TRIM LINE

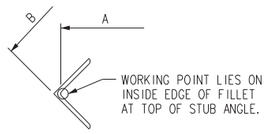
TOWER TYPE	TOWER NUMBER	SERIAL NUMBER	TOWER BODY (FEET)	FOOTING	LEG EXT. (FEET)	ANCHOR SETTING DIMENSIONS (FEET)			ELEVATIONS (FEET)		
						A	B	C	WORKING POINT	TOP OF CONCRETE	GROUND LINE
48B	15/5	AZE 69	120	1	12.5	34.367	24.364	36.070	1987.02	1982.02	1980.87
				2	40	41.357	29.306	43.060	1959.52	1954.52	1952.28
				3	37.5	40.721	28.857	42.424	1962.02	1957.02	1955.71
				4	12.5	34.367	24.364	36.070	1987.02	1982.02	1980.43

LIST OF MATERIALS FOR ONE FOOTING

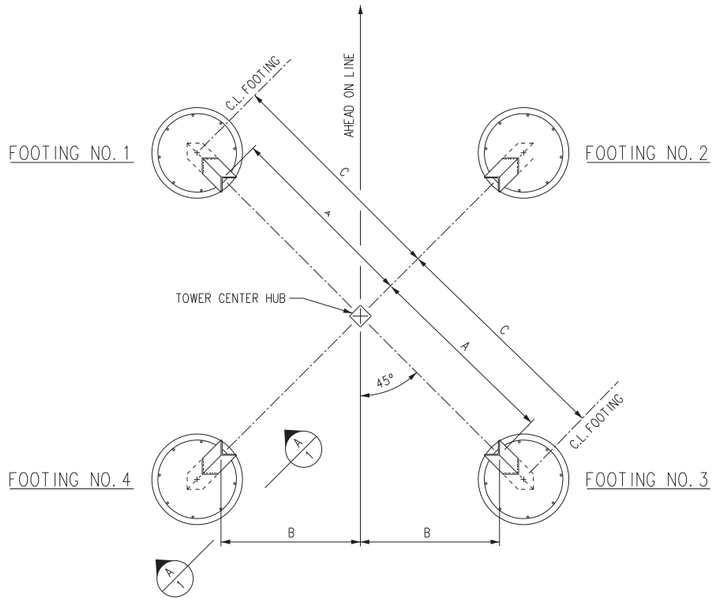
PCS	DESCRIPTION
1	48B CONCRETE FOOTING STUB
8	#10 STEEL REINFORCING BAR
-	#4 STEEL REINFORCING BAR
-	CONCRETE

GENERAL NOTES:

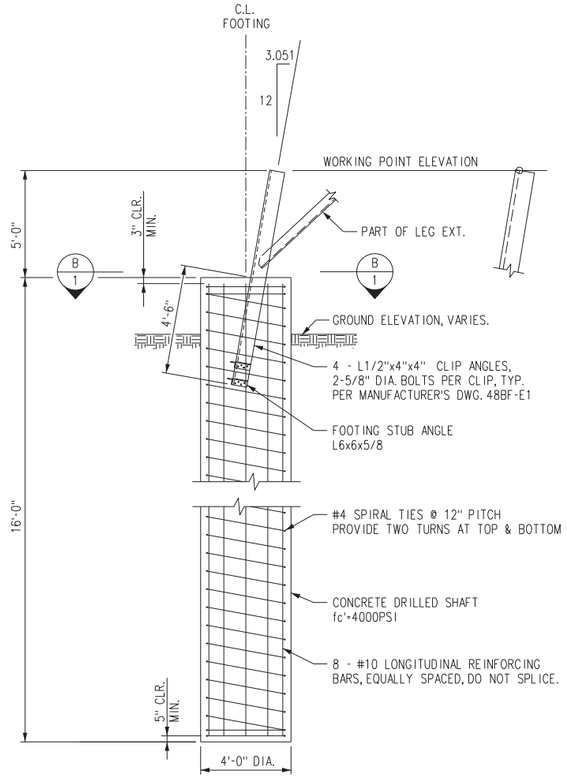
1. CONCRETE f'c=4,000 PSI.
2. REINFORCING STEEL fy=60,000 PSI.
3. ANY CHANGE IN THE FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE PROJECT ENGINEER.
4. REFER TO STEEL TOWER LIST FOR TOWER STATIONS.



WORKING POINT DETAIL

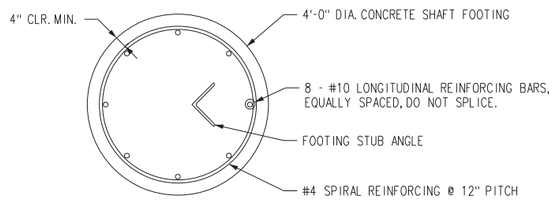


TOWER FOOTING PLAN



SECTION A 1 / A 1

EST WEIGHT OF ONE CONCRETE FOOTING STUB = 252 LBS.
WEIGHT INCLUDES STUB ANGLE, CLIP ANGLES, BOLTS & PALNUTS, PLUS 3.5% FOR GALVANIZING.



SECTION B 1 / B 1

PRELIMINARY
3/30/2011

48BF-1	1	MANUFACTURER'S DETAIL DWG., 48B FOOTINGS
48BF-E1	1	MANUFACTURER'S ERECTION DWG., 48B FOOTINGS
48BBF-1	1	MANUFACTURER'S DETAIL DWG., 48BB FOOTINGS
48BBF-E1	1	MANUFACTURER'S ERECTION DWG., 48BB FOOTINGS
268552-LFS-A1	1	TYPE 48B & 48BB ANCHOR SETTING DIMENSIONS
263250-LFS-A1	15	48B-BB FOOTINGS
DRAWING NO.	SHEET	TITLE
REFERENCE DRAWINGS		

NO.	*	W.O.	REVISION	BY	DATE	APPROVED
	C	00232575				

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

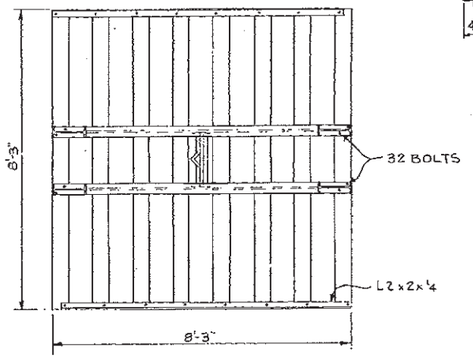
DSGN HDR/JIL
DRWN HDR/BLA
CHKD
REVW
CNCR
APPR
PROJECT MANAGER
DATE

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

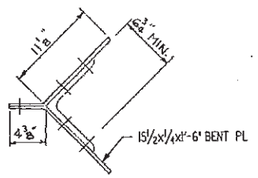
500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
BIG EDDY-KNIGHT NO 1
SERIAL NUMBER AZE 69
48B CONCRETE SHAFT FOOTINGS

Serial	Source	Size	Sheet	Revision
290752	LFS	A1	1 OF 1	0

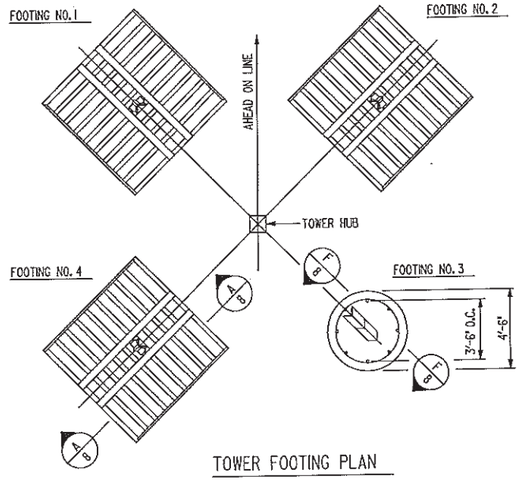
TRIM LINE



SECTION B/8 B/8

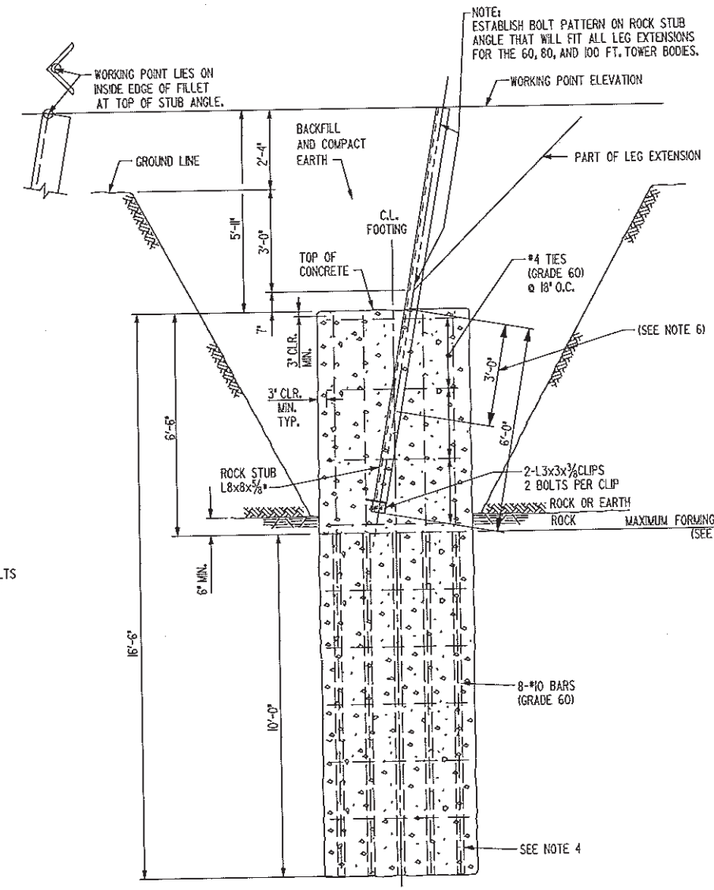


SECTION D/8 D/8



TOWER FOOTING PLAN

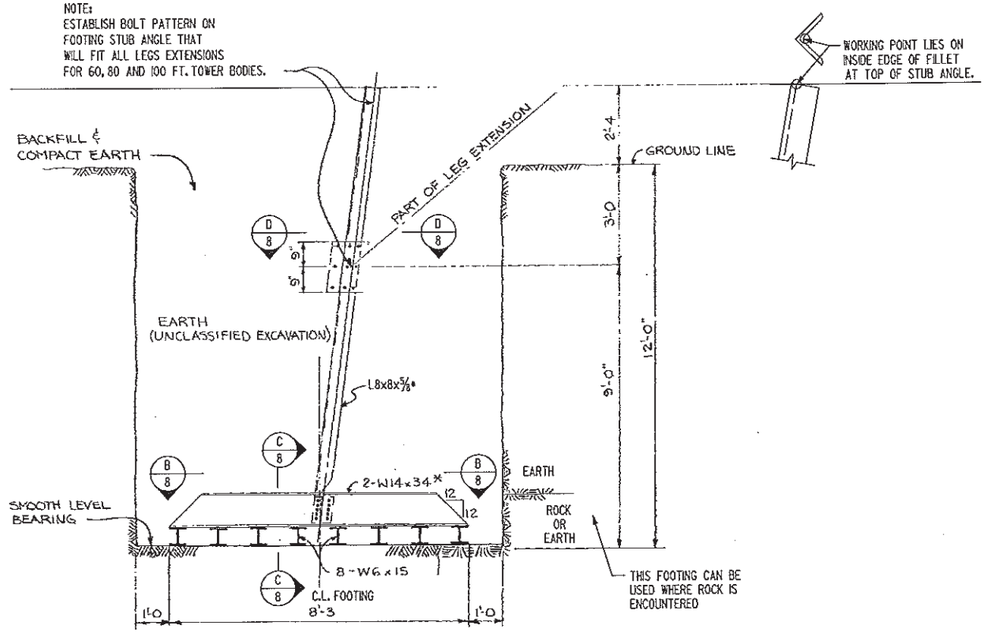
ROCK FOOTING NOTES:
1. THE ROCK FOOTING MAY BE INSTALLED WHEN ROCK IS JUDGED SUITABLE FOR ANCHORAGE BY THE CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE, AND WHERE THE TOP OF GOOD, SOUND QUALITY ROCK IS 6' MINIMUM ABOVE THE MAXIMUM FORMING DEPTH.
2. CONCRETE MAY BE FORMED TO THE DEPTH INDICATED.
3. ANY CHANGE IN FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE PROJECT ENGINEER.
4. AS AN ALTERNATIVE TO THE 16'-6" CONCRETE DEPTH, THE 8 #10 BARS MAY BE GROUTED IN 2½" MINIMUM DIAMETER HOLES DRILLED 10'-0" DEEP BELOW THE MAXIMUM FORMING DEPTH.
5. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED ROCK.
6. THIS DIMENSION ESTABLISHES THE POSITION OF THE STUB ANGLE (C.G.) RELATIVE TO THE CONCRETE SECTION (C.L.).



SECTION F/8 F/8

ROCK FOOTING DETAIL

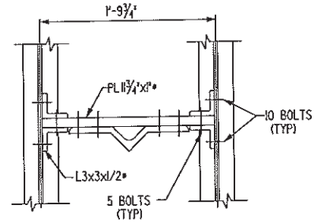
DETAILED WEIGHT OF ONE ROCK FOOTING = 419 LBS.



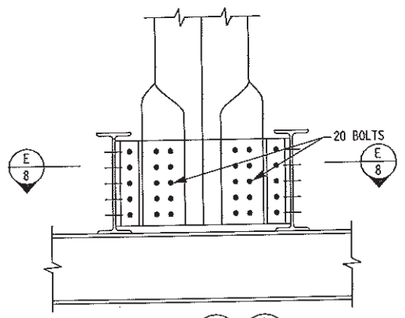
SECTION A/8 A/8

GRILLAGE FOOTING DETAIL

DETAILED WEIGHT OF ONE GRILLAGE FOOTING = 2321LBS.



SECTION E/8 E/8



SECTION C/8 C/8

MAXIMUM UPLIFT	= 201.1KIPS
MAXIMUM HORIZONTAL SHEAR	= 11.4 KIPS
MAXIMUM COMPRESSION	= 268.6 KIPS

GENERAL NOTES:
1. ALL DIMENSIONS ARE TO OUTSIDE OF ANGLES UNLESS OTHERWISE NOTED.
2. • DENOTES ASTM A572 GRADE 50 STEEL.

