

ABBREVIATIONS

AB	ANCHOR BOLT	MAX	MAXIMUM
ACI	AMERICAN CONCRETE INSTITUTE	MB	MACHINE BOLT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	MECH	MECHANICAL
APPROX	APPROXIMATE	MEZZ	MEZZANINE
ARCH	ARCHITECTURAL	MFR	MANUFACTURER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MIN	MINIMUM
AW	AMERICAN WELDING SOCIETY	MISC	MISCELLANEOUS
		MPH	MILES PER HOUR
B/B	BACK TO BACK	NIC	NOT IN CONTRACT
B/P	BASE PLATE	NS	NEAR SIDE
BM	BEAM	NTS	NOT TO SCALE
BOF	BOTTOM OF FOOTING		
BOS	BOTTOM OF STEEL	OC	ON CENTER
BRCC	BRACING	OD	OUTSIDE DIAMETER
BTE	BEAM TUBE ENCLOSURE	OH	OPPOSITE HAND
		OPNG	OPENING
C	CAMBER	OPP	OPPOSITE
CC OR C/C	CENTER TO CENTER	OTO	OUT TO OUT
CG	CENTER OF GRAVITY	PCF	POUNDS PER CUBIC FOOT
C/J	CONSTRUCTION JOINT	PL	PLATE
CLG	CLEAR	PSF	POUNDS PER SQUARE FOOT
CLR	CLEAR	PSI	POUNDS PER SQUARE INCH
CMU	CONCRETE MASONRY UNIT	PT	POINT
COL	COLUMN		
CONC	CONCRETE	R	RADIUS
CONT	CONTINUOUS	RD	ROOF DRAIN
CUBIC	CUBIC	REF	REFERENCE
		REIN	REINFORCING STEEL
DET	DETAIL	REQD	REQUIRED
DIAG	DIAGONAL	REV	REVISE OR REVISION
DIM	DIMENSION		
DL	DEAD LOAD	SCHED	SCHEDULE
DO	DITTO	SECT	SECTION
DWG	DRAWING	SHT	SHEET
DWL	DOWEL	SIM	SIMILAR
		SJV	SHORT LEG VERTICAL
EA	EACH	SPA	SPACED
EF	EACH FACE	ST STL	STAINLESS STEEL
EL	ELEVATION	STD	STANDARD
ENCL	ENCLOSURE	STIF	STIFFENER
ENGR	ENGINEER	SYM	SYMMETRICAL
EQ	EQUAL		
EQUIP	EQUIPMENT	T&B	TOP AND BOTTOM
ETC	ETCETERA	THK	THICKNESS
EW	EACH WAY	TOC	TOP OF CONCRETE
EXIST	EXISTING	TOP	TOP OF FOOTING
		TOS	TOP OF STEEL
FD	FLOOR DRAIN	TOW	TOP OF WALL
FDN	FOUNDATION	TYP	TYPICAL
FIN	FINISH		
FLR	FLOOR	UON	UNLESS OTHERWISE NOTED
FLSHG	FLASHING		
FOC	FACE OF CONCRETE	VE	VACUUM EQUIPMENT
FRMG	FRAMING	VERT	VERTICAL
FS	FAR SIDE		
FT	FOOT, FEET	W/	WITH
FTG	FOOTING	WP	WATER PROOF
		WP	WORKING POINT
GA	GAUGE	WS	WELDED STUD
GALV	GALVANIZED	WT	WEIGHT
GR	GRADE	WWF	WELDED WIRE FABRIC
		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		
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
	SHEET NUMBER		SHEET WHERE REFERENCED FROM
	DET/SECT CROSS REF		
	TYPE A		REVISED AREA CLOUDED
			REVISION

GENERAL NOTES

GENERAL

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE PROJECT SPECIFICATIONS.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AFFECTING THE WORK AND SHALL NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCY WITH THE INFORMATION SHOWN ON THE DRAWINGS PRIOR TO PROCEEDING WITH THE WORK.
3. FOR TOP OF CONCRETE SLAB FOR BEAM TUBE ENCLOSURE SEE CIVIL DRAWINGS.
4. INSTALLATION AND SEALING OF BEAM TUBE ENCLOSURE SEGMENTS ARE NOT INCLUDED IN THIS CONTRACT (NIC).
5. INSTALLATION OF DOORS ARE NOT INCLUDED IN THIS CONTRACT (NIC).

FOUNDATIONS AND SOILS

1. ALLOWABLE SOIL BEARING PRESSURE IS 2000 PSF ON FOOTINGS WITH A MINIMUM OF 2'-0" DEPTH. 1/3 INCREASE IN ALLOWABLE BEARING VALUES ARE PERMITTED FOR SHORT DURATION LOADINGS RESULTING FROM WIND OR SEISMIC.
2. FOUNDATION AND SOIL REQUIREMENTS ARE BASED ON SOIL REPORT BY DAMES AND MOORE; REPORT NO. 177-004-0016 DATED: FEBRUARY 10, 1993.
3. REFER TO CIVIL DRAWINGS FOR BASE COURSE FOR SLABS AND FOUNDATIONS.

