

ABBREVIATIONS

AB	ANCHOR BOLT	MAX	MAXIMUM
ACI	AMERICAN CONCRETE INSTITUTE	MS	MACHINE BOLT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	MECH	MECHANICAL
APPROX	APPROXIMATE	MEZZ	MEZZANINE
ARCH	ARCHITECTURAL	MANUF	MANUFACTURER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MIN	MINIMUM
AWS	AMERICAN WELDING SOCIETY	MISC	MISCELLANEOUS
B/B	BACK TO BACK	MPH	MILES PER HOUR
B/P	BASE PLATE	NS	NEAR SIDE
BM	BEAM	NTS	NOT TO SCALE
BOF	BOTTOM OF FOOTING	OC	ON CENTER
BOS	BOTTOM OF STEEL	OD	OUTSIDE DIAMETER
BRAC	BRACING	OH	OPPOSITE HAND
C	CAMBER	OPNG	OPENING
CC OR C/C	CENTER TO CENTER	OPP	OPPOSITE
CG	CENTER OF GRAVITY	OSB	OPERATIONS SUPPORT BUILDING
CJ	CONSTRUCTION JOINT	OTO	OUT TO OUT
CLG	CEILING	PCF	POUNDS PER CUBIC FOOT
CLR	CLEAR	PL	PLATE
CMU	CONCRETE MASONRY UNIT	PSF	POUNDS PER SQUARE FOOT
COL	COLUMN	PSI	POUNDS PER SQUARE INCH
CONC	CONCRETE	PT	POINT
CONT	CONTINUOUS	R	RADIUS
CU	CUBIC	RD	ROOF DRAIN
DET	DETAIL	REF	REFERENCE
DIAG	DIAGONAL	REF OR BARS	REINFORCING STEEL
DIM	DIMENSION	REQD	REQUIRED
DL	DEAD LOAD	REV	REVISION OR REVISION
DM	DITTO	SCHED	SCHEDULE
DWG	DRAWING	SECT	SECTION
DWL	DOWEL	SHT	SHEET
EA	EACH	SIM	SIMILAR
EF	EACH FACE	SIV	SHORT LEG VERTICAL
EL	ELEVATION	SPA	SPACED
ENCL	ENCLOSURE	STL	STAINLESS STEEL
ENGR	ENGINEER	STD	STANDARD
EOP	EQUAL	STIF	STIFFENER
EQUIP	EQUIPMENT	SYM	SYMMETRICAL
ETC	ETCETERA	T&B	TOP AND BOTTOM
EW	EACH WAY	THK	THICKNESS
EXIST	EXISTING	TOP	TOP OF CONCRETE
FD	FLOOR DRAIN	TOS	TOP OF FOOTING
FDW	FOUNDATION	TOS	TOP OF STEEL
FIN	FINISH	TOW	TOP OF WALL
FLR	FLOOR	TYP	TYPICAL
FLSHG	FLASHING	UON	UNLESS OTHERWISE NOTED
FRM	FACE OF CONCRETE	VERT	VERTICAL
FRMG	FRAMING	W/	WITH
FS	FAR SIDE	W/P	WATER PROOF
FT	FOOT/FEET	WP	WORKING POINT
FTG	FOOTING	WS	WELDED STUD
GA	GUAGE	WT	WEIGHT
GALV	GALVANIZED	WTF	WELDED WIRE FABRIC
GR	GRADE	WWM	WELDED WIRE MESH
HORIZ	HORIZONTAL		
HP	HIGH POINT		
HR	HANDRAIL		
HSB	HIGH STRENGTH BOLT		
ID	INSIDE DIAMETER		
IN	INCH		
INFO	INFORMATION		
INSUL	INSULATION		
JST	JOIST		
JT	JOINT		
LB	POUND		
LG	LENGTH		
LL	LIVE LOAD		
LLH	LONG LEG HORIZONTAL		
LLV	LONG LEG VERTICAL		
LVEA	LASER AND VACUUM EQUIPMENT AREA		
LWC	LIGHT WEIGHT CONCRETE		

SYMBOLS

L	ANGLE	△	DELTA
C	CHANNEL	⊕	SQUARE FEET
PL	PLATE	#	NUMBER or POUND
⊕	CENTER LINE	&	AND
∅	DIAMETER or ROUND	@	AT
◆	WORK POINT OR ELEV BENCH MARK		

