

STRUCTURAL DESIGN CRITERIA

SECTION 3 - CONCRETE (CONT.):

3.1 - CAST-IN-PLACE CONCRETE (CONT):

- REINFORCING DETAILING:
- ALL REINFORCING SHALL BE DETAILED IN ACCORDANCE WITH ACI 318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" AND ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" PER PUBLICATION SP-66.
 - SPACING OF REINFORCING BARS ARE REFERENCED TO THE DETAILS AS DETAILED OR AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPICES, WHERE PERMITTED, SHALL BE CLASS 'B', UNLESS SHOWN OTHERWISE IN DETAILS, NOTES, OR SCHEDULES.
 - REFER TO DEVELOPMENT LENGTH AND LAP SPICE TYPICAL DETAILS AND SCHEDULES ON SHEET CS-002 FOR DEVELOPMENT LENGTHS, SPICE LENGTHS, AND ADDITIONAL REQUIREMENTS.
 - MAKE ALL REINFORCING BARS CONTINUOUS AROUND CORNERS OR PROVIDE CORNER BARS OF EQUAL SIZE AND SPACING. SEE TYPICAL DETAILS.
 - WHERE ALL REINFORCING WITHIN A STRUCTURAL ELEMENT WILL BE SPICED AT THE SAME LOCATION THE SPICES SHALL BE STAGGERED UNLESS SHOWN OTHERWISE IN DETAILS OR SCHEDULES.
 - AT ENDS OF BEAMS, SLABS, JOISTS, WALLS, AND GRADE BEAMS TERMINATE TOP REINFORCING WITH STANDARD HOOKS UNLESS SHOWN OTHERWISE.
 - PROVIDE THE FOLLOWING CLEAR COVER MEASURED FROM SURFACE OF CONCRETE TO OUTER FACE OF REBAR UNLESS SHOWN OTHERWISE ON PLANS OR IN DETAILS:

DESCRIPTION OF REBAR USE	COVER (INCHES)
CONCRETE POURED AGAINST EARTH	3"
CONCRETE POURED IN FORMS AND EXPOSED TO WEATHER OR EARTH: #5 BAR OR SMALLER	1 1/2"
CONCRETE POURED IN FORMS AND EXPOSED TO WEATHER OR EARTH: #6 BAR OR LARGER	2"
SLABS, WALLS, AND JOISTS (UNLESS NOTED OTHERWISE)	3/4"

- K. PLACING OF REINFORCING: PROVIDE ALL ACCESSORIES AND ADDITIONAL SUPPORT BARS NECESSARY TO SUPPORT AND SECURE REINFORCING AT POSITIONS SHOWN ON DRAWINGS AND TO MAINTAIN REQUIRED CONCRETE COVER.
- L. CONTROL JOINTS IN CONCRETE:
1. PROVIDE CONTROL JOINTS IN CONCRETE WALLS AT A MAXIMUM SPACING OF 30'-0" ON CENTER. SEAL CONTROL JOINTS EXPOSED TO EARTH OR WEATHER WITH JOINT SEALANT.
- M. CONSTRUCTION JOINTS:
1. REINFORCING SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS, UNLESS DETAILED OTHERWISE. ALTERNATE SPICE CONFIGURATIONS SHALL BE SUBMITTED FOR ENGINEER REVIEW AND APPROVAL PRIOR TO PROCEEDING WITH WORK.
- N. CONSTRUCTION TOLERANCES: CONSIDER EFFECTS OF SLAB SHRINKAGE DUE TO CONCRETE CURING AND APPLICATION OF POST-TENSIONING FORCES, AS APPLICABLE, AND COORDINATE WITH SLAB EDGES AND OTHER DIMENSIONS THAT MAY BE AFFECTED.

3.2 - POST-INSTALLED ANCHORS INTO CONCRETE:

1. CONSOLIDATE ALL CONCRETE DURING PLACEMENT AND THOROUGHLY WORK AROUND REINFORCING AND EMBEDDED ITEMS AND INTO CORNERS OF FORMS FOLLOWING ACI RECOMMENDATIONS.
2. WHEN CONCRETE PLACEMENT IS INTERRUPTED, NOTIFY STRUCTURAL ENGINEER FOR RECOMMENDATIONS. UNLESS DIRECTED OTHERWISE, PROVIDE A CONSTRUCTION JOINT BY INTENTIONALLY ROUGHENING THE CONCRETE SURFACE TO 1/4" AMPLITUDE. COAT THE JOINT WITH AN APPROVED BONDING AGENT PRIOR TO POURING CONCRETE ON THE OPPOSITE SIDE OF THE JOINT.

