
 WALKWAYS, STAIRS, PLATFORMS 100 PSF
 UNRESTRICTED VEHICULAR AREAS AASHTO HS 20

DEFLECTION CRITERIA FOR FLOOR FRAMING MEMBERS:

TOTAL LOAD (UNO) L/240
 LIVE LOAD ONLY L/360
 LIVE LOAD PLUS MASONRY L/720

WHERE L IS THE MEMBER'S SPAN LENGTH

5. WIND LOADS:

EXISTING BUILDING:

WIND SPEED (FASTEST MILE) 85 MPH
 BASIC VELOCITY PRESSURE (Pv) 18.5 PSF
 EXPOSURE CATEGORY C
 IMPORTANCE FACTOR 1.0

SILO, NEW EQUIPMENT AND TANKS:

WIND SPEED (3 SECOND GUST) 105 MPH
 EXPOSURE CATEGORY C
 IMPORTANCE FACTOR 1.15

6. SEISMIC LOADS:

EXISTING BUILDING:

EFFECTIVE PEAK VELOCITY RELATED ACCELERATION (Av) 0.13
 EFFECTIVE PEAK ACCELERATION (Aa) 0.13
 SEISMIC HAZARD EXPOSURE GROUP C
 SEISMIC PERFORMANCE GROUP C
 SITE COEFFICIENT (S₁) 1.5
 RESPONSE MODIFICATION FACTOR (R) 4.5
 DEFLECTION AMPLIFICATION FACTOR (Cd) 4
 THE EXISTING STRUCTURE WAS ANALYZED USING THE EQUIVALENT LATERAL FORCE PROCEDURE.

SILO, NEW EQUIPMENT AND TANKS:

SPECTRAL RESPONSE ACCELERATION AT SHORT PERIOD (S_s) 0.40
 SPECTRAL RESPONSE ACCELERATION AT 1-SECOND PERIOD (S₁) 0.092
 SITE CLASSIFICATION D

OTHER SEISMIC PARAMETERS BY MANUFACTURER

7. SOIL PARAMETERS:

A EXISTING PILE UNDER EXISTING BUILDING: PER OWNER'S DIRECTIVES, CH2M HILL IS TO ASSUME EXISTING PILES ARE ADEQUATE FOR NEW LOADS.

B NEW PILES: HP12x53, 50 KSI
 75 KIP ALLOWABLE CAPACITY

C EQUIVALENT DRAINED FLUID PRESSURES:
 ACTIVE: 35 PSF
 AT REST: 55 PSF

7. SOIL PARAMETERS CONT:

D EQUIVALENT UNDRAINED FLUID PRESSURES:
 ACTIVE: 80 PSF
 AT REST: 90 PSF
 E GROUND WATER ELEVATION:
 100 YEAR FLOOD WITH ELEVATION 15.85
 25 YEAR FLOOD ELEVATION 13.55

GENERAL INFORMATION

- FOR ABBREVIATIONS NOT LISTED, SEE ASME Y14.38 "ABBREVIATIONS AND ACRONYMS" PUBLICATION AS DISTRIBUTED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) AND PER LIST ON DRAWING G-6.
- DESIGN DETAILS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS OCCURRING THROUGHOUT THE PROJECT, WHETHER OR NOT THEY ARE INDIVIDUALLY CALLED OUT.
- DETAILING AND DIMENSIONS OF EXISTING STRUCTURES SHOWN ARE BASED ON PREVIOUS CONTRACT DOCUMENTS, AND DO NOT NECESSARILY REPRESENT THE AS-CONSTRUCTED CONDITIONS. THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND DETAILING OF THE EXISTING STRUCTURES PRIOR TO FABRICATION OF ADJACENT FRAMING OR CONNECTIONS THAT ARE AFFECTED BY THE EXISTING STRUCTURE.
- VERIFY OPENING DIMENSIONS IN WALLS, SLABS, AND DECKS WITH OTHER DISCIPLINE DRAWINGS.
- FOR NUMBER, TYPE, SIZE, ARRANGEMENT AND/OR LOCATION OF EQUIPMENT PADS SEE OTHER DISCIPLINE DRAWINGS. COORDINATE WITH EQUIPMENT SUPPLIER PRIOR TO PLACING SLABS, WALLS AND FOUNDATIONS. COORDINATE PIPING OPENINGS WITH OTHER DISCIPLINE DRAWINGS.
- FOR SIZES, REINFORCING AND LOCATIONS OF ELECTRICAL CABLES, CONDUITS, DUCT BANKS AND TRANSFORMER PADS, SEE ELECTRICAL DRAWINGS.
- FOR SIZES AND LOCATIONS OF SHELF ANGLES, LOOSE LINTELS, ABRASIVE TILES, REGLET INSERTS AND THRESHOLDS, SEE ARCHITECTURAL DRAWINGS.
- CUT NO STRUCTURAL MEMBERS FOR PIPES, DUCTS, ETC., UNLESS SPECIFICALLY DETAILED OR APPROVED IN WRITING BY THE ENGINEER.
- VISITS TO THE JOB SITE BY THE ENGINEER TO OBSERVE THE CONSTRUCTION DO NOT IN ANY WAY MEAN THAT ENGINEER IS GUARANTORS OF CONSTRUCTOR'S WORK, NOR RESPONSIBLE FOR THE COMPREHENSIVE OR SPECIAL INSPECTIONS, COORDINATION, SUPERVISION, NOR SAFETY AT THE JOB SITE.
- CONCRETE PLACEMENT REINFORCING STEEL PLACEMENT WELDING OF REINFORCING STEEL STRUCTURAL WELDING ANCHORS, EMBEDS, HEADED STUDS, POST-INSTALLED ANCHORS AND BOLTS INSTALLED IN CONCRETE HIGH STRENGTH BOLTS PILES GRADING, EXCAVATION, AND FILLING MASONRY, AS NOTED

SPECIFIED CONCRETE AND MASONRY TESTING DURING CONSTRUCTION WILL BE OWNER FURNISHED. SPECIFIED LABORATORY TEST MIXES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

FOUNDATIONS

- BOTTOM OF EXTERIOR FOOTINGS AND SLABS SHALL EXTEND A MINIMUM OF 3'-8" BELOW FINISH GRADE UNLESS THE SOIL BENEATH MEMBER IS FREE-DRAINING SOIL WITH AN UNDERDRAIN SYSTEM DESIGNED TO REMOVE MOISTURE BENEATH MEMBER. THE FREE-DRAINING SOIL IS TO EXTEND TO A MINIMUM DEPTH 3'-6" BELOW FINISH GRADE. THE FREE-DRAINING MATERIAL AND UNDERDRAIN SYSTEM SHALL BE APPROVED BY A GEOTECHNICAL ENGINEER.
- EXCAVATION SHALL BE SHORED TO PREVENT SUBSIDENCE OR DAMAGE TO ADJACENT EXISTING STRUCTURES, STREETS, UTILITIES, ETC.
- ALL FOUNDATION SLABS, SLABS-ON-GRADE AND WALL AND COLUMN FOUNDATIONS SPECIFICALLY NOTED TO BE ON FILL SHALL BEAR ON COMPACTED GRANULAR FILL AS SPECIFIED.
- ALL FOUNDATION BEARING SURFACES SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF REINFORCING STEEL.
- NO BACKFILL SHALL BE PLACED BEHIND CANTILEVERED, FREE TOP WALLS UNTIL THE CONCRETE HAS ATTAINED 100 PERCENT OF ITS SPECIFIED COMPRESSIVE STRENGTH.

FORMWORK, SHORING AND BRACING

- STRUCTURES SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED FOR STABILITY UNDER FINAL CONDITIONS ONLY. DESIGN SHOWN DOES NOT INCLUDE NECESSARY COMPONENTS OR EQUIPMENT FOR STABILITY OF THE STRUCTURES DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ALL WORK RELATING TO CONSTRUCTION ERECTION METHODS, BRACING, SHORING, RIGGING, GUYS, SCAFFOLDING, FORMWORK, AND OTHER WORK AIDS REQUIRED TO SAFELY PERFORM THE WORK SHOWN.

CONCRETE REINFORCING

- MINIMUM REINFORCING FOR ALL CONCRETE WALLS AND SLABS SHALL BE AS FOLLOWS:

WALL THICKNESS	REINF EACH WAY	LOCATION
6"	#4@12"	CENTERED
8"	#5@12"	CENTERED
10"	#4@12"	EACH FACE
12"	#5@12"	EACH FACE

PROVIDE LARGER SIZES AND MORE REINFORCING IN SECTIONS OF CONCRETE WHERE REQUIRED BY THE DETAILS ON THE DRAWINGS OR BY THE SPECIFICATIONS.

- CLEARANCE FOR REINFORCEMENT BARS, UNLESS SHOWN OTHERWISE, SHALL BE: WHEN PLACED ON GROUND: 3"
 INTERIOR, FINISHED, HUMIDITY CONTROLLED AREAS:
 WALLS AND SLABS 3/4"
 BEAM STIRRUPS AND COLUMN TIES 1 1/2"
 ALL OTHER CONCRETE SURFACES: 2"
- REFER TO WALL CORNER AND WALL INTERSECTION REINFORCING DETAIL 3303. WALL CORNER REINFORCING SIZES AND SPACINGS SHALL BE AS SHOWN ON THE DRAWINGS AND REFERENCED TO THIS DETAIL. TYPICAL HORIZONTAL WALL REINFORCING SHALL LAP WITH THE CORNER HORIZONTAL REINFORCING.
- 90 DEGREE BENDS, UNLESS OTHERWISE SHOWN, SHALL BE ACI 318 STANDARD HOOKS.
- WALL CORNER AND WALL INTERSECTION REINFORCEMENT BARS SHALL BE CONTINUOUS AROUND CORNERS AND THROUGH COLUMNS OR PILASTERS. REINFORCEMENT SHALL BE EXTENDED INTO CONNECTING WALLS AND LAPPED ON THE OPPOSITE FACE OF THE CONNECTING WALLS, AS INDICATED IN DETAIL 3303.
- LAP VERTICAL WALL BARS WITH DOWELS FROM BASE SLABS AND EXTEND INTO TOP FACE OF SLABS AND LAP WITH TOP SLAB REINFORCEMENT. PROVIDE A MINIMUM OF FOUR FULL HEIGHT VERTICAL BARS WITH MATCHING DOWELS AT WALL ENDS, CORNERS AND INTERSECTIONS WITH SIZE TO MATCH TYPICAL VERTICAL REINFORCING STEEL SHOWN OR REQUIRED BY NOTES ABOVE.
- LOCATE SLAB AND BEAM TOP BAR SPLICES AT MIDSPAN AND BOTTOM BAR SPLICES AT SUPPORTS.
- REINFORCEMENT BENDS AND LAPS, UNLESS OTHERWISE NOTED, SHALL SATISFY THE FOLLOWING MINIMUM REQUIREMENTS:

CONCRETE DESIGN STRENGTH = 4,000 PSI		GRADE 60 REINFORCING STEEL								
BAR SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11
LAP SPLICE LENGTH										
SPACING<6"	TOP BAR ✗	1'-4"	2'-0"	3'-0"	4'-0"	5'-10"	6'-8"	7'-7"	8'-6"	9'-5"
	OTHER BAR	1'-4"	1'-7"	2'-4"	3'-1"	4'-6"	5'-2"	5'-10"	6'-7"	7'-3"
SPACING>6"	TOP BAR ✗	1'-4"	1'-8"	2'-0"	2'-5"	3'-6"	4'-0"	5'-0"	6'-2"	7'-5"
	OTHER BAR	1'-4"	1'-4"	1'-7"	1'-10"	2'-9"	3'-1"	3'-10"	4'-9"	5'-8"
EMBEDMENT LENGTH										
SPACING<6"	TOP BAR ✗	1'-0"	1'-7"	2'-4"	3'-1"	4'-6"	5'-2"	5'-10"	6'-7"	7'-3"
	OTHER BAR	1'-0"	1'-3"	1'-9"	2'-5"	3'-6"	4'-0"	4'-6"	5'-1"	5'-7"
SPACING>6"	TOP BAR ✗	1'-0"	1'-3"	1'-7"	1'-10"	2'-9"	3'-1"	3'-10"	4'-9"	5'-8"
	OTHER BAR	1'-0"	1'-0"	1'-3"	1'-5"	2'-1"	2'-5"	3'-0"	3'-8"	4'-5"

TOP BARS SHALL BE DEFINED AS ANY HORIZONTAL BARS PLACED SUCH THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR IN ANY SINGLE POUR. HORIZONTAL WALL BARS ARE CONSIDERED TOP BARS.

WHERE 3000 PSI CONCRETE IS USED, INCREASE ABOVE LENGTHS BY 16 PERCENT.

CONCRETE

- 28-DAY CAST-IN-PLACE CONCRETE STRENGTHS:
 TYPICAL UNLESS NOTED OTHERWISE: 4000 PSI
 CONCRETE FILL: 2500 PSI
 EXTERIOR CURBS, SIDEWALKS, SLABS AND PAVEMENT: 5000 PSI
 CONDUIT ENCASEMENTS: 3000 PSI
 PIPE ENCASEMENTS NOT INTEGRAL WITH SLAB OR FOUNDATION: 3000 PSI
- REINFORCING STEEL:
 TYPICAL: ASTM A615, GRADE 60
 WELDED: ASTM A706, GRADE 60
- FABRICATION AND PLACEMENT OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CRSI MSP-1 "MANUAL OF STANDARD PRACTICE" AND ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDING".
- FOR CONCRETE SHEAR WALL STRUCTURES, ALL REINFORCING STEEL SHALL MEET THE FOLLOWING REQUIREMENTS:
 A. ACTUAL YIELD STRENGTH BASED ON MILL TESTS SHALL NOT EXCEED SPECIFIED YIELD STRENGTH BY MORE THAN 18,000 PSI. (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI).
 B. RATIO OF THE ACTUAL ULTIMATE TENSILE STRESS TO ACTUAL TENSILE YIELD STRENGTH SHALL NOT BE LESS THAN 1.25.
- CONTINUOUS WATERSTOP AS SPECIFIED SHALL BE INSTALLED IN ALL CONSTRUCTION JOINTS IN WALLS OF BELOW GRADE STRUCTURES, EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE.
- CONSTRUCTION JOINTS INDICATED ARE SUGGESTED LOCATIONS. CONTRACTOR MAY REVISE LOCATION OF JOINTS, SUBJECT TO SPECIFIED REQUIREMENTS. ADDITIONAL CONSTRUCTION JOINT LOCATIONS, INCLUDING ADDITIONAL REQUIRED FOR CONSTRUCTION, SHALL BE SUBMITTED FOR REVIEW BY ENGINEER.

- ROUGHEN AND CLEAN CONSTRUCTION JOINTS IN WALLS AND SLABS AS SPECIFIED PRIOR TO PLACING ADJACENT CONCRETE.
- THE CONTRACTOR SHALL COORDINATE PLACEMENT OF OPENINGS, CURBS, DOWELS, SLEEVES, CONDUITS, BOLTS AND INSERTS PRIOR TO PLACEMENT OF CONCRETE.
- NO ALUMINUM CONDUIT OR PRODUCTS CONTAINING ALUMINUM OR ANY OTHER MATERIAL INJURIOUS TO THE CONCRETE SHALL BE EMBEDDED IN THE CONCRETE.
- CONDUIT SHALL NOT BE PLACED PARALLEL WITH BEAM OR COLUMN REINFORCEMENT UNLESS SPECIFICALLY INDICATED IN DRAWINGS.

MASONRY

- MORTAR: ASTM C270, TYPE S, HYDRATED. MASONRY CEMENT SHALL NOT BE USED.
- GROUT: ASTM C476 COURSE GROUT. 2000 PSI MINIMUM 28 DAY COMPRESSIVE STRENGTH.
- CONCRETE MASONRY UNITS: ASTM C90, GRADE N, MEDIUM WEIGHT, 1900 PSI UNIT COMPRESSIVE MASONRY STRENGTH. LINEAR SHRINKAGE SHALL NOT EXCEED .065 PERCENT.
- DESIGN f_m OF THE FINISHED ASSEMBLY SHALL BE 1500 PSI.
- PLACE COURSES IN RUNNING BOND PATTERN, UNLESS SPECIFICALLY INDICATED OTHERWISE.
- GROUTING:
 A. DO NOT SOLID GROUT WALLS UNLESS SO INDICATED ON THE DRAWINGS.
 B. GROUT ONLY CELLS WITH REINFORCING WHERE REBAR IS SPACED AT 32 INCHES ON CENTER OR GREATER EACH WAY.
 C. SOLID GROUT CMU WALLS WHERE REBAR IS SPACED AT 24 INCHES ON CENTER OR LESS, EITHER WAY.
 D. SOLID GROUT ALL PIERS, COLUMNS, HEADERS, AND BOND BEAMS. SOLID GROUT ADDITIONAL MASONRY AREAS SPECIFICALLY INDICATED ON THE DRAWINGS.

SPECIFIED MASONRY STRENGTH f _m = 1500psi					
BAR SIZE	#2	#3	#4	#5	#6
LAP LENGTH (INCHES) ^					
CENTERED IN 8" WYTHE	15	19	25	31	57
CENTERED IN 12" MINIMUM WYTHE	15	19	25	31	52
ONE BAR EACH FACE IN 12" MINIMUM WYTHE ^{b AND c}	15	19	28	44	92

- STAGGER ADJACENT LAP SPLICES BY 24 INCHES, WHEN SEPARATED BY 3 INCHES OR LESS.
 - CENTER OF REINFORCING TO FACE OF 12" WYTHE OF MASONRY = 2 1/2" FOR #4 AND GREATER.
 - MINIMUM COVER OVER #2 AND #3 REINFORCING BARS: 1 3/4".
- PROVIDE TWO FULL HEIGHT TYPICAL VERTICAL BARS AT EDGES OF OPENINGS AND FULL HEIGHT TYPICAL VERTICAL BARS IN 3 CELLS AT CORNERS. PROVIDE MATCHING DOWELS FOR VERTICAL BARS. PROVIDE REINFORCED LINTELS ABOVE AND REINFORCED BOND BEAMS BELOW OPENINGS. PROVIDE HORIZONTAL CORNER BARS WITH MINIMUM 2'-0" LEGS AT CORNERS. SEE DETAILS 4001, 4003A, 4003B, 4003C AND 4004-1.
 - PROVIDE LEVEL 1 SPECIAL INSPECTION FOR MASONRY CONSTRUCTION EXCEPT PROVIDE LEVEL 2 FOR THE FOLLOWING:
 A. MASONRY BOND BEAMS, PIERS, COLUMNS AND PILASTERS, AND UNIQUE DETAIL AREAS. AS NOTED FOR ANY PART OR PORTION OF EACH INDIVIDUAL STRUCTURE.
 - MASONRY UNIT AND GROUT TESTING SHALL BE IN CONFORMANCE WITH 2003 IBC "UNIT STRENGTH METHOD". TESTING WILL BE OWNER FURNISHED. OTHER IBC TEST METHODS MAY BE SUBMITTED AS AN ALTERNATIVE.
 - THE MINIMUM REINFORCING FOR CONCRETE BLOCK WALLS SHALL BE AS FOLLOWS:
 WALL THICKNESS 8"
 VERTICAL REINFORCING #5@32" CTR
 HORIZONTAL REINFORCING 2-W9@16"
 #5@48" EF
 2-W9@16" (SEE NOTE 14)
 PROVIDE LARGER SIZES AND MORE REINFORCING IN WALLS WHERE REQUIRED BY THE DRAWINGS OR BY THE SPECIFICATIONS.
 - PLACE NO CONDUIT IN CELLS CONTAINING REINFORCEMENT.
 - TIE HORIZONTAL REINFORCING TO STEEL FRAMING WITH DUR-O-WALL D/A 901 AND D/A 914 MASONRY ANCHORING 2'-8" ON CENTER UNLESS NOTED OTHERWISE.
 - SEE DRAWING S-2403 AND S-2408 FOR REINFORCING IN WALLS ALONG COLUMN LINES A AND 2 RESPECTIVELY.

THESE RECORD DOCUMENTS HAVE BEEN PREPARED BASED ON THE INFORMATION PROVIDED BY OTHERS. THE DESIGN PROFESSIONAL HAS NOT VERIFIED THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.



STAMFORD WATER POLLUTION CONTROL AUTHORITY SOLIDS DRYING PROJECT

GENERAL STRUCTURAL DESIGN NOTES

VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING.	
DATE	JUNE 2006
PROJ	334058
DWG	G-5
SHEET	50