	NUMBER FOR DETAILS		LETTER
	SHEET ON WHICH DETAIL OCCURS		SHEET ON WHICH SECTION OCCURS
DETAIL		SECTION	
	NUMBER FOR DETAIL		LETTER FOR SECTION
	REF		ROOM NUMBER
	SHEET NUMBER		REVISION
	SHEET WHERE REFERENCED FROM		REVISED AREA CLOUDED
DET/SECT CROSS REF		REVISION	

	COLUMN LINES
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NOTES

INSPECTIONS AND APPROVALS

- GENERAL**
- PROFESSIONAL SOILS ENGINEER REGISTERED IN THE STATE OF WASHINGTON SHALL INSPECT AND APPROVE ALL FOOTING EXCAVATIONS PRIOR TO PLACING CONCRETE ACCORDING TO SECTION 2200 OF THE SPECIFICATION.
 - CONTINUOUS INSPECTION BY AN INSPECTOR, APPROVED BY THE DEPARTMENT OF BUILDING AND SAFETY SHALL BE PROVIDED FOR THE FOLLOWING FIELD WORK:
 - PLACEMENT OF COMPACTED FILL.
 - PLACEMENT OF CONCRETE AND REINFORCING STEEL AND ANCHOR BOLTS.
 - EXPANSION TYPE CONCRETE ANCHORS.
 - FIELD WELDING.
 - INSTALLATION OF HIGH STRENGTH BOLTS.
 - FIELD WELDERS AND WELDING OPERATORS SHALL BE FULLY QUALIFIED IN ACCORDANCE WITH AWS D1.1 AND BE APPROVED BY THE DEPARTMENT OF BUILDING AND SAFETY.
 - THE CONSTRUCTION SHALL COMPLY WITH REQUIREMENTS OF THE BUILDING CODE.

- GENERAL**
- ALL STRUCTURAL WORK AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE JOB SPECIFICATIONS AND STANDARDS.
 - ALL SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO FABRICATION.
 - NO HOLES OTHER THAN THOSE SPECIFICALLY DETAILED, SHALL BE ALLOWED THROUGH STRUCTURAL STEEL MEMBERS. NO CUTTING OR BURNING OF STEEL SHALL BE PERMITTED WITHOUT APPROVAL OF THE ENGINEER OF RECORD.
 - PAINTING AND SHOP PRIMING WHERE REQUIRED SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 - FOR TYPICAL DETAILS SEE DRAWINGS WA-5-002 THROUGH WA-5-009.
 - CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AND SHORING AS REQUIRED TO MAINTAIN THE ALIGNMENT OF BUILDING AND RETAINING WALLS UNTIL ALL CONNECTIONS ARE COMPLETED AND SLAB AND WALLS CONSTRUCTED.
 - PRIOR TO PLACING FOUNDATIONS & SLABS, REFER TO UNDERDRAIN SYSTEM DRAWINGS, ARCHITECTURAL DWGS FOR SLOPES & ELECTRICAL DWGS FOR GROUNDING.
 - FOR BUILDING COLUMN LOCATION COORDINATES SEE CIVIL DWGS.

NOTES

FOUNDATIONS

- FOUNDATION AND SOIL REQUIREMENTS ARE BASED ON SOIL REPORT BY DAMES AND MOORE; REPORT NO. 177-004-0016 DATED: FEBRUARY 10, 1993.

STRUCTURAL STEEL

- THE DESIGN, FABRICATION AND ERECTION OF ALL STRUCTURAL STEEL SHALL CONFORM TO AISC "MANUAL OF STEEL CONSTRUCTION" AND WITH THE SPECIFICATIONS. STRUCTURAL STEEL SHAPES & PLATES SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE NOTED ON PLAN.
- PROVIDE FILLERS AT SPICES OF PARTS HAVING MORE THAN 1/8" DIFFERENCE IN THICKNESS.
- ALL BEARING STIFFENER PLATES SHALL HAVE A CLOSE BEARING AGAINST THE INNER SURFACES OF BOTH FLANGES.