2.1 - FOUNDATION DESIGN CRITERIA:

- A. PROVIDE POST-INSTALLED CONCRETE ANCHORS AS SHOWN IN THE PLANS, DETAILS, AND SPECIFICATIONS. ALTERNATE PRODUCTS TO BE SUBMITTED FOR REVIEW AND APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD. ALL ANCHORS SHALL BE DESIGNED AS ANCHORS AND FASTENERS AS MANUFACTURED BY HILTI, INC. OR OTHERWISE SPECIFIED.
- B. ANCHOR CAPACITY USED IN DESIGN SHALL BE BASED ON THE TECHNICAL DATA PUBLISHED BY HILTI, INC. OR SUCH OTHER METHOD AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD. SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD. CALCULATIONS AND TEST DATA MUST BE SUBMITTED DEMONSTRATING THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED BY THEIR HAVING AN ICC-ESR REPORT SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE FOR SEISMIC USES, LOAD RESISTANCE, INSTALLATION CATEGORY, AND AVAILABILITY OF COMPREHENSIVE INSTALLATION INSTRUCTIONS. ALL ANCHORS SHALL CONSIDER CREEP AS WELL AS BOTH IN-SERVICE AND INSTALLATION TEMPERATURES.
- C. ANCHORS ARE TO BE INSTALLED PER THE MANUFACTURER'S WRITTEN INSTRUCTIONS, AS INCLUDE IN THE ANCHOR PACKAGING. ALL ANCHORS ARE TO BE INSTALLED IN DRY CONDITIONS IN HAMMER DRILL HOLES. PRIOR WRITTEN APPROVAL HAS BEEN RECEIVED FROM THE STRUCTURAL ENGINEER OF RECORD.
- D. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. EXISTING REINFORCING IS NOT TO BE CUT WITHOUT PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD.
- E. ALL PERSONS RESPONSIBLE FOR THE INSTALLATION OF POST-INSTALLED MECHANICAL ANCHORS ARE TO BE PROPERLY TRAINED BY A MANUFACTURER'S REPRESENTATIVE OR AN ALTERNATE EQUIVALENT TRAINING FOR EACH TYPE OF INSTALLATION INCLUDED IN THE PROJECT.
- F. ALL PERSONS RESPONSIBLE FOR THE INSTALLATION OF ADHESIVE ANCHORS SHALL BE CERTIFIED OF COMPLIANCE WITH THE MANUFACTURER'S ADHESIVE ANCHOR INSTALLATION CERTIFICATION PROGRAM, OR EQUIVALENT. PROGRAM CERTIFICATES OF INSTALLATION PERSONNEL SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER OF RECORD.

2.2 - FOUNDATION SLAB:

- A. FOUNDATION SLAB SHALL BEAR ON UNDISTURBED SOIL OR COMPACTED STRUCTURAL FILL GOOD FOR THE ALLOWABLE BEARING PRESSURE AS INDICATED IN SECTION 2.1.
- B. ALL EXCAVATIONS SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER IMMEDIATELY PRIOR TO PLACING FOUNDATION CONCRETE.
- C. AREAS OF LOOSE OR SOFT SOIL MATERIAL ENCOUNTERED AT THE BOTTOM OF FOOTING EXCAVATIONS SHALL BE REMOVED AND REPLACED WITH NON-EXPANSIVE STRUCTURAL FILL OR CONCRETE FILL-FILL IN ACCORDANCE WITH EARTHWORK REQUIREMENTS AND AS APPROVED BY THE GEOTECHNICAL ENGINEER.
- D. SMITH RIGID SHAFTS SHALL BE USED AS FORMWORK FOR FOOTINGS WITHOUT APPROVAL FROM GEOTECHNICAL ENGINEER AND STRUCTURAL ENGINEER.

2.3 - GENERAL FOUNDATION REQUIREMENTS:

- A. PREPARE SUB-BASE BELOW ALL SLAB-ON-GRADE CONSTRUCTION PER THE GEOTECHNICAL REPORT UNLESS NOTED OTHERWISE IN PLANS OR DETAILS. OVER-EXCAVATE BELOW FOUNDATION SLAB AND REPLACE WITH COMPACTED STRUCTURAL FILL SHOULD SOFT, LOOSE SOIL BE ENCOUNTERED AS NOTED IN THE REPORT.
- B. ALL EARTHWORK AND SITE PREPARATION SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND GEOTECHNICAL REPORT. ALL EXCAVATION AND BACKFILL SHALL BE VERIFIED BY THE GEOTECHNICAL ENGINEER.
- C. EXCAVATING ADJACENT TO EXISTING STRUCTURES SHALL ONLY BE DONE UNDER THE SUPERVISION OF THE GEOTECHNICAL ENGINEER. UNDER NO CIRCUMSTANCES SHALL EXCAVATIONS UNDERMINE EXISTING FOUNDATIONS. PROVIDE ADEQUATE SOIL LAYBACK AS NECESSARY TO ENSURE THE STABILITY OF EXISTING STRUCTURES.