CONCRETE

1. PORTLAND CEMENT SHALL BE TYPE I OR II CONFORMING TO ASTM C150.
2. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
3. ALL STEEL REINFORCEMENT, ANCHOR BOLTS AND OTHER EMBEDDED ITEMS SHALL BE SECURED IN PLACE. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER PRIOR TO CONCRETE PLACEMENT.
4. ALL CONCRETE MIX DESIGNS SHALL BE SUBMITTED TO THE CONSTRUCTION MANAGER FOR REVIEW 3 WEEKS PRIOR TO SCHEDULED CONCRETE PLACEMENT.
5. ALL EXPOSED EDGES SHALL BE CHAMFERED TO 3/8" UNLESS OTHERWISE NOTED ON THE DESIGN DRAWINGS.
6. CONTACT SURFACE AT CONSTRUCTION JOINTS WITHOUT A SHEAR KEY SHALL BE ROUGHENED TO A FULL AMPLITUDE OF 1/4" THROUGHOUT.
7. NO SAWCUTTING OF CONCRETE WALLS OR SLABS SHALL BE PERFORMED WITHOUT PRIOR WRITTEN APPROVAL FROM THE CONSTRUCTION MANAGER.
8. ANCHOR FOUNDATIONS AT VACUUM EQUIPMENT INTERFACES AT CORNER, MID AND END STATIONS SHALL BE CURED WITH MOISTURE CURING METHOD. SEE SPECIFICATION SECTION 03300, "CAST-IN PLACE CONCRETE".

STEEL REINFORCEMENT FOR CONCRETE

1. STEEL REINFORCEMENT SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.
2. STEEL REINFORCEMENT SHALL HAVE THE FOLLOWING MINIMUM CONCRETE COVER UNLESS OTHERWISE NOTED:
 - CONCRETE CAST AGAINST EARTH ----- 3"
 - CONCRETE EXPOSED TO EARTH OR WEATHER: #5 BARS & LARGER ----- 2"
 - (INCLUDING VAPOR BARRIER) #5 BARS & SMALLER ----- 1 1/2"
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER: SLABS & WALLS ----- 3/4"
3. ALL CONCRETE STEEL REINFORCEMENT SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH ACT 318-89 AND ACT 315-80.
4. MINIMUM SPLICE LENGTH SHALL BE 2'-0".

STRUCTURAL AND MISC METAL WORKS

1. STRUCTURAL AND MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36.
2. ALL WELDING AND ELECTRODES SHALL CONFORM TO THE REQUIREMENTS OF AWS D1.1 STRUCTURAL WELDING CODE.
3. FIELD WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS AND CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER PRIOR TO WELDING.
4. ALL STRUCTURAL STEEL SHALL BE FABRICATED BY AN APPROVED FABRICATION SHOP.
5. CONTRACTOR SHALL SUBMIT STRUCTURAL AND MISCELLANEOUS METAL WORK SHOP DRAWINGS TO THE CONSTRUCTION MANAGER FOR REVIEW AND APPROVAL PRIOR TO START OF FABRICATION.
6. HEADED ANCHORS SHALL BE "NELSON" TYPE H4L OR S3L, FLUX FILLED, MADE FROM COLD DRAWN STEEL GRADES C-1010 THROUGH C-1020 PER ASTM A108 OR APPROVED EQUAL. ANCHORS SHALL BE WELDED PER THE MANUFACTURER'S SPECIFICATIONS.

DESIGN LOADS - FOR THE BEAM TUBE ENCLOSURE

1. DEAD LOADS: ACTUAL LOAD
2. LIVE LOADS: SNOW LOADS --- 20 PSF
3. LATERAL LOADS: PER UBC 1994
 - A) SEISMIC LOADS: ZONE 2B
 - IMPORTANCE FACTOR 1.0
 - COEFFICIENT R_w 4.0
 - B) WIND LOADS: BASIC WIND VELOCITY - 70 MPH
 - WIND EXPOSURE C
 - IMPORTANCE FACTOR 1.0
4. CONSTRUCTION LOADS:
 - A) HANDLING AND TRANSPORTATION LOADS INCLUDING IMPACT.
 - B) LOADS DUE TO FOUNDATION SLAB ALLOWABLE TOLERANCES - 1/2 INCH OF VERTICAL DISPLACEMENT BETWEEN OPPOSITE DIAGONAL ENDS OF SEGMENT BASE.
5. BEAM TUBE ENCLOSURE AND ACCESS DOORS SHALL BE CAPABLE OF STOPPING THE PENETRATION OF A STRAY BULLET WITH THE FOLLOWING PROPERTIES:
 - A) CALIBER ----- 308
 - B) WEIGHT ----- 180 GRAINS
 - C) VELOCITY AT IMPACT --- 2900 FEET PER SECOND
 - D) ENERGY AT IMPACT --- 2800 FEET-POUNDS
 - E) MATERIAL ----- LEAD CORE, FULLY JACKETED WITH COOPER

MATERIALS LEGEND

	CONCRETE		WELDED WIRE FABRIC
	GRAVEL		EARTH
			STRUCTURAL BACKFILL

LIGO-D960186-01-O

REFERENCES	NO.	DATE	BY	CHKD	ENGR	PROJ	DESCRIPTION
	1	1-22-99	MEI	--	--	MDW	ISSUED FOR AS BUILT

ISSUED FOR CONSTRUCTION			
DRAWN	MCS	1-19-96	
CHECKED	RM	1-19-96	
ENGINEER	FD	1-19-96	
PROJ	MW	1-19-96	
AS-BUILT DRAWINGS			

100 WEST WALNUT STREET
PASADENA, CALIFORNIA

CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LASER INTERFEROMETER
GRAVITATIONAL-WAVE OBSERVATORY
BTE SITework & FABRICATION - HANFORD, WA

TITLE	SCALE	CONTRACT NUMBER	PROJECT NUMBER
STRUCTURAL GENERAL NOTES, ABBREVIATIONS & LEGEND	NONE	PP150969	8094
SHEET NUMBER		REVISIONS	
BT-S-001		△	