CONNECTIONS

- PLATE FOR BOLTED SHEAR PLATE CONNECTIONS SHALL BE THE SAME THICKNESS AS THE BEAM WEB WITH A MINIMUM THICKNESS OF 3/8" UNLESS OTHERWISE NOTED. DIAGONAL GUSSET PLATE CONNECTIONS SHALL HAVE A MINIMUM THICKNESS OF 1/2" (UNLESS OTHERWISE NOTED) AND THE NET AREA THROUGH THE BOLTS SHALL DEVELOP TOTAL SHEAR CAPACITY OF THE BOLTS. ALL CONNECTIONS SHALL HAVE A MINIMUM OF TWO BOLTS. LOAD INDICATOR WASHERS SHALL BE USED WITH ALL ASTM A325SC BOLTS.
- ALL BOLTS SHALL BE ASTM A325SC, CLASS A, UNLESS OTHERWISE NOTED. 3/4" BOLTS SHALL BE USED FOR MID & END STATION, OSB BUILDING AND MAINTENANCE BUILDING AND 5/8" BOLTS SHALL BE USED FOR CORNER LVEA BUILDING, UNLESS OTHERWISE NOTED.
- ALL STIFFENERS SHALL HAVE A MINIMUM THICKNESS OF 3/8", UNLESS OTHERWISE NOTED.
- GIRT CONNECTIONS SHALL HAVE A MINIMUM OF 2-3/4" Ø, ASTM A307 BOLTS.

WELDING

- ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF AWS D1.1-90 STRUCTURAL WELDING CODE AND THE SPECIFICATION.
- ALL WELDING PROCEDURE SPECIFICATIONS AND WELDING PROCEDURE QUALIFICATIONS, WELDERS, AND WELDING OPERATORS SHALL BE FULLY QUALIFIED IN ACCORDANCE WITH AWS D1.1-90.
- LENGTHS OF WELDS SHOWN ARE EFFECTIVE LENGTHS AS SPECIFIED IN AISC SPECIFICATIONS. WHERE LENGTH OF WELD IS NOT SHOWN, IT SHALL BE FULL LENGTH OF JOINT. ALL BUTT WELDS SHALL BE FULL PENETRATION WELDS, UNLESS OTHERWISE NOTED.
- ALL WELDING ELECTRODES SHALL BE E70XX.
- WITH REFERENCE TO MINIMUM SIZE OF FILLET WELD REQUIREMENTS IN SECTION 1.17 OF AISC SPECIFICATIONS, MINIMUM SIZE OF FILLET WELDS WHEN NOT SPECIFIED ON WELD SYMBOLS SHALL BE AS FOLLOWS:
 - 1/4" WELD FOR MATERIAL THICKNESS UP TO AND INCLUDING 1/2"
 - 3/8" WELD FOR MATERIAL THICKNESS OVER 1/2" TO 1 1/2"
- WELDING PROCEDURES AND SEQUENCES SHALL BE PLANNED TO MINIMIZE WELD SHRINKAGE THAT COULD RESULT IN LAMELLAR TEARING, AND APPROVED BY OWNERS REPRESENTATIVE.
- GRIND SMOOTH WELDED JOINTS WHERE FLUSH SURFACE IS REQUIRED.

METAL DECK

- ALL METAL DECKING SHALL BE IN ACCORDANCE WITH SECTION 5312 OF THE SPECIFICATIONS.
- ROOF DECK SHALL HAVE SINGLE RIBS 3" DEEP AND MADE OUT OF 20 GAGE STEEL WITH MINIMUM 1=0.873 IN./FOOT OF WIDTH AND MINIMUM S(+)=0.508 IN Y-FOOT WIDTH AND S(-)=0.562 IN X-FOOT WIDTH. ATTACHMENT OF ROOF DECK TO SUPPORTS SHALL BE PER MANUFACTURER'S RECOMMENDATIONS. THE ATTACHMENT SHALL BE CAPABLE OF RESISTING 80 PSF NET UPLIFT AND 300 POUNDS PER LINEAR FOOT OF SHEAR.
- ACOUSTICAL ROOF DECK OF SAME SECTION PROPERTIES AS INDICATED IN ITEM 2 ABOVE SHALL BE USED FOR THE ROOF OVER MULTIPURPOSE ROOM OF THE OSB BLDG AS INDICATED ON THE DWG.
- ROOF DECK SHALL HAVE A MINIMUM OF TWO (2) SPANS UNLESS OTHERWISE NOTED.