DRAWING NO.	SHEET	TITLE
REFERENCE DRAWINGS		

NO.	W.O. 00004340	REVISION	BY	DATE	APPROVED

• C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

DSGN	D.M. HESSE/JMS
DRWN	M. FETESCU
CHKD	M.J. RILEY
REVW	MD MILLER
CNCR	GW GREEN
APPR	LEON KEMPNER JR (PROJ. ENGR.)
DATE	08/18/05

500 KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT=51,000 LBS.

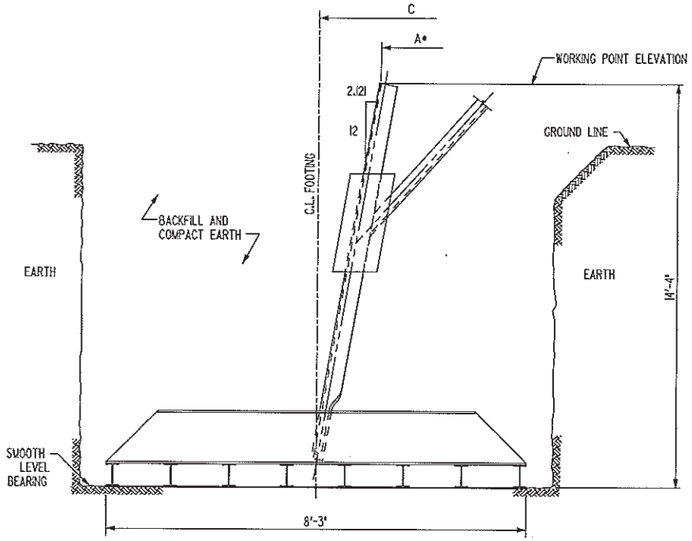
TYPE 39M & 39ME — FOOTINGS

Serial	Source	Size	Sheet	Revision
265933	LFS	A1	8	0

26593308.LFS/26593308.CIT

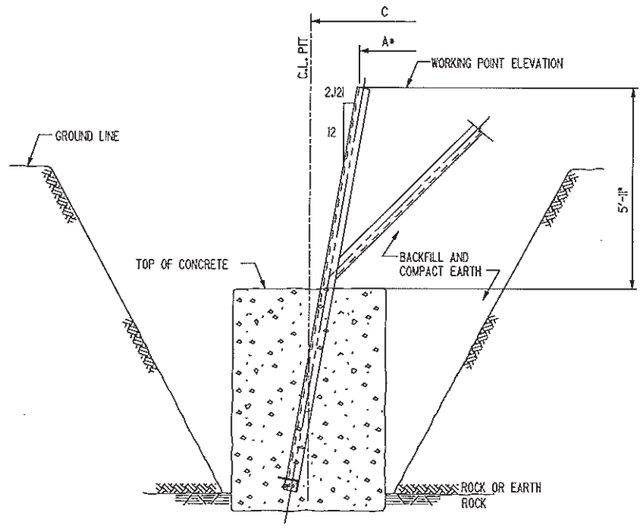
TRIM LINE

TRIM LINE



ELEVATION X X

GRILLAGE FOOTING



ELEVATION Y Y

ROCK FOOTING

ANCHOR SETTING DIMENSIONS

LEG EXT	DIMENSIONS FOR 60' BODY				DIMENSIONS FOR 80' BODY				DIMENSIONS FOR 100' BODY			
	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK
	A*	B	C	C	A*	B	C	C	A*	B	C	C
5'-0"	15.202	10.816	17.478	16.608	18.737	13.316	21.013	20.144	22.273	15.816	24.549	23.679
7'-6"												
10'-0"	16.085	11.441	18.362	17.492	19.621	13.941	21.897	21.027	23.156	16.441	25.433	24.563
12'-6"												
15'-0"	16.970	12.066	19.246	18.375	20.505	14.576	22.781	21.911	24.040	17.066	26.317	25.447
17'-6"												
20'-0"	17.854	12.691	20.130	19.260	21.389	15.191	23.665	22.795	24.924	17.691	27.200	26.330
22'-6"												
25'-0"	18.737	13.316	21.013	20.144	22.273	15.816	24.549	23.679	25.808	18.316	28.085	27.214
27'-6"												
30'-0"	19.621	13.941	21.897	21.027	23.156	16.441	25.433	24.563	26.692	18.941	28.968	28.098
32'-6"												
35'-0"	20.505	14.576	22.781	21.911	24.040	17.066	26.317	25.447	27.576	19.566	29.852	28.982
37-6"												
40-0"	21.389	15.191	23.665	22.795	24.924	17.691	27.200	26.330	28.460	20.191	30.736	29.866

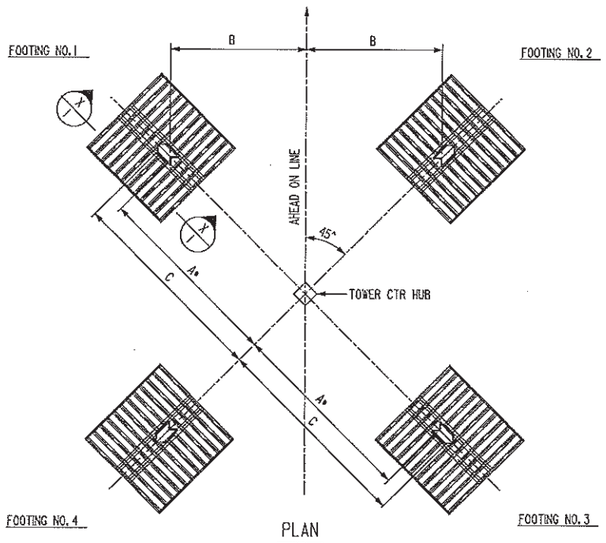
ANCHOR SETTING DIMENSIONS PROVIDED BY TOWER DETAILER.

NOTES:

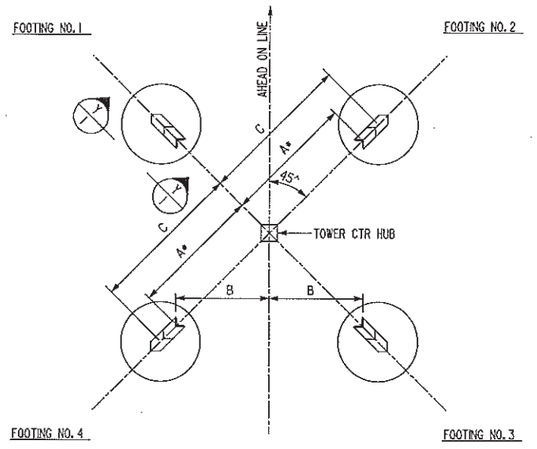
SETTING DIMENSIONS IN FEET.

DRAWING NOT TO SCALE.

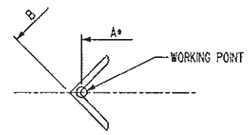
WORK THIS DRAWING WITH FOOTING DESIGN DRAWING 265933-LFS-A1.



PLAN



PLAN



* WORKING POINT DETAIL

NO.	*	W.O. 00004340	REVISION	BY	DATE	APPROVED

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN	MJ RILEY
DRWN	MF/MJR
CHKD	JMS
REVW	MDM
CNCR	GW GREEN
APPR	LEON KEMPNER L (PROFESSIONAL ENGINEER)
DATE	12/23/03

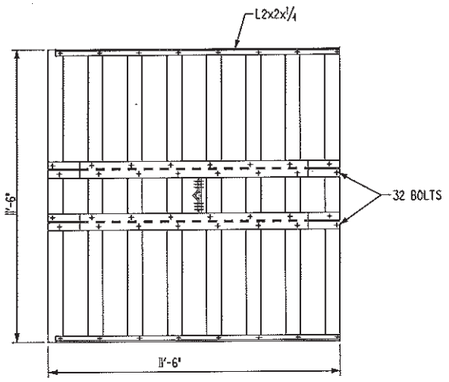
UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT=51,000 LBS.
TYPE 39M & 39ME
ANCHOR SETTING DIMENSIONS

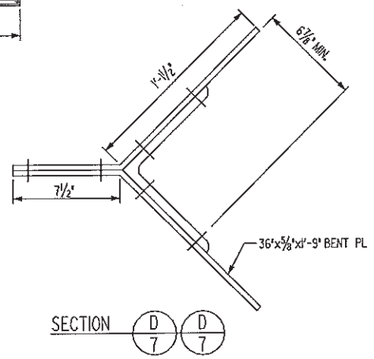
Serial	Source	Size	Sheet	Revision
268566	LFS	A1	1 OF 1	0

TRIM LINE

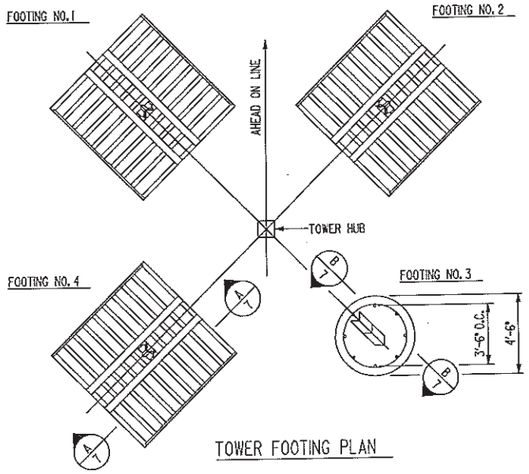
TRIM LINE



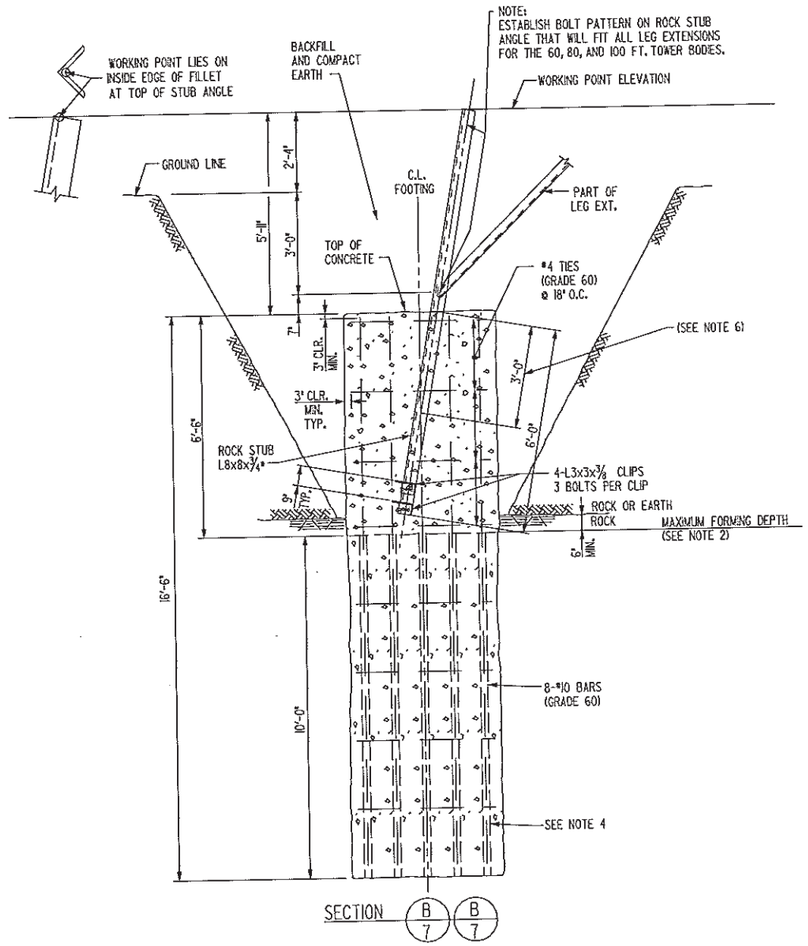
SECTION C/7 C/7



SECTION D/7 D/7



TOWER FOOTING PLAN

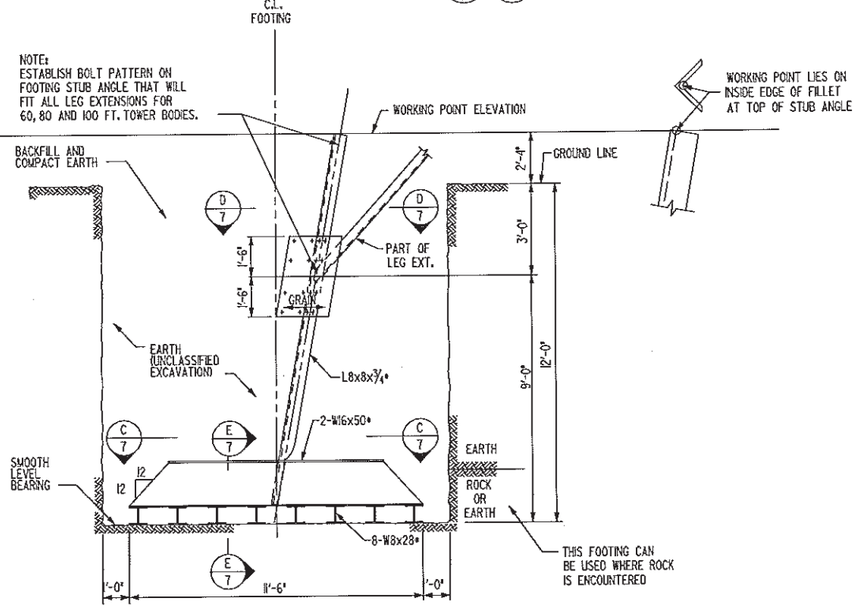


SECTION B/7 B/7

ROCK FOOTING DETAIL

DETAILED WEIGHT OF ONE ROCK FOOTING = 507 LBS.
WEIGHT DOES NOT INCLUDE CONCRETE OR REINFORCING.

ROCK FOOTING NOTES:
1. THE ROCK FOOTING MAY BE INSTALLED WHEN ROCK IS JUDGED SUITABLE FOR ANCHORAGE BY THE CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE, AND WHERE THE TOP OF GOOD, SOUND QUALITY ROCK IS 6' MINIMUM ABOVE THE MAXIMUM FORMING DEPTH.
2. CONCRETE MAY BE FORMED TO THE DEPTH INDICATED.
3. ANY CHANGE IN FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE PROJECT ENGINEER.
4. AS AN ALTERNATIVE TO THE 16'-6' CONCRETE DEPTH, THE 8 #10 BARS MAY BE GROUTED IN 2 1/2" MINIMUM DIAMETER HOLES DRILLED 10'-0" DEEP BELOW THE MAXIMUM FORMING DEPTH.
5. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED ROCK.
6. THIS DIMENSION ESTABLISHES THE POSITION OF THE STUB ANGLE (C.G.) RELATIVE TO THE CONCRETE SECTION (C.L.).

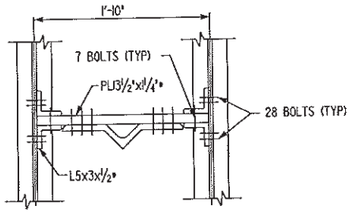


SECTION A/7 A/7

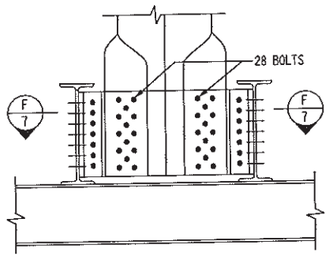
GRILLAGE FOOTING DETAIL

DETAILED WEIGHT OF ONE GRILLAGE FOOTING = 4996 LBS.

MAXIMUM UPLIFT =	298.4 KIPS
MAXIMUM HORIZONTAL SHEAR =	25.1 KIPS
MAXIMUM COMPRESSION =	396.5 KIPS



SECTION F/7 F/7



SECTION E/7 E/7

GENERAL NOTES:
1. ALL DIMENSIONS ARE TO OUTSIDE OF ANGLES UNLESS OTHERWISE NOTED.
2. * DENOTES ASTM A572 GRADE 50 STEEL.

NO.	R	W.A. 00004340	REVISION	BY	DATE	APPROVED

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN	M.J. RILEY
DRWN	MF/MJR
CHKD	J.C. NUNO
REVW	MD MILLER
CNCR	GW GREEN
APPR	LEON KEMPNER JR (PRINCIPAL ENGINEER)
DATE	08/18/05

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT=51,000 LBS

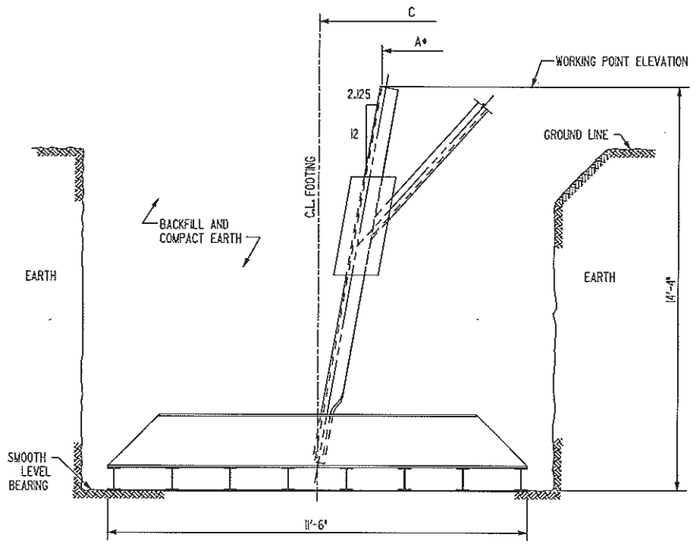
TYPE 39A — FOOTINGS

DRAWING NO.	SHEET	TITLE
REFERENCE DRAWINGS		

Serial	Source	Size	Sheet	Revision
265935	LFS	A1	7	0

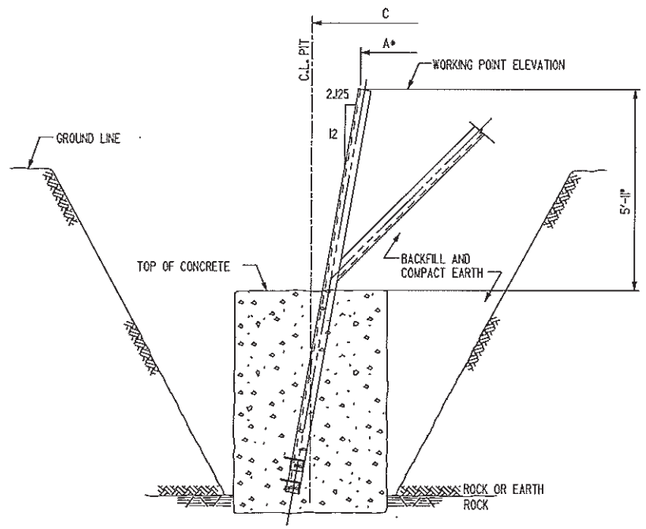
TRIM LINE

TRIM LINE



ELEVATION (X / X)

GRILLAGE FOOTING



ELEVATION (Y / Y)

ROCK FOOTING

ANCHOR SETTING DIMENSIONS

LEG EXT	DIMENSIONS FOR 60' BODY				DIMENSIONS FOR 80' BODY				DIMENSIONS FOR 100' BODY			
	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK
	A*	B	C	C	A*	B	C	C	A*	B	C	C
5'-0"	15.208	10.831	17.482	16.662	18.742	13.331	21.016	20.156	22.279	15.831	24.552	23.693
7'-6"												
10'-0"	16.091	11.456	18.365	17.505	19.628	13.956	21.898	21.042	23.161	16.456	25.435	24.575
12'-6"												
15'-0"	16.974	12.081	19.221	18.388	20.510	14.581	22.784	21.924	24.047	17.081	26.318	25.461
17'-6"												
20'-0"	17.859	12.706	20.133	19.273	21.396	15.206	23.667	22.810	24.930	17.706	27.203	26.344
22'-6"												
25'-0"	18.742	13.331	21.016	20.156	22.279	15.831	24.552	23.693	25.815	18.331	28.086	27.229
27'-6"												
30'-0"	19.628	13.956	21.898	21.042	23.161	16.456	25.435	24.575	26.698	18.956	28.971	28.112
32'-6"												
35'-0"	20.510	14.581	22.784	21.924	24.047	17.081	26.318	25.461	27.581	19.581	29.854	28.995
37-6"												
40-0"	21.396	15.206	23.667	22.810	24.930	17.706	27.203	26.344	28.466	20.206	30.740	29.880

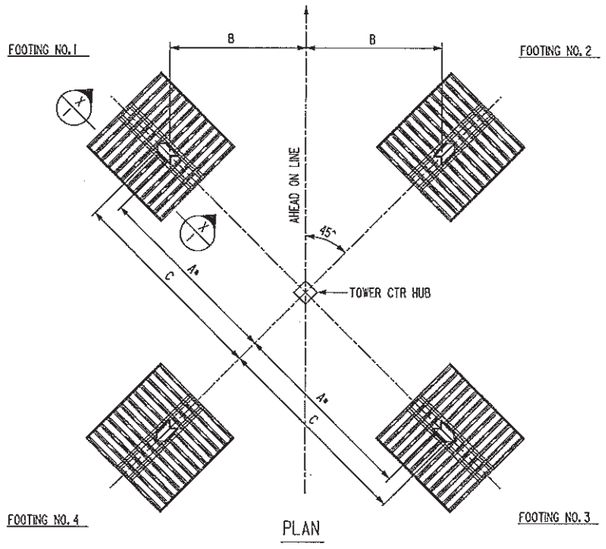
ANCHOR SETTING DIMENSIONS PROVIDED BY TOWER DETAILER.

NOTES:

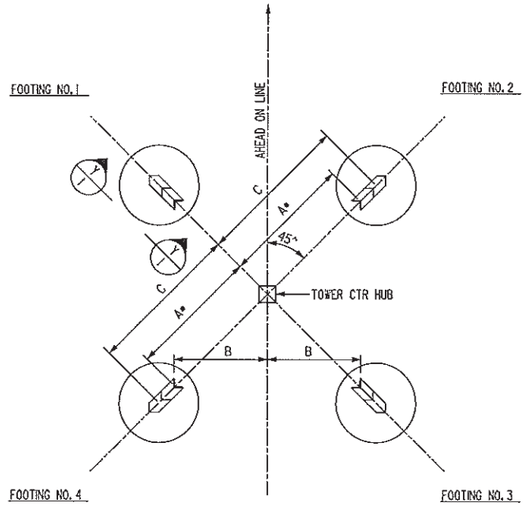
SETTING DIMENSIONS IN FEET.

DRAWING NOT TO SCALE.

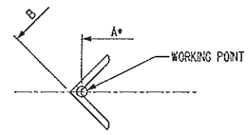
WORK THIS DRAWING WITH FOOTING DESIGN DRAWING 265935-LFS-AL



PLAN



PLAN



* WORKING POINT DETAIL

NO.	*	W.O. 00004340	REVISION	BY	DATE	APPROVED

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN	MJ RILEY
DRWN	MF/MJR
CHKD	JMS
REVW	MDM
CNCR	GW GREEN
APPR	LEON KEMPNER L (PRINTED NAME)
DATE	12/23/03

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT=51,000 LBS.

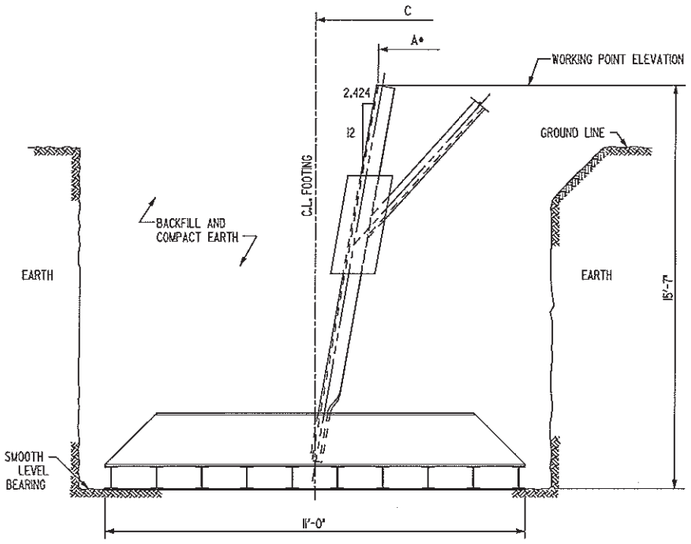
TYPE 39A ANCHOR SETTING DIMENSIONS

Serial	Source	Size	Sheet	Revision
268565	LFS	A1	1 OF 1	0

TRIM LINE

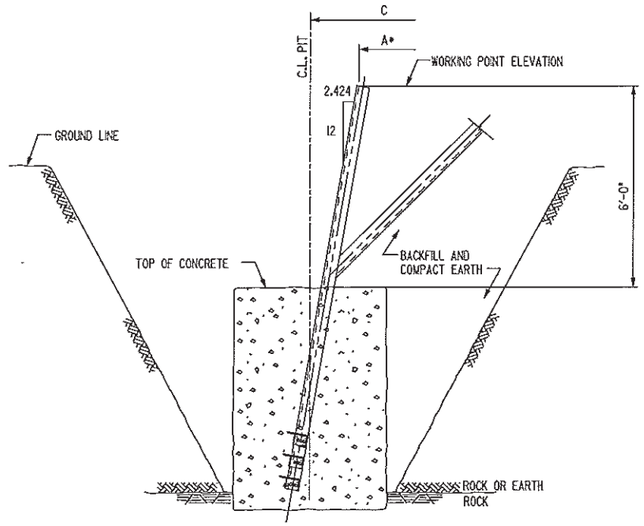
TRIM LINE

TRIM LINE



ELEVATION X X

GRILLAGE FOOTING



ELEVATION Y Y

ROCK FOOTING

ANCHOR SETTING DIMENSIONS

LEG EXT	DIMENSIONS FOR 60' BODY				DIMENSIONS FOR 80' BODY				DIMENSIONS FOR 100' BODY			
	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK
	A*	B	C	C	A*	B	C	C	A*	B	C	C
5'-0"	17.130	12.211	19.994	18.796	21.169	15.067	24.035	22.835	25.210	17.925	28.075	26.877
7'-6"												
10'-0"	18.139	12.925	21.004	19.805	22.180	15.783	25.045	23.847	26.219	18.639	29.086	27.886
12'-6"												
15'-0"	19.148	13.639	22.015	20.815	23.190	16.496	26.055	24.856	27.231	19.354	30.096	28.897
17'-6"												
20'-0"	20.160	14.354	23.025	21.826	24.201	17.211	27.065	25.867	28.240	20.067	31.106	29.906
22'-6"												
25'-0"	21.169	15.067	24.035	22.835	25.210	17.925	28.075	26.877	29.252	20.783	32.116	30.918
27'-6"												
30'-0"	22.180	15.783	25.045	23.847	26.219	18.639	29.086	27.886	30.261	21.496	33.126	31.927
32'-6"												
35'-0"	23.190	16.496	26.055	24.856	27.231	19.354	30.096	28.897	31.272	22.211	34.136	32.938
37-6"												
40-0"	24.201	17.211	27.065	25.867	28.240	20.067	31.106	29.906	32.281	22.925	35.147	33.948

ANCHOR SETTING DIMENSIONS PROVIDED BY TOWER DETAILER.

NOTES:

SETTING DIMENSIONS IN FEET.

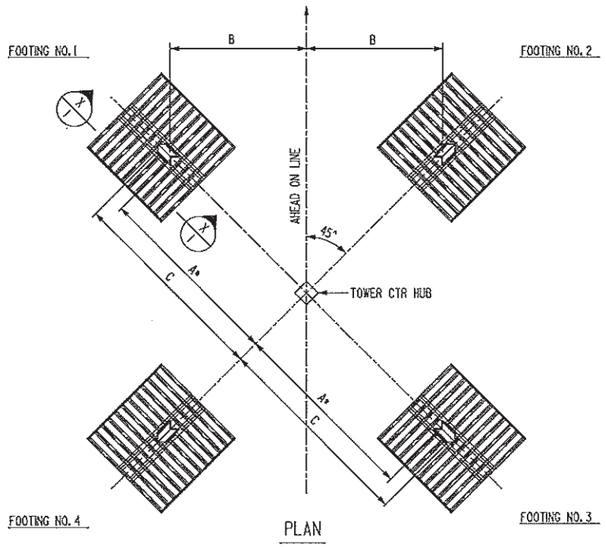
DRAWING NOT TO SCALE.

WORK THIS DRAWING WITH FOOTING DESIGN DRAWING 266822-LFS-A1.

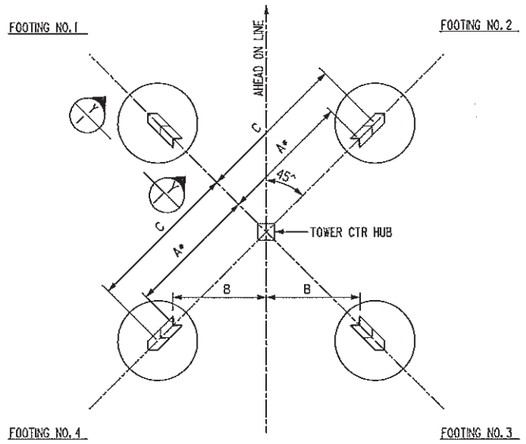
ANCHOR SETTING DIMENSIONS

LEG EXT	DIMENSIONS FOR 120' BODY			
	GRILL & ROCK		GRILL	ROCK
	A*	B	C	C
5'-0"	29.252	20.783	32.116	30.918
7'-6"				
10'-0"	30.261	21.496	33.126	31.927
12'-6"				
15'-0"	31.272	22.211	34.136	32.938
17'-6"				
20'-0"	32.281	22.925	35.147	33.948
22'-6"				
25'-0"	33.290	23.639	36.157	34.957
27'-6"				
30'-0"	34.302	24.354	37.167	35.968
32'-6"				
35'-0"	35.311	25.067	38.177	36.977
37-6"				
40-0"	36.323	25.783	39.187	37.989

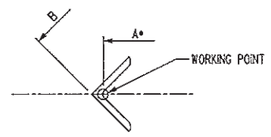
ANCHOR SETTING DIMENSIONS PROVIDED BY TOWER DETAILER.



PLAN



PLAN



* WORKING POINT DETAIL

NO.	R	WO. 00004340	REVISION	BY	DATE	APPROVED
1	R	00004340	WIDTH OF GRILLAGE FOOTING CORRECTED BASED ON REFINED DESIGN.	MJR	10/21/04	MJR JMS GWG

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN	MJ RILEY
DRWN	MF/MJR
CHKD	JMS
REVW	MDM
CNCR	GW GREEN
APPR	LEON KEMPNER L. PROFESSIONAL ENGINEER
DATE	12/23/03

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT=51,000 LBS.

TYPE 39B ANCHOR SETTING DIMENSIONS

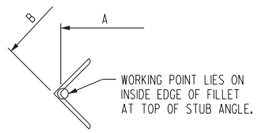
Serial	Source	Size	Sheet	Revision
268563	LFS	A1	1 OF 1	1

TRIM LINE

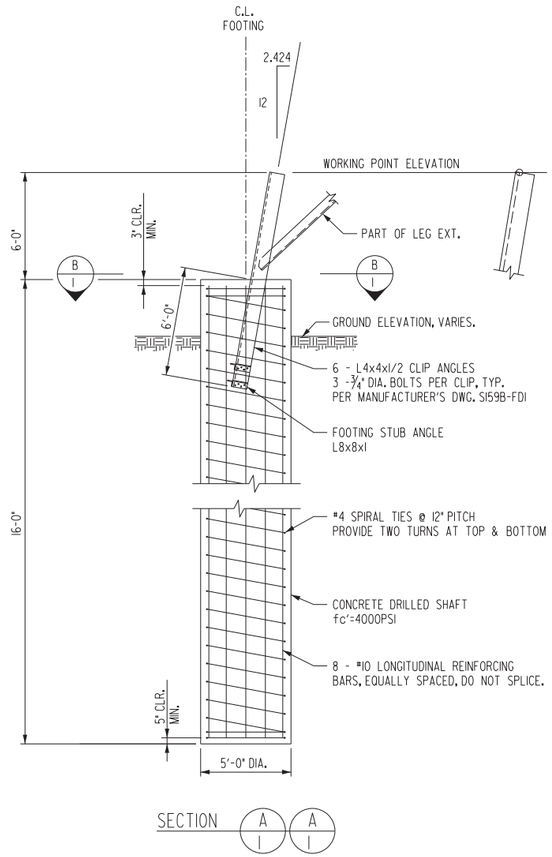
TOWER TYPE	TOWER NUMBER	SERIAL NUMBER	TOWER BODY (FEET)	FOOTING	LEG EXT. (FEET)	ANCHOR SETTING DIMENSIONS (FEET)			ELEVATIONS (FEET)		
						A	B	C	WORKING POINT	TOP OF CONCRETE	GROUND LINE
39B	11/1	AZE 45	120	1	5	29.252	20.783	30.918	784.18	778.85	777.77
				2	35	35.311	25.067	36.977	754.18	748.85	745.02
				3	35	35.311	25.067	36.977	754.18	748.85	747.84
				4	5	29.252	20.783	30.918	784.18	778.85	777.76

LIST OF MATERIALS FOR ONE FOOTING

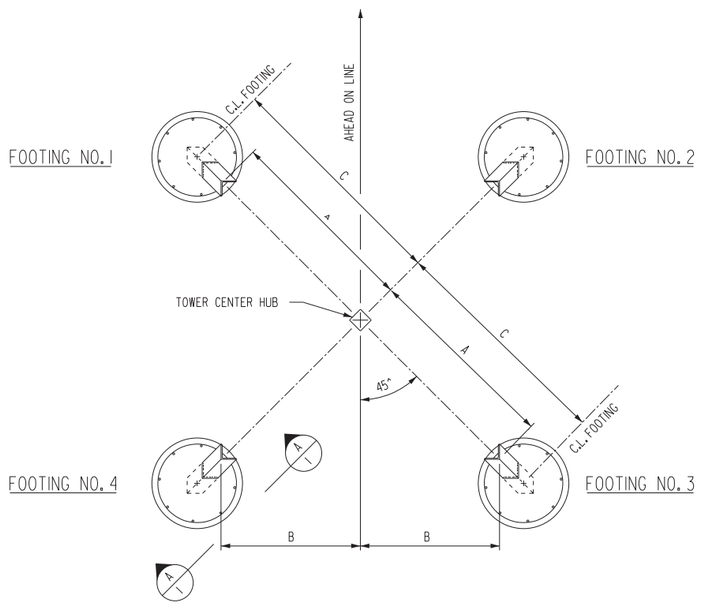
PCS	DESCRIPTION
1	39B CONCRETE FOOTING STUB
8	#10 STEEL REINFORCING BAR
-	#4 STEEL REINFORCING BAR
-	CONCRETE



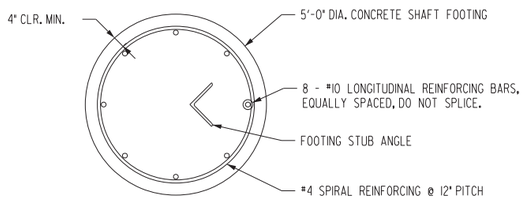
WORKING POINT DETAIL



DETAILED WEIGHT OF ONE CONCRETE FOOTING STUB = 507.2 LBS.
WEIGHT INCLUDES STUB ANGLE, CLIP ANGLES, BOLTS & PALNUTS,
PLUS 3½% FOR GALVANIZING.



TOWER FOOTING PLAN



GENERAL NOTES:

1. CONCRETE f'c=4,000 PSI.
2. REINFORCING STEEL fy=60,000 PSI.
3. ANY CHANGE IN THE FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE PROJECT ENGINEER.
4. REFER TO STEEL TOWER LIST FOR TOWER STATIONS.

PRELIMINARY
3/30/2011

DRAWING NO.	SHEET	TITLE
39B-FDI	1	MANUFACTURER'S ERECTION DWG., 39B FOOTINGS
266822-LFS-A	9	39B FOOTINGS
REFERENCE DRAWINGS		

NO.	*	W.O.	REVISION	BY	DATE	APPROVED
	C	00232575				

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN HDR/JIL
DRWN HDR/BLA
CHKD
REVW
CNCR
APPR
PROJECT MANAGER
DATE

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

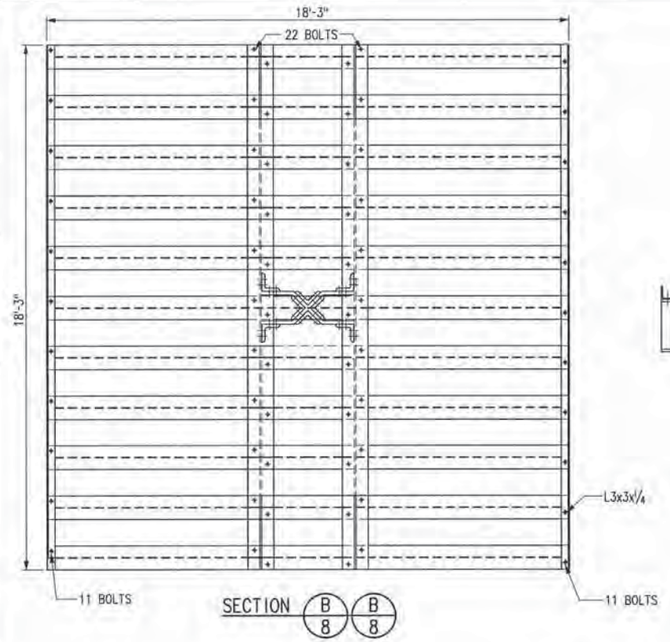
500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
BIG EDDY-KNIGHT NO 1
SERIAL NUMBER AZE45
39B CONCRETE SHAFT FOOTINGS

Serial	Source	Size	Sheet	Revision
290753	LFS	A1	1 OF 1	0

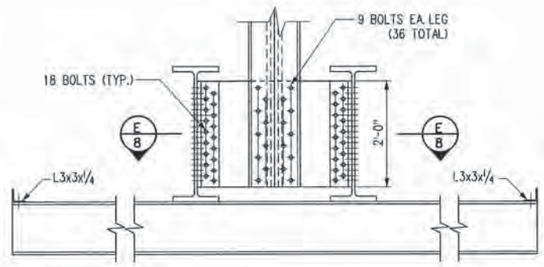
TRIM LINE

TRIM LINE

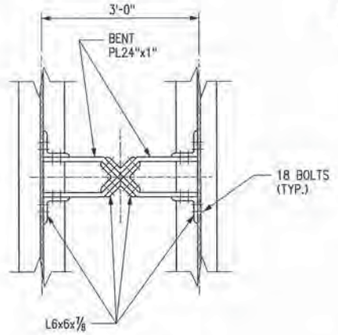
290753-1-1.dgn 4/5/2011 3:58:13 PM jjustice



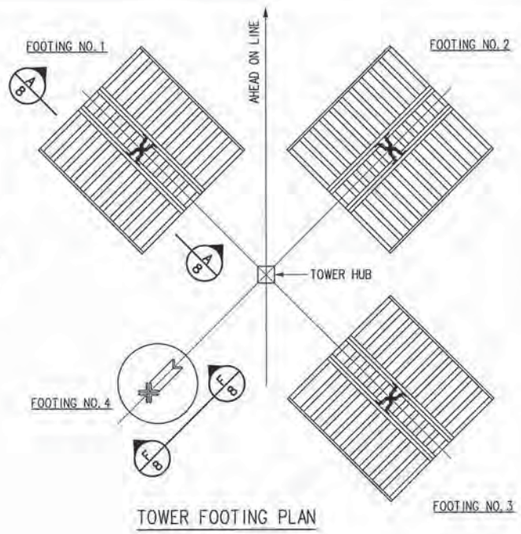
SECTION B/8 B/8



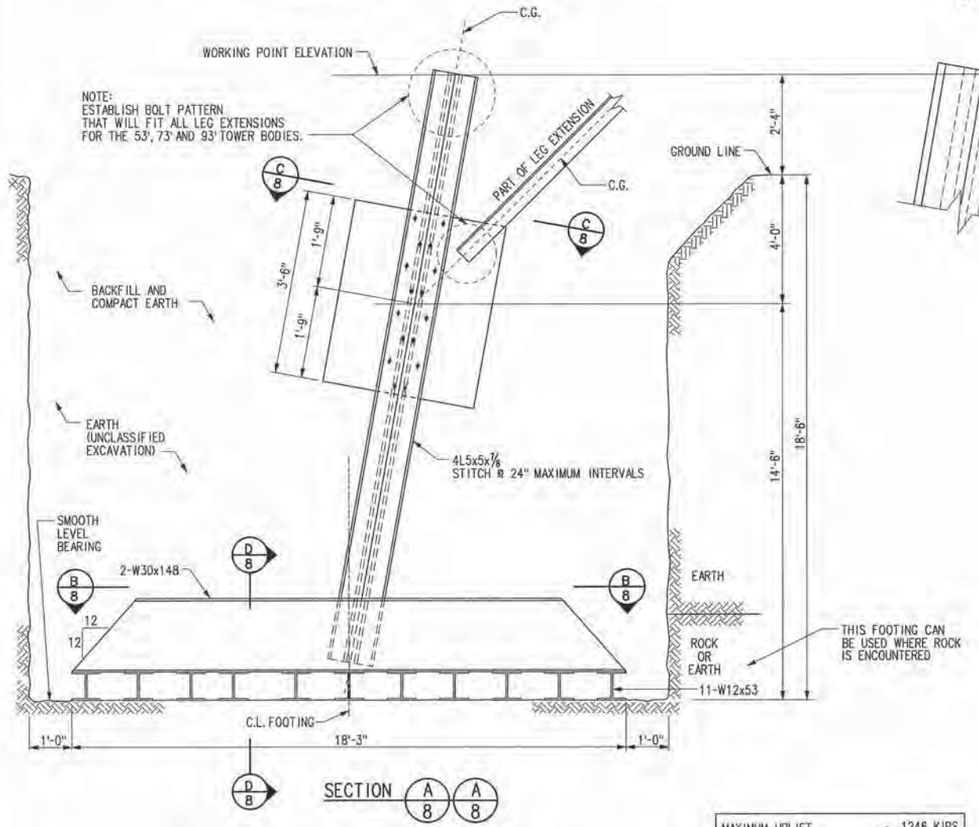
SECTION D/8 D/8



SECTION E/8 E/8



TOWER FOOTING PLAN

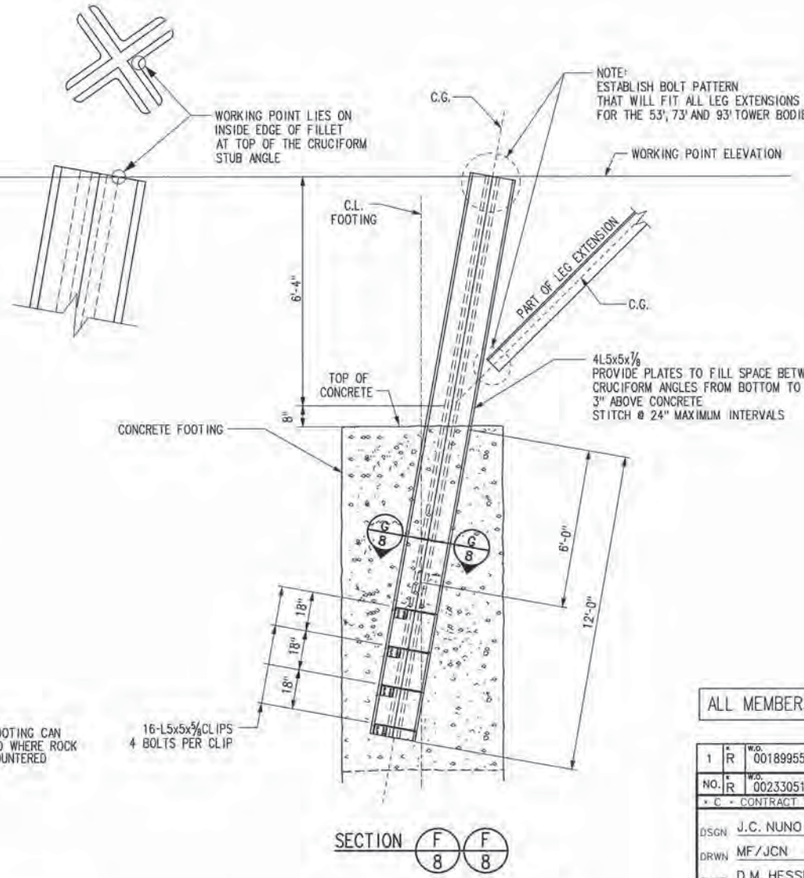


SECTION A/8 A/8

GRILLAGE FOOTING DETAIL

DETAILED WEIGHT OF ONE GRILLAGE FOOTING = 21472 LBS.

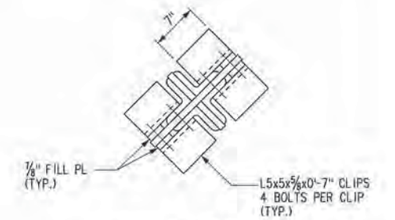
MAXIMUM UPLIFT	= 1246 KIPS
MAXIMUM HORIZONTAL SHEAR	= 94 KIPS
MAXIMUM COMPRESSION	= 1358 KIPS



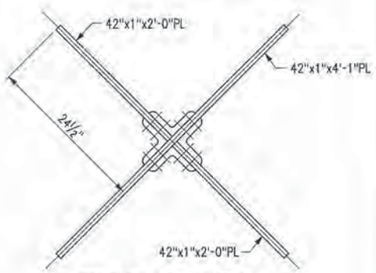
SECTION F/8 F/8

CONCRETE FOOTING STUB DETAIL

DETAILED WEIGHT OF ONE FOOTING STUB = 3161 LBS.



SECTION G/8 G/8



SECTION C/8 C/8

ALL MEMBERS AND PLATES ARE ASTM A572 GRADE 50 STEEL

NO.	R	W.O.	REVISION	BY	DATE	APPROVED
1	R	00189955	CHANGE CLIP SIZE IN SEC. E; CORRECT FILL SIZE IN SEC. G; ADD DETAILED WEIGHT	JCN	4/22/10	JCN DMH DEO
	R	00233051				

C - CONTRACT CONSTRUCTION, FA - FORCE ACCOUNT, R - RECORD

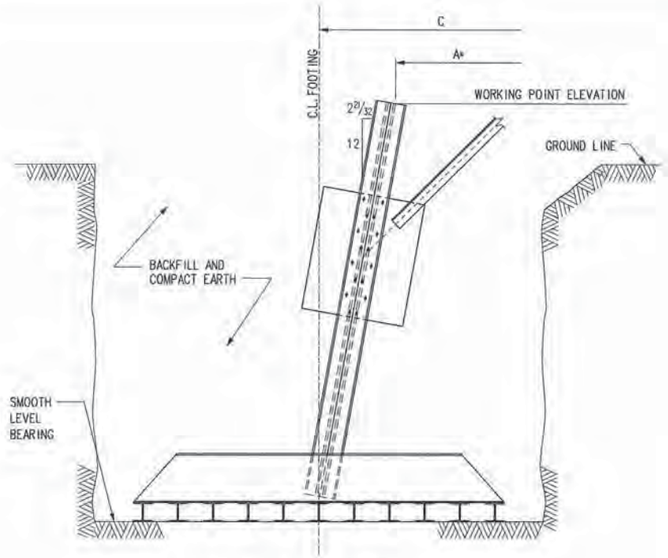
DSGN	J.C. NUNO
DRWN	MF/JCN
CHKD	D.M. HESSE
REVW	G.W. GREEN
CNCR	D.E. O'CLAIRE
APPR	L. KEMPNER (PRINCIPAL ENGINEER)
DATE	6-15-09

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT = 57,000 LBS

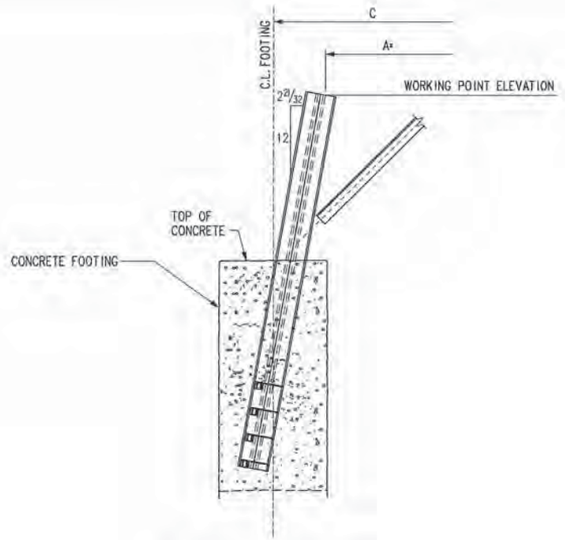
TYPE 139D, 139DE — FOOTINGS

Serial	Source	Size	Sheet	Revision
284768	LFS	A1	8	1



SECTION A/1 A/1

GRILLAGE FOOTING



SECTION B/1 B/1

CONCRETE FOOTING

ANCHOR SETTING DIMENSIONS

LEG EXT	DIMENSIONS FOR 53' BODY				DIMENSIONS FOR 73' BODY				DIMENSIONS FOR 93' BODY			
	GRILL & CONC		GRILL	CONC	GRILL & CONC		GRILL	CONC	GRILL & CONC		GRILL	CONC
	A*	B	C	C	A*	B	C	C	A*	B	C	C
5'-0"	21.260	15.122	25.817	24.280	25.668	18.239	30.223	28.686	30.073	21.354	34.629	33.093
7'-6"	21.812	15.512	26.367	24.831	26.218	18.628	30.774	29.237	30.623	21.743	35.180	33.643
10'-0"	22.362	15.901	26.918	25.382	26.767	19.016	31.324	29.788	31.175	22.133	35.731	34.194
12'-6"	22.914	16.292	27.469	25.933	27.320	19.407	31.875	30.339	31.725	22.522	36.281	34.745
15'-0"	23.464	16.680	28.020	26.483	27.869	19.796	32.426	30.890	32.277	22.912	36.832	35.296
17'-6"	24.014	17.069	28.571	27.034	28.422	20.186	32.977	31.440	32.827	23.301	37.383	35.846
20'-0"	24.566	17.460	29.121	27.585	28.971	20.575	33.527	31.991	33.377	23.690	37.934	36.397
22'-6"	25.116	17.848	29.672	28.136	29.524	20.965	34.078	32.542	33.929	24.080	38.484	36.948
25'-0"	25.668	18.239	30.223	28.686	30.073	21.354	34.629	33.093	34.479	24.469	39.035	37.499
27'-6"	26.218	18.628	30.774	29.237	30.623	21.743	35.180	33.643	35.031	24.860	39.586	38.050
30'-0"	26.767	19.016	31.324	29.788	31.175	22.133	35.731	34.194	35.581	25.248	40.137	38.600
32'-6"	27.320	19.407	31.875	30.339	31.725	22.522	36.281	34.745	36.131	25.637	40.688	39.151
35'-0"	27.869	19.796	32.426	30.890	32.277	22.912	36.832	35.296	36.683	26.028	41.238	39.702
37'-6"	28.422	20.186	32.977	31.440	32.827	23.301	37.383	35.846	37.233	26.416	41.789	40.253
40'-0"	28.971	20.575	33.527	31.991	33.377	23.690	37.934	36.397	37.785	26.807	42.340	40.803
42'-6"					33.929	24.080	38.484	36.948	38.335	27.196	42.891	41.354
45'-0"					34.479	24.469	39.035	37.499	38.887	27.586	43.441	41.905
47'-6"					35.031	24.860	39.586	38.050	39.436	27.975	43.992	42.456
50'-0"					35.581	25.248	40.137	38.600	39.986	28.364	44.543	43.007

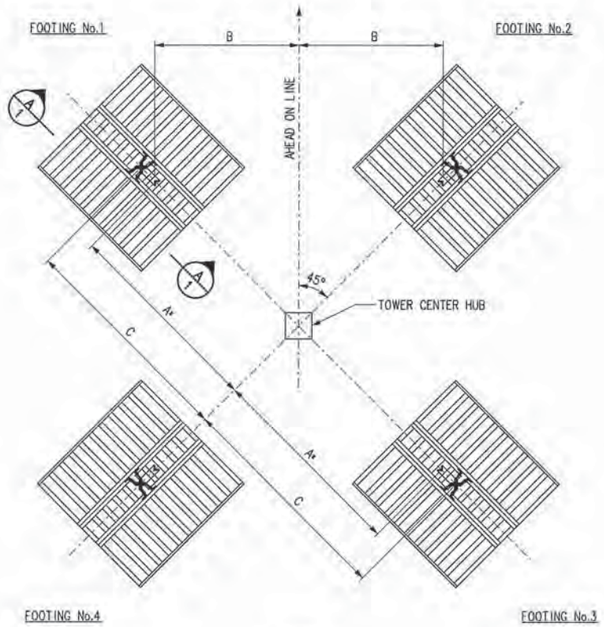
ANCHOR SETTING DIMENSIONS PROVIDED BY TOWER DETAILER.

NOTES:

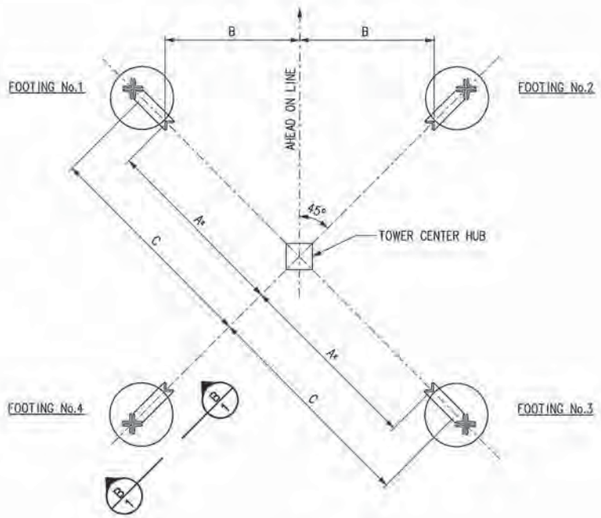
SETTING DIMENSIONS IN FEET.

DRAWING NOT TO SCALE.

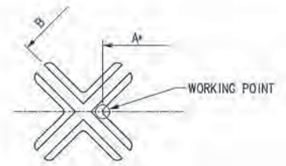
WORK THIS DRAWING WITH FOOTING
DESIGN DRAWING 272974-LFS-A1 SHEET 8.



PLAN



PLAN



* WORKING POINT DETAIL

NO.	* R	W.O. 00233051	REVISION	BY	DATE	APPROVED

* C - CONTRACT CONSTRUCTION, FA - FORCE ACCOUNT, R - RECORD

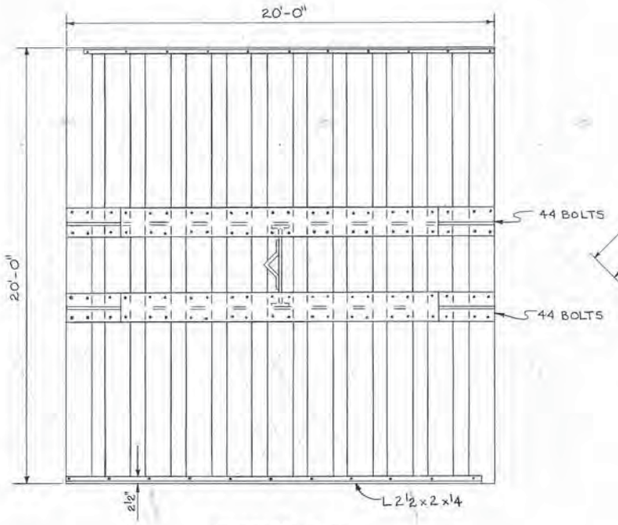
DSGN	J.C. NUNO
DRWN	J.C. NUNO
CHKD	D.M. Hesse
REVW	G.W. Green
CNCR	DE OCLARE
APPR	Leon Kempema L
DATE	02/07/11

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

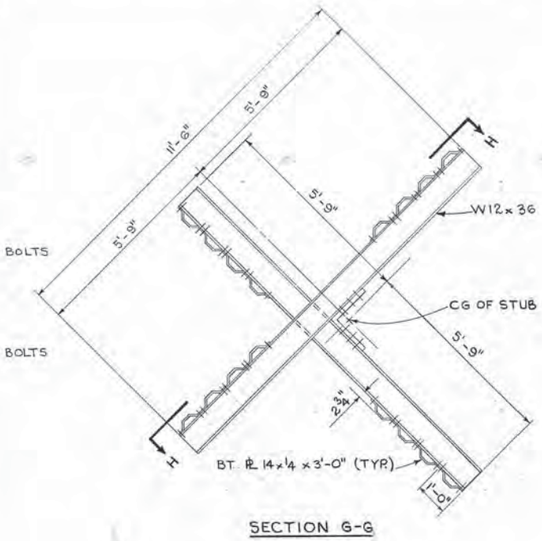
500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT=51,000 LBS

TYPE 139D, 139DE ANCHOR SETTING DIMENSIONS

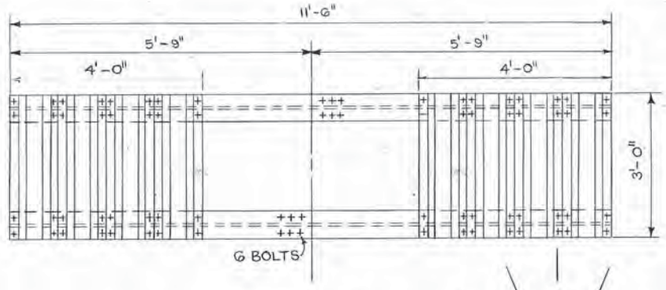
Serial	Source	Size	Sheet	Revision
286523	LFS	A1	1 OF 1	0



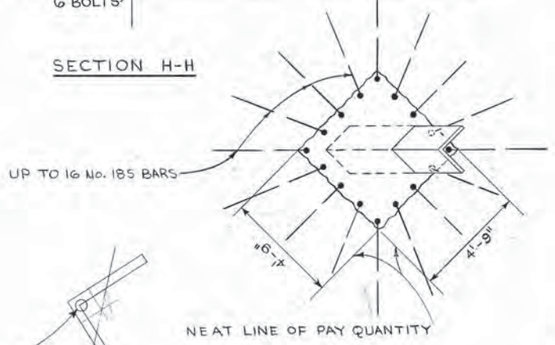
SECTION B-B



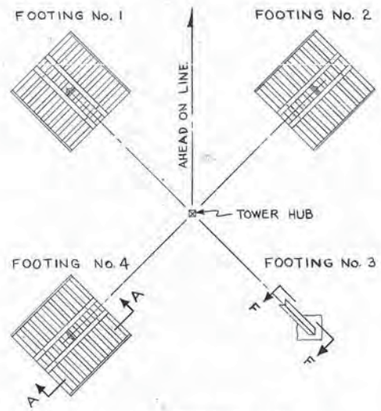
SECTION G-G



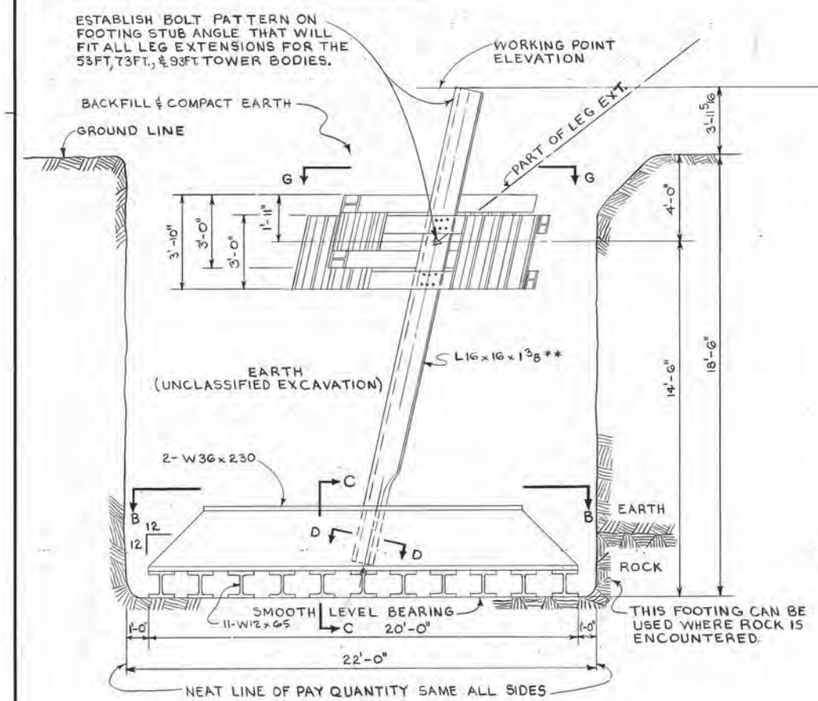
SECTION H-H



PLAN
ROCK FOOTING



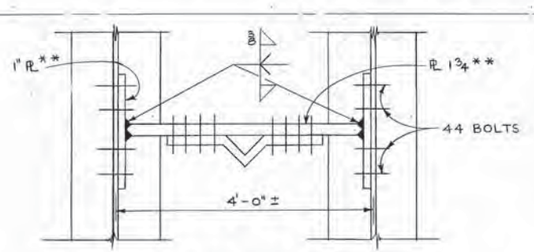
FOOTING PLAN
(TYPICAL)



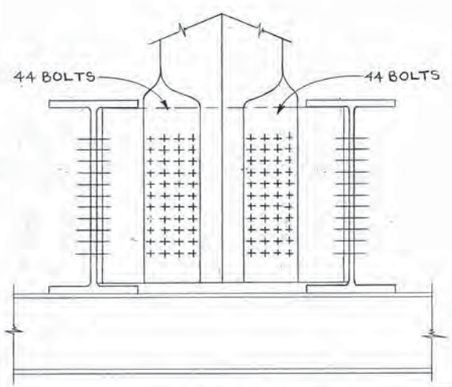
SECTION A-A
GRILLAGE FOOTING

DET. WT. OF ONE GRILLAGE FOOTING = 30280 LBS

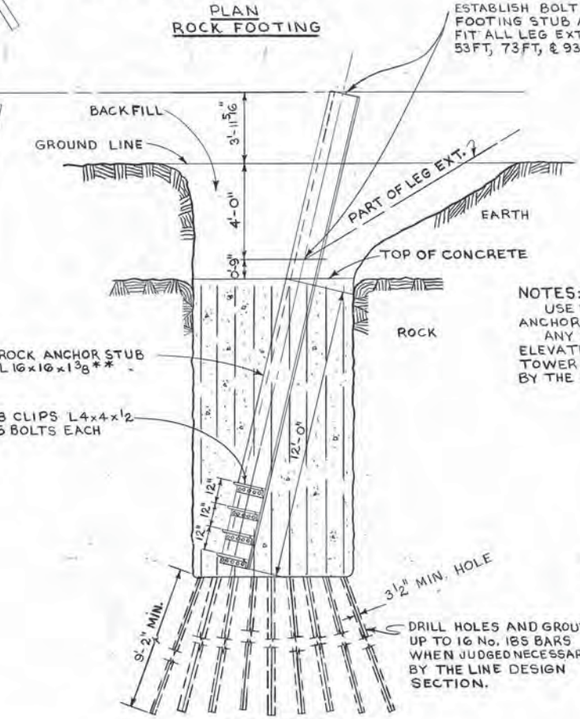
MAX. UPLIFT	= 1404.2^K CASE D1
MAX. COMPRESSION	= 1810.8^K CASE D2
MAX. HORIZ. SHEAR	= 165.0^K CASE D2



SECTION D-D



SECTION C-C



SECTION F-F
ROCK FOOTING

DET. WT. OF ONE ROCK ANCHOR = 3287 LBS

NOTES:
USE WHEN ROCK IS JUDGED SUITABLE FOR ANCHORAGE.
ANY CHANGE IN FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE LINE DESIGN SECTION.

ULTIMATE LOAD DESIGN
ALL STRESSES AND LOADS SHOWN ARE ULTIMATE. WORKING LOADS ARE ⅔ ULTIMATE LOADS.

DRAWING NO.	SHEET	TITLE
153181C-DTS-D		TYPE 09G LEG EXT.-53FT BODY
153181D-DTS-D		TYPE 09G LEG EXT.-73FT BODY
153181E-DTS-D		TYPE 09G LEG EXT.-93FT BODY

REFERENCE DRAWINGS

NO.	C	REVISION	BY	DATE	APPROVED
2	C	CHG'D WT. OF GRILLAGE & ROCK FTG	R R	5-30-73	WAG DC JH
1	C	DIMENSION SECT. A-A & F-F	R R	10-31-72	DC JH BBL

UNITED STATES DEPARTMENT OF THE INTERIOR
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

525/550KV DOUBLE CIRCUIT
TRANSMISSION TOWERS
BUNDLE "CHUKAR"
THREE @ 19,000 MWT = 57,000 LBS
TYPE 09G
FOOTINGS

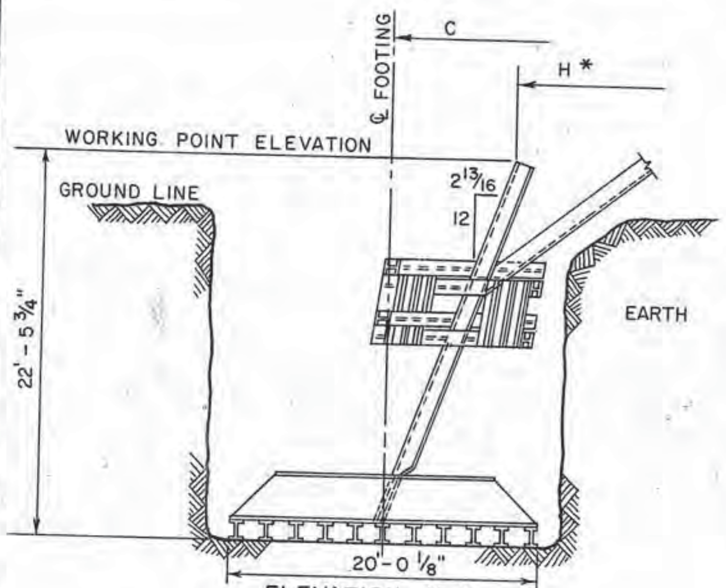
Designed JDR	Sub. T.B. Drury	Approved M. Marzi	
Drawn PTR	B.C. Young	Date 5-2-72	Chief Branch Transmission Design
Checked WAG	N.B. Jensen	DATE 6-28-72	SHEET OF
		Dwg. 153181F-DTS-D	STD

153181F | 2 | 700096 FR GRO | 550DC570 09G | DSGN

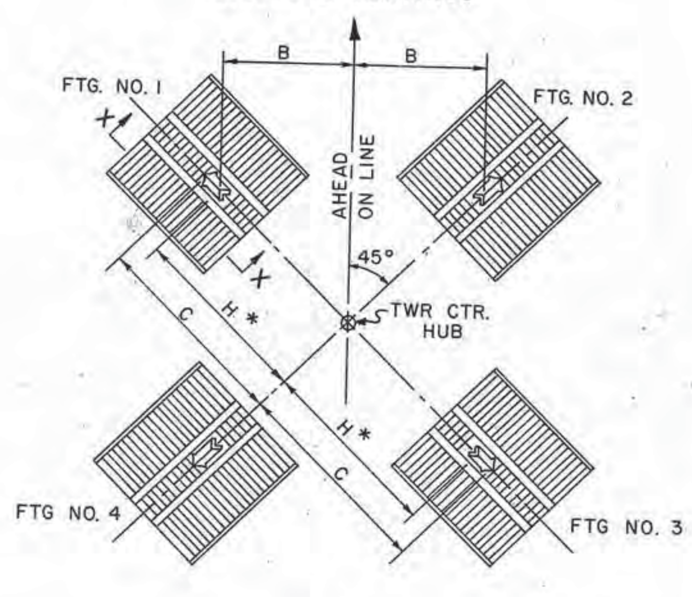
*C = FOR CONTRACT CONSTRUCTION FA = FOR FORCE ACCOUNT CONSTRUCTION R = FOR RECORD

TD-69

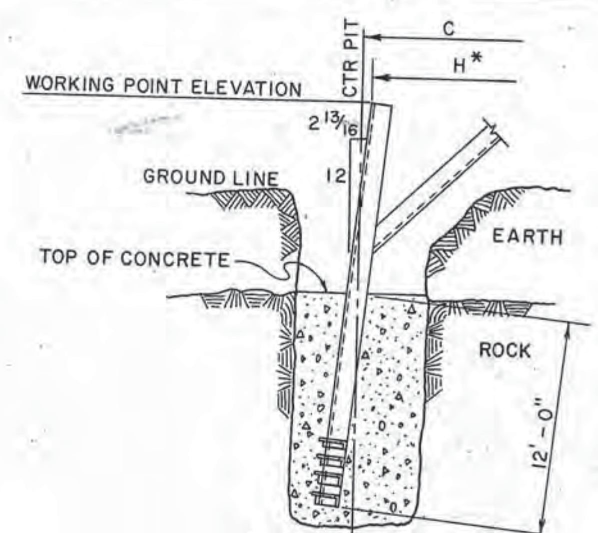
154193 | 1 | 809G | AD | 500DC570 09G | GRRR | DSGN



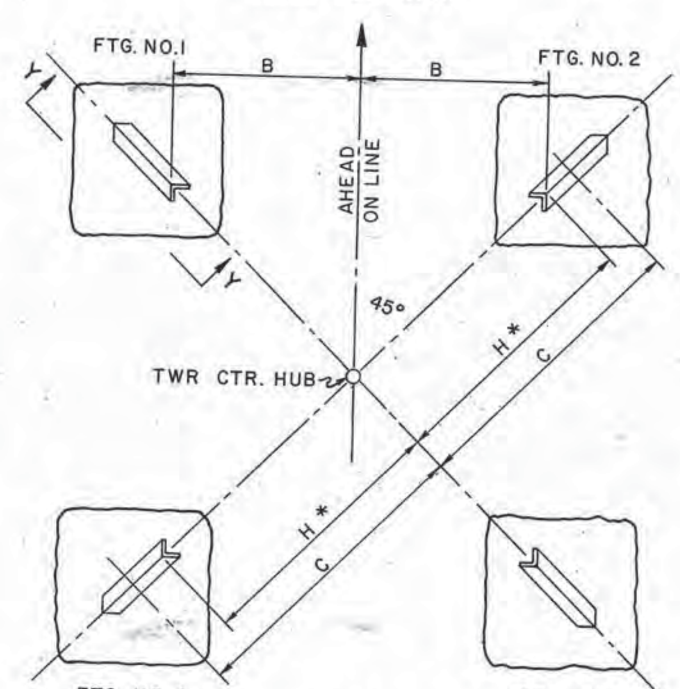
ELEVATION X-X
GRILLAGE FOOTINGS



PLAN



ELEVATION Y-Y
ROCK FOOTINGS



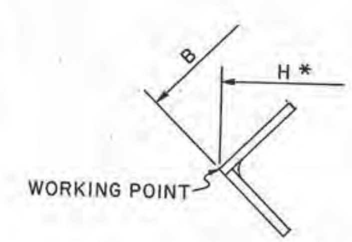
PLAN

ANCHOR SETTING DIMENSIONS

LEG EXT	DIMENSIONS FOR 53' BODY				DIMENSIONS FOR 73' BODY				DIMENSIONS FOR 93' BODY			
	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK	GRILL & ROCK		GRILL	ROCK
	H*	B	C	C	H*	B	C	C	H*	B	C	C
5'-0"	21.199	14.990	25.660	23.460	25.913	18.323	30.370	28.180	30.627	21.656	35.090	32.890
10'-0"	22.377	15.823	26.840	24.640	27.091	19.156	31.550	29.360	31.805	22.489	36.270	34.070
15'-0"	23.556	16.656	28.020	25.820	28.270	19.989	32.730	30.530	32.984	23.323	37.440	35.240
20'-0"	24.734	17.490	29.190	27.000	29.448	20.823	33.910	31.710	34.162	24.156	38.620	36.430
25'-0"	25.913	18.323	30.370	28.180	30.627	21.656	35.090	32.890	35.341	24.990	39.800	37.610
30'-0"	27.091	19.156	31.550	29.360	31.805	22.489	36.270	34.070	36.519	25.823	40.980	38.780
35'-0"	28.270	19.989	32.730	30.530	32.984	23.323	37.440	35.240	37.698	26.656	42.160	39.960
40'-0"	29.448	20.823	33.910	31.710	34.162	24.156	38.620	36.430	38.876	27.490	43.340	41.140
45'-0"	30.627	21.656	35.090	32.890	35.341	24.990	39.800	37.610	40.055	28.323	44.520	42.320
50'-0"	31.805	22.489	36.270	34.070	36.519	25.823	40.980	38.780	41.233	29.156	45.690	43.500
55'-0"	32.984	23.323	37.440	35.240	37.698	26.656	42.160	39.960	42.412	29.990	46.870	44.680
60'-0"	34.162	24.156	38.620	36.430	38.876	27.490	43.340	41.140	43.590	30.823	48.050	45.860

NOTES:

SETTING DIMENSIONS IN FEET.
DRAWINGS NOT TO SCALE.
WORK THIS DWG WITH FOOTING DESIGN DWG SERIAL 153181F



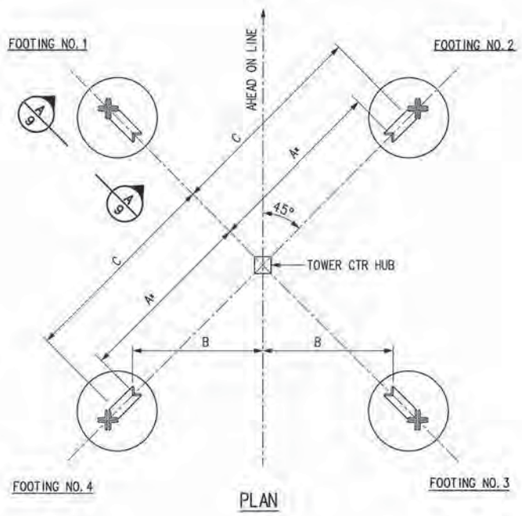
* WORKING POINT DETAIL

UNITED STATES DEPARTMENT OF THE INTERIOR
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

ANCHOR SETTING DIMENSIONS
525/550 KV DC TOWERS MWT=57,000 LBS
TYPE 09G TOWER
GRILLAGE & ROCK FOOTINGS

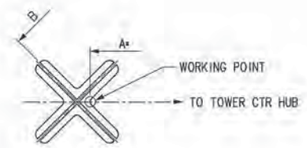
Dr. SMK | Sub. [signature] | APPROVED: E. H. Gehrig
SR/ | Rec. [signature] | Date 3-26-73 Ch Br Trans Dsgn
Ck: | | Date 3-8-73 | Sh 1 of 1

154193-DTS-F | STD



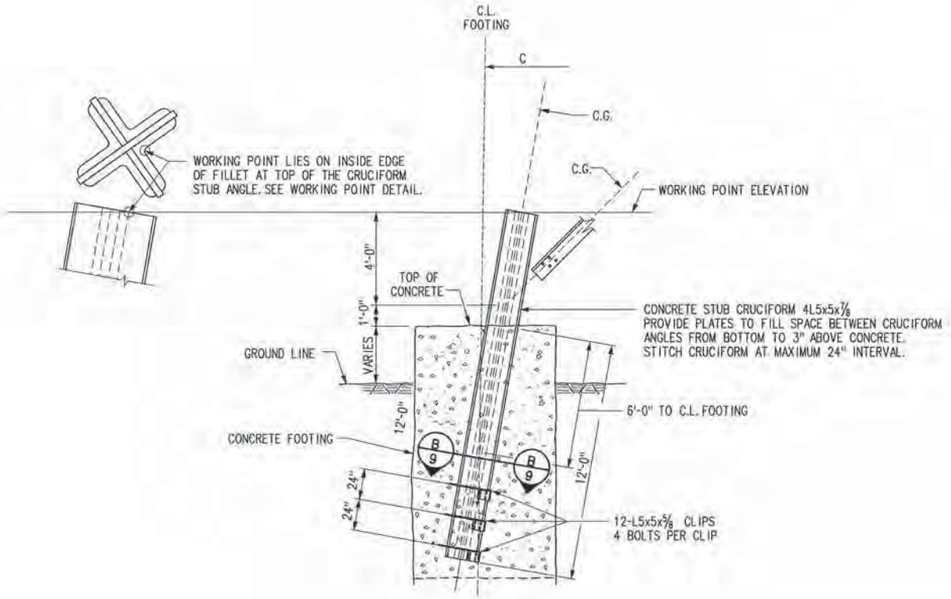
PLAN

ALL MEMBERS AND PLATES ARE ASTM A572 GRADE 50 STEEL



BUILT-UP CRUCIFORM SECTION

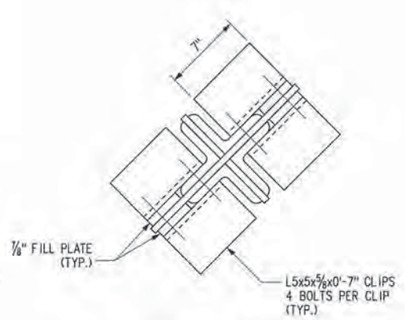
WORKING POINT DETAIL



SECTION A 9 A 9

CONCRETE FOOTING STUB DETAIL

DETAILED WEIGHT OF ONE FOOTING STUB = 2570 LBS.



SECTION B 9 B 9

MAXIMUM UPLIFT	= 970 KIPS
MAXIMUM HORIZONTAL SHEAR	= 205 KIPS
MAXIMUM COMPRESSION	= 1210 KIPS

DRAWING NO.	SHEET	TITLE
REFERENCE DRAWINGS		

NO.	R	WO	REVISION	BY	DATE	APPROVED
1	R	00232575	ADDED DETAILED WEIGHT	MF	11/23/10	DM 11/29/10 ZK
C	C	00231815				

* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN	C.J. HAMEL
DRWN	M. FETESCU
CHKD	C.S. WAGNER
REVW	G.W. GREEN
CNCR	D.E. O'CLAIRE
APPR	L. KEMPNER, JR (PRINCIPAL ENGINEER)
DATE	10-07-09

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS; PORTLAND, OREGON

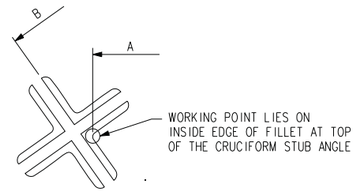
500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT = 120,000 LBS
TYPE S159B FOOTINGS

Serial	Source	Size	Sheet	Revision
286957	LFS	A1	9	1

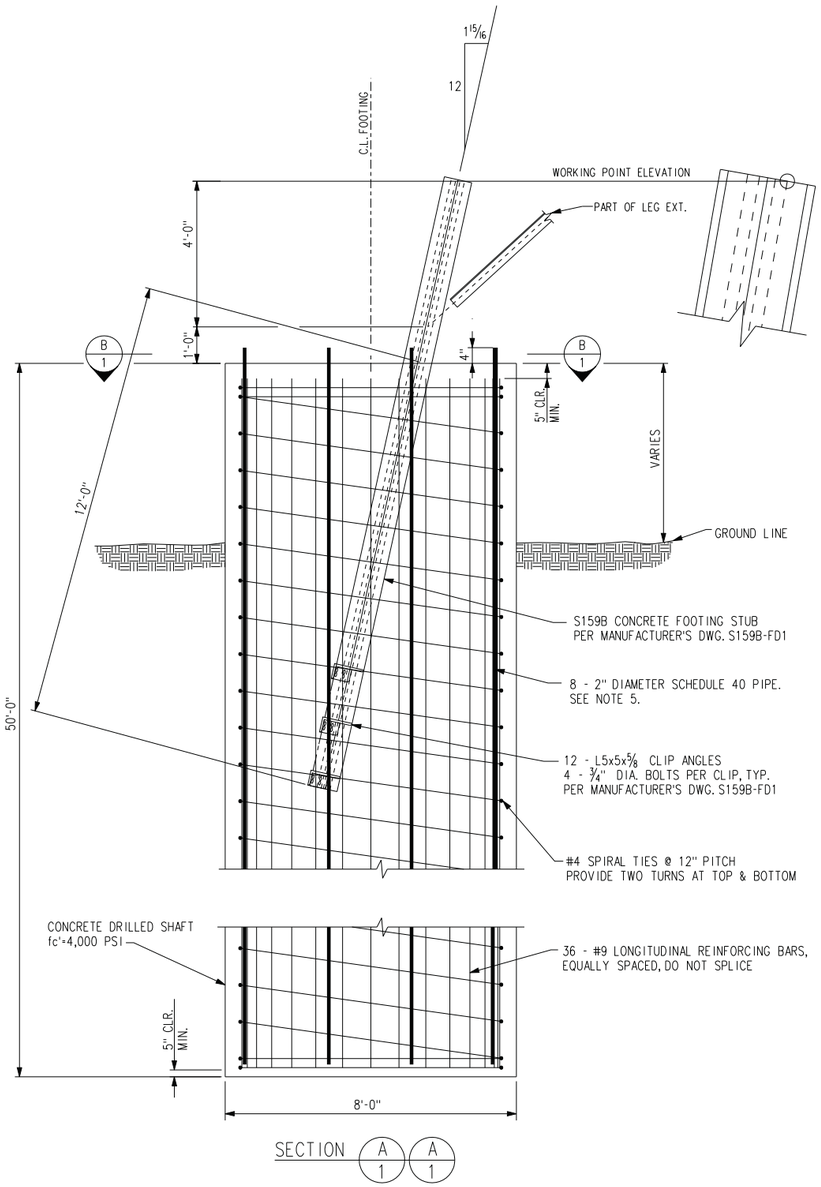
TOWER TYPE	TOWER NUMBER	SERIAL NUMBER	TOWER BODY (FEET)	FOOTING	LEG EXT. (FEET)	ANCHOR SETTING DIMENSIONS (FEET)			ELEVATIONS (FEET)		
						A	B	C	WORKING POINT	TOP OF CONCRETE	GROUND LINE
S159B	8/1	AZE 32	242'-6"	1	42'-6"	52.319	37.078	54.252	650.48	645.48	640.40
				2	42'-6"	52.319	37.078	54.252	650.48	645.48	642.10
				3	42'-6"	52.319	37.078	54.252	650.48	645.48	644.70
				4	42'-6"	52.319	37.078	54.252	650.48	645.48	644.40

LIST OF MATERIALS FOR ONE FOOTING

PCS	DESCRIPTION
1	S159B CONCRETE FOOTING STUB
36	#9 STEEL REINFORCING BAR
-	#4 STEEL REINFORCING BAR
8	2" DIAMETER SCHEDULE 40 PIPE
-	CONCRETE

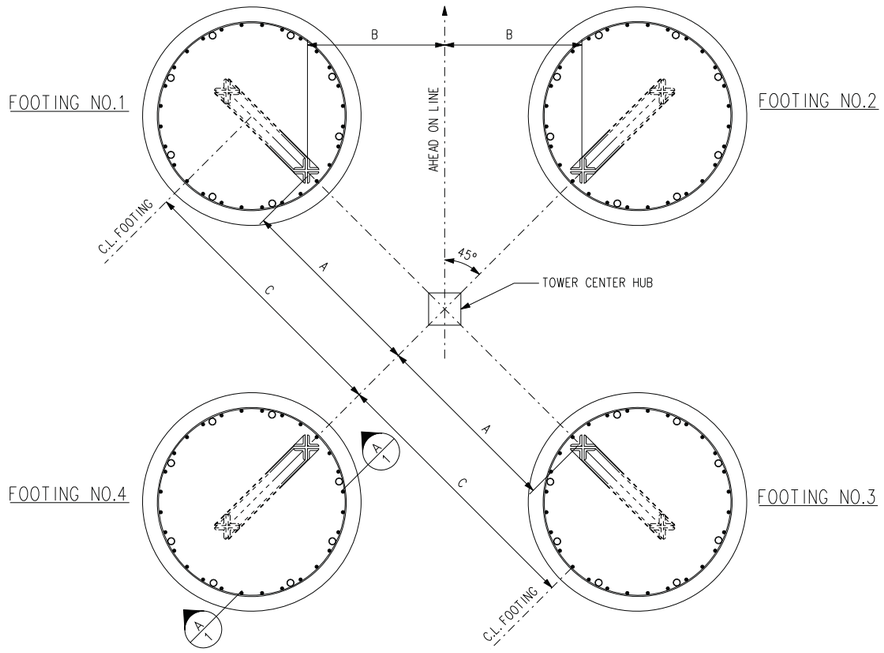


WORKING POINT DETAIL

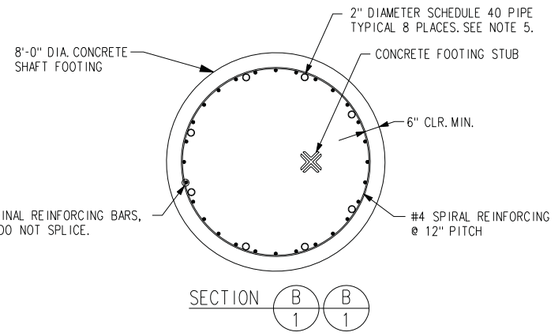


SECTION A 1 A 1

DETAILED WEIGHT OF ONE CONCRETE FOOTING STUB = 2500.7 LBS.
WEIGHT INCLUDES STUB ANGLE, CLIP ANGLES, BOLTS & PALNUTS,
PLUS 3 1/2% FOR GALVANIZING.



TOWER FOOTING PLAN



SECTION B 1 B 1

GENERAL NOTES:

1. CONCRETE f'c=4,000 PSI.
2. REINFORCING STEEL fy=60,000 PSI.
3. ANY CHANGE IN THE FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE PROJECT ENGINEER.
4. REFER TO STEEL TOWER LIST FOR TOWER STATIONS.
5. UNIFORMLY SPACE 2" DIAMETER SCHEDULE 40 PIPE AROUND INSIDE OF REINFORCING CAGE. PIPE MUST CONFORM TO ASTM A53 GRADE B.

   FOLLOW INSTALLATION PROCEDURES DEFINED IN ASTM D6760.

   SECURELY ATTACH PIPE TO INSIDE OF REINFORCING CAGE AS NEAR TO PARALLEL AS POSSIBLE AND MATCHING THE PATTERN SHOWN ON THE PLAN. EXTEND THE PIPES FROM THE BOTTOM OF THE REINFORCEMENT CAGE TO AT LEAST 4" ABOVE TOP OF SHAFT. CAP ENDS OF PIPE TO KEEP OUT CONCRETE AND DEBRIS AND RETAIN WATER.

   FILL PIPES WITH CLEAN WATER NO LATER THAN 1 HOUR AFTER PLACEMENT OF THE CONCRETE. REPLACE CAP.

   WHEN INSTRUCTED TO BY THE COTR, CUT PIPES FLUSH WITH TOP OF CONCRETE, APPLY GALVANIZING COMPOUND, AND FILL WITH GROUT.

PRELIMINARY
3/28/2011

REFERENCE DRAWINGS		
DRAWING NO.	SHEET	TITLE
286957-LFS-A1	9	S159B FOOTINGS
S159B-FD1	1	MANUFACTURER'S ERECTION DWG., S159B FOOTINGS

NO.	*	W.O.	REVISION	BY	DATE	APPROVED
	C	00232575				

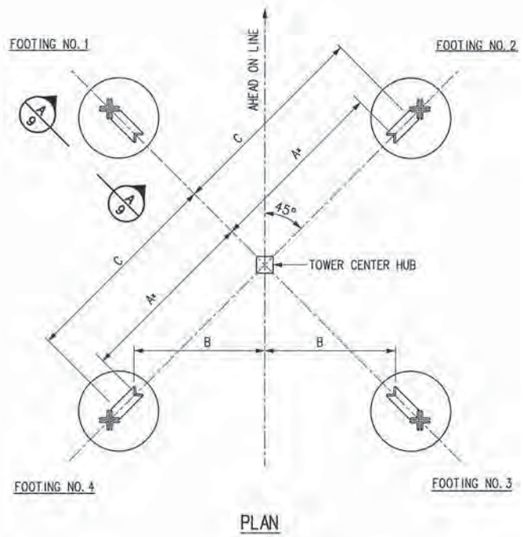
* C = CONTRACT CONSTRUCTION, FA = FORCE ACCOUNT, R = RECORD

DSGN	D.M. HESSE
DRWN	M. FETESCU
CHKD	
REVW	
CNCR	
APPR	PROJECT MANAGER
DATE	

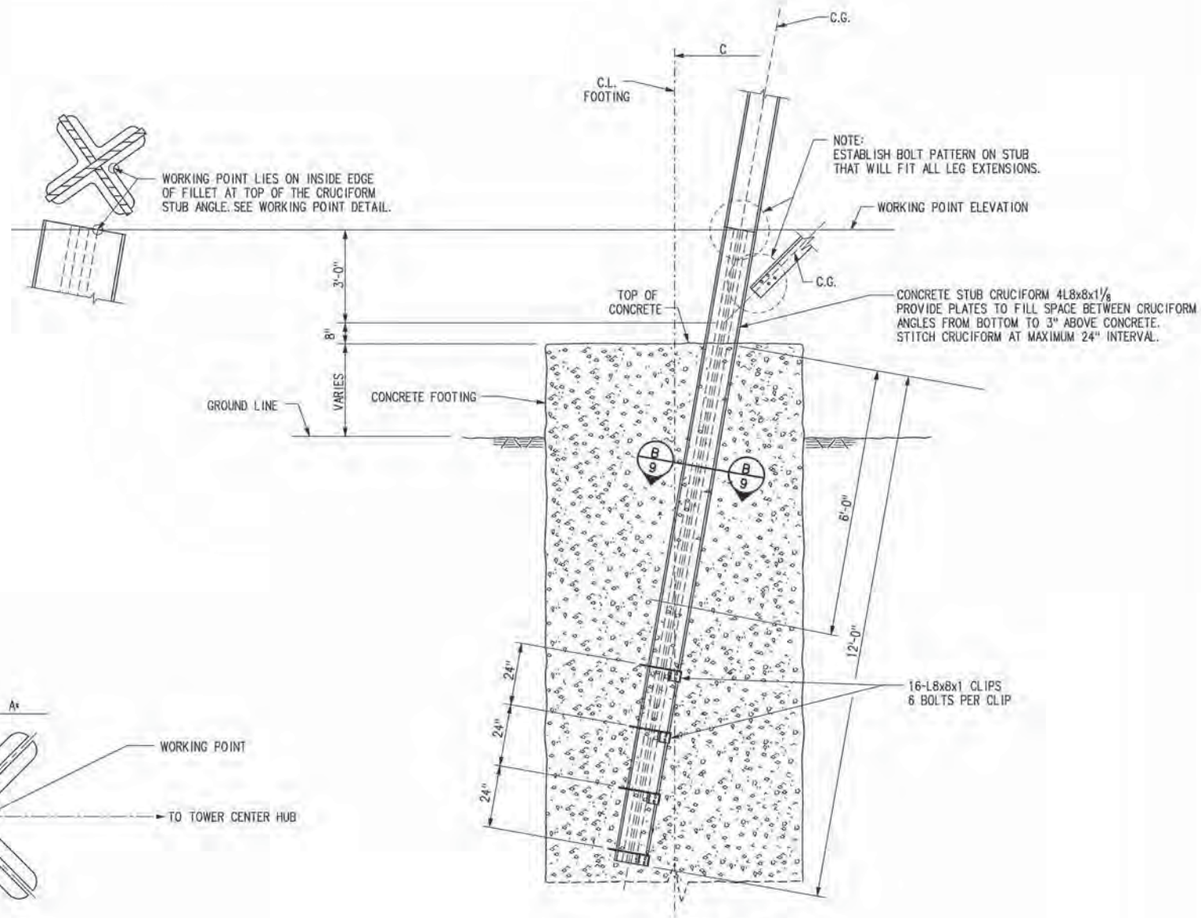
UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
BIG EDDY-KNIGHT 1 & 2
SERIAL NUMBER AZE32
S159B CONCRETE SHAFT FOOTINGS

Serial	Source	Size	Sheet	Revision
296923	LFS	A1	1 OF 1	0



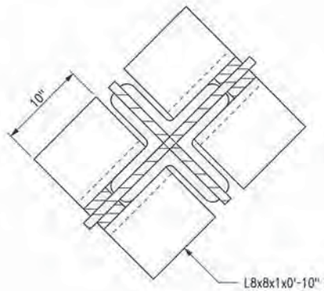
PLAN



SECTION A 9 A 9

CONCRETE FOOTING STUB DETAIL

ESTIMATED WEIGHT OF ONE FOOTING STUB = 5378 LBS
FOOTING STUB CATALOG I.D. - 1012384



SECTION B 9 B 9

BUILT-UP CRUCIFORM SECTION

* WORKING POINT DETAIL

ALL MEMBERS AND PLATES ARE ASTM A572 GRADE 50 STEEL

NO.	*	W.O.	REVISION	BY	DATE	APPROVED
	C	00232575				

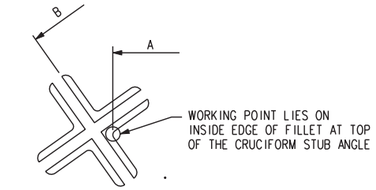
* C - CONTRACT CONSTRUCTION, FA - FORCE ACCOUNT, R - RECORD

DSGN	A.M. WILLIAMS
DRWN	M. FETESCU
CHKD	D.M. Hesse
REVW	GW Green
CNCR	DE O'CLAIRE
APPR	Jon Komperud
DATE	01/13/11

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500 KV DOUBLE CIRCUIT
TRANSMISSION TOWER
MWT = 120,000 LBS
TYPE S159D, S159DE — FOOTINGS

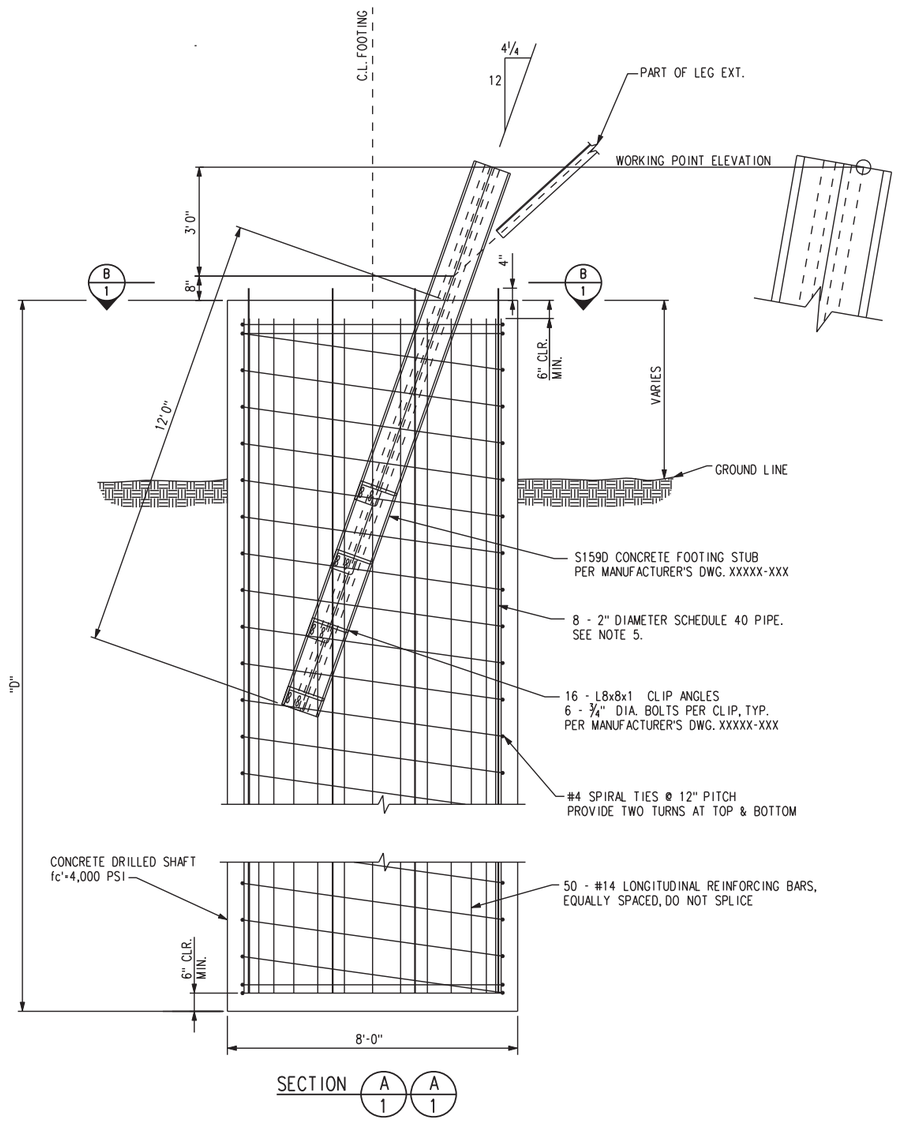
Serial	Source	Size	Sheet	Revision
295313	LFS	A1	9	0



WORKING POINT DETAIL

TOWER TYPE	TOWER NUMBER	SERIAL NUMBER	TOWER BODY (FEET)	FOOTING	LEG EXT. (FEET)	MIN. SHAFT LENGTH "D"	ANCHOR SETTING DIMENSIONS (FEET)			ELEVATIONS (FEET)		
							A	B	C	WORKING POINT	TOP OF CONCRETE	GROUND LINE
S159D	7/5	AZE 31	40	1	42.5	73'-0"	---	---	---	1062.87	1059.20	1056.96
				2	42.5	73'-0"	---	---	---	1062.87	1059.20	1057.12
				3	40.0	73'-0"	---	---	---	1065.37	1061.70	1059.36
				4	42.5	73'-0"	---	---	---	1062.87	1059.20	1056.48
S159D	8/2	AZE 33	60	1	37.5	37'-6"	---	---	---	335.43	331.76	329.68
				2	37.5	38'-6"	---	---	---	335.43	331.76	328.41
				3	37.5	38'-6"	---	---	---	335.43	331.76	328.36
				4	37.5	38'-6"	---	---	---	335.43	331.76	328.59

LIST OF MATERIALS FOR ONE FOOTING	
PCS	DESCRIPTION