SECTION 3 - CONCRETE:

3.1 - CAST-IN-PLACE CONCRETE:

- A. ALL CONCRETE WORK INCLUDING FABRICATION AND PLACEMENT OF REINFORCING SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN ACI 318 AND ACI 301, CODE REFERENCED EDITIONS, EXCEPT AS MODIFIED BY THE PROJECT CONTRACT DOCUMENTS.
- B. CONCRETE MIXES SHALL SATISFY THE REQUIREMENTS GIVEN IN THE TABLE BELOW AND MEET THE MINIMUM STRENGTHS AS FOLLOWS:

DESCRIPTION OF CONCRETE USE	28 DAY STRENGTH (PSI)	DURABILITY EXPOSURE CLASS REQUIREMENTS			
		FREEZE/THAW	SULFATE	PERMEABILITY	CORROSION
FDN SLAB AND WALL	5,000	F3	S2	W0	C2
NOTES:					
1. ALL CONCRETE IS NORMAL WEIGHT CONCRETE = 145 PCF, U.N.O.					
2. REFER TO ACI 318 FOR ADDITIONAL INFORMATION ON DURABILITY REQUIREMENTS					

- D. ALL REINFORCING STEEL IN CONCRETE SHALL HAVE A MINIMUM YIELD STRENGTH OF 60,000 PSI AND SHALL MEET THE REQUIREMENTS OF ASTM A615 OR ASTM A706. REINFORCING SHOWN AS GRADE 75 SHALL HAVE A MINIMUM YIELD STRENGTH OF 75,000 PSI AND MEET THE REQUIREMENTS OF ASTM A615.

@	AT	LWC	LIGHTWEIGHT CONCRETE
&	AND	M	MOMENT
#	NUMBER, POUND	MAX	MAXIMUM
Ø	ROUND, DIAMETER	MC	MOMENT CONNECTION
AD/L	ADDITIONAL	MECH	MECHANICAL
AESS	ARCHITECTURALLY EXPOSED STR. STEEL	MEZZ	MEZZANINE
AFF	ABOVE FINISHED FLOOR	MFR	MANUFACTURER
AHU	AIR HANDLING UNIT	MH	HORIZONTAL MOMENT
ALT	ALTERNATE	MIN	MINIMUM
APPROX	APPROXIMATE	MISC	MISCELLANEOUS
ARCH	ARCHITECT ARCHITECTURAL	MTL	METAL
ASD	ALLOWABLE STRUCTURAL DESIGN	MWFRS	MAIN WIND FORCE RESISTING SYSTEM
BLDG	BUILDING	NF	NEAR FACE
BM	BEAM	NR	NON-REDUCIBLE
B.O.	BOTTOM OF	NIC	NOT IN CONTRACT
BOT	BOTTOM	NS	NEAR SIDE
BRG	BEARING	NTS	NOT TO SCALE
BTWN	BETWEEN	NWC	NORMAL WEIGHT CONCRETE
C	CAMBER	OAH	OVERALL HEIGHT
CANTIL	CANTILEVERED	OC	ON CENTER
CFMF	COLD FORMED METAL FRAMING	OUTSD	OUTSIDE DIAMETER
CIP	CAST-IN-PLACE	OPH OH	OPPOSITE HAND
C.J.P	COMPLETE JOINT PENETRATION	OPNG	OPENING
CL	CENTERLINE	OPP	OPPOSITE
CLR	CLEAR COVER	OSB	ORIENTED STRAND BOARD
CMU	CONCRETE MASONRY UNIT	OVS	OVERSIZE, OVERSIZED
COL	COLUMN	P	AXIAL LOAD
CONC	CONCRETE	PAF	POWDER ACTUATED FASTENER
CONN	CONNECTION	PAR	PARALLEL
CONSTR	CONSTRUCTION	PC	PRECAST, PRECAST CONCRETE
CONT	CONTINUOUS	PCF	POUNDS PER CUBIC FOOT
COORD	COORDINATE	PCY	POUNDER CUBIC YARD
COV	COVER	PERP	PERPENDICULAR
Db	BAR DIAMETER	PL	PLATE
DBA	DEFORMED BAR ANCHOR	P.LF	POUNDS PER LINEAR FOOT
DCW	DEMAND CRITICAL WELD	PJP	PARTIAL JOINT PENETRATION
DET	DETAIL	PRELIM	PRELIMINARY
DIA	DIAMETER	PROP	PROPERTY
DWG	DRAWING	PSF	POUNDS PER SQUARE FOOT
EA	EACH	PSI	POUNDS PER SQUARE INCH
EAF	EACH FACE	PSL	PARALLEL STRAND LUMBER
EJ	EXPANSION JOINT	PT	POST-TENSIONED, POST-TENSIONING
ELV	ELEVATOR	Q	QUANTITY
EMBD	EMBEDMENT, EMBEDDED	R	REACTION
ENGR	ENGINEER	R	REDUCIBLE
EQ	EQUAL	RAD	RADIUS
EQUIP	EQUIPMENT	RE	REFER, REFERENCE
EQU/V	EQUIVALENT	REINF	REINFORCEMENT, REINFORCING
EW	EACH WAY	REIM	REMAINDER
EXIST	EXISTING	REQ'D	REQUIRED
EXP	EXPANSION	REV	REVISION
EX	EXTERIOR	RO	ROUGH OPENING
FAB	FABRICATE	RTU	ROOF UNIT
fc	CONCRETE STRENGTH	SC	SLIP CRITICAL
f _m	MASONRY STRENGTH	SCHED	SCHEDULE, SCHEDULED
FD	FLOOR DRAIN	SDS	SELF DRILLING SCREW
FDN	FOUNDATION	SECT	SECTION
FF	FAR FACE	SHT	SHEET
FIN	FINISH, FINISHED	SIM	SIMILAR
FLR	FLOOR	SLBB	SHORT LEG BACK TO BACK
FS	FAR SIDE	SLFS	SEISMIC LOAD FORCE SYSTEM
FTG	FOOTING	SOG	SLAB ON GRADE
Fv	FIELD VERIFY	SP	SPACING
GALV	GALVANIZE, GALVANIZED	SPEC	SPECIFICATION
GEN	GENERAL	SPRT	SUPPORT
GLB	GLUED LAMINATED BEAM	SQ	SQUARE
GR	GRADE	SS	STAINLESS STEEL
HORIZ, H	HORIZONTAL	SSLP	SHORT SLOTTED HOLE PARALLEL
HGR	HANGER	SSLT	SHORT SLOTTED HOLE TRANSVERSE
HAS	HEADED ANCHOR STUD	STD	STANDARD
HSS	HOLLOW STRUCTURAL SECTION	STIF	STIFFENER
ID	INSIDE DIAMETER	STIR	STIRRUP
INFO	INFORMATION	STRUC	STRUCTURE, STRUCTURAL
INT	INTERIOR	SW	SHEAR WALL
JT	JOINT	SYMM	SYMMETRIC
JST	JOIST	T	TORSION
K	KIP, KIPS (1 KIP = 1000 POUNDS)	TBD	TO BE DETERMINED
KLF	KIPS PER LINEAR FOOT	THD	THREAD, THREADED
KSF	KIPS PER SQUARE FOOT	T.O.	TOP OF
KSI	KIPS PER SQUARE INCH	T.O.C	TOP OF CONCRETE
LBS	POUNDS	T.O.S	TOP OF SLAB, TOP OF STEEL
Ld	DEVELOPMENT LENGTH	TRANS	TRANSVERSE
LLBB	LONG LEG BACK TO BACK	TYPE	TYPICAL
LLH	LONG LEG HORIZONTAL	U.N.O.	UNLESS NOTED OTHERWISE
LONG	LONGITUDE, LONGITUDINAL	VERT, V	VERTICAL
LRFD	LOAD AND RESISTANCE FACTOR DESIGN	WF	WIDE FLANGE
LSH	LONG SIDE HORIZONTAL	WP	WORK POINT
LSL	LONG SLOTTED HOLE PARALLEL	WS	WATERSTOP
LSLV	LONG SLOTTED HOLE PARALLEL TRANSVERSE	WEIGHT	WEIGHT
LSV	LONG SIDE VERTICAL	WWR	WELDED WIRE REINFORCEMENT
LVL	LAMINATED VENEER LUMBER	XS	EXTRA STRONG
		XXS	DOUBLE EXTRA STRONG

SYMBOLS & PATTERNS

	CAST-IN-PLACE CONCRETE		STRUCTURAL STEEL		CMU / MASONRY		COBBLE		EARTH		GRAVEL		SAND		ELEVATION MARKER
	PRECAST CONCRETE		ALUMINUM		COBBLE		EARTH		GRAVEL		SAND		SAND		STEP INDICATOR
	GROUT		PLYWOOD		EARTH		GRAVEL		SAND		SAND		SAND		SLOPE INDICATOR
	UNIT MASONRY - BRICK		WOOD		GRAVEL		SAND		SAND		SAND		SAND		FOOTING STEP INDICATOR
	CMU / MASONRY		STUD WALL FRAMING		COBBLE		EARTH		GRAVEL		SAND		SAND		BRICK LEDGE STEP INDICATOR

EXPLANATION OF DRAWING CALL-OUTS ON PLANS:

3 DEVELOPMENT AND SPLICE LENGTHS OF GRADE 60 SLAB REINFORCING BARS IN TENSION
 DETAIL VIEW 3/4" = 1'-0" 03-CONC-201