CONCRETE

- ALL CONCRETE MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF DIVISION 3 (CONCRETE) OF THE SPECIFICATIONS. (REGULAR WEIGHT AND LIGHT WEIGHT)
- STRUCTURAL CONCRETE SHALL HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS UNLESS OTHERWISE NOTED. ALL CONCRETE SHALL BE REGULAR WEIGHT CONCRETE UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60 (UNLESS OTHERWISE NOTED). SPLICES AND HOOKS SHALL CONFORM TO ACI 318-89. SPLICES SHALL BE CLASS B UNLESS OTHERWISE NOTED. MINIMUM LAP SHALL BE 30 DIAMETERS. STIRRUP AND TIE HOOKS SHALL HAVE 135-DEGREE BENDS.
- LOCATION OF ALL CONSTRUCTION JOINTS OR OTHER TYPES OF JOINTS, OTHER THAN SPECIFIED, SHALL BE APPROVED BY THE CONSTRUCTION MANAGER BEFORE PLACING.
- MINIMUM CONCRETE COVER PROVIDED FOR REINFORCEMENT SHALL BE IN ACCORDANCE WITH THE SPECIFICATION.
- ALL REINFORCING STEEL, ANCHOR BOLTS, DOWELS AND OTHER INSERTS SHALL BE WELL SECURED IN POSITION AND INSPECTED BY QUALIFIED INSPECTOR PRIOR TO PLACING CONCRETE.
- EXISTING PAVEMENT SHALL BE SAW CUT AND BROKEN OUT TO CLEAN, STRAIGHT EDGES OF DEMOLITION AREAS.
- EXPOSED EDGES OF CONCRETE SHALL HAVE A 3/8" CHAMFER UNLESS OTHERWISE NOTED ON DRAWINGS.
- EXCAVATING AND BACKFILLING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONSTRUCTION JOINTS SHALL BE CLEANED AND ROUGHENED TO 1/4" AMPLITUDE.
- PROVIDE REINFORCEMENT IN WALLS AT CORNER AND INTERSECTIONS AS PER DETAIL (11) WA-5-002

ANCHOR BOLTS

- FOR ANCHOR BOLT DETAILS SEE DRAWING WA-5-003

MASONRY

- WALLS SHALL BE LOAD BEARING REGULAR WEIGHT HOLLOW CONCRETE MASONRY UNITS WITH ALL CELLS GROUTED (UON), ACCORDING TO THE SPECIFICATIONS.
- THE MORTAR SHALL BE CEMENT-LIME TYPE S' WITH A COMPRESSIVE STRENGTH OF 1800 PSI AT 28 DAYS, CONSISTING OF ONE PART OF CEMENT 1/2 TO 1/2 PART OF HYDRATED LIME OR LIME PUTTY AND DAMP LOOSE AGGREGATE 2 1/2 TO 3 TIMES THE SUM OF VOLUMES OF CEMENT AND LIME. THE GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AT 28 DAYS.
- THE MINIMUM CLEAR DISTANCE BETWEEN PARALLEL BARS SHALL BE THE BARS DIAMETER, BUT NOT LESS THAN 1".
- MINIMUM LAP OF REINFORCING STEEL SHALL BE 40 DIAMETERS, BUT NOT LESS THAN 2'-0".
- IF WORK STOPPED FOR ONE HOUR OR MORE, PROVIDE A HORIZONTAL CONSTRUCTION JOINT BY STOPPING THE GROUT 1/2" MINIMUM BELOW THE TOP OF MORTAR OR MASONRY.

MATERIALS LEGEND

	STEEL (LARGE SCALE SECTION)		SPAN DIRECTION
	CONCRETE		WELDED WIRE FABRIC
	CONCRETE MASONRY UNIT		EARTH
	FLOOR OPENING		STRUCTURAL BACKFILL
	GRATING		

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NO.	DATE	BY	CHKD	ENGR	PROJ	DESCRIPTION
1	6-15-98	CKT				ISSUED FOR AS-BUILT

ISSUED FOR CONSTRUCTION	
DRAWN	MCS 6-24-96
CHECKED	DDM 7-2-96
ENGINEER	BP 6-28-96
PROJ	MDW 7-9-96

AS-BUILT DRAWINGS

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 PASADENA, CALIFORNIA

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 CALIFORNIA INSTITUTE OF TECHNOLOGY
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LIGO-D960286-01-O

LASER INTERFEROMETER
 GRAVITATIONAL-WAVE OBSERVATORY
 SITE NO. 1 - HANFORD, WASHINGTON

TITLE	STRUCTURAL GENERAL NOTES, ABBREVIATIONS & LEGEND	SHEET NUMBER	NONE	PP150969	8094
DATE	6-15-98	BY	CKT	CHKD	ENGR

WA-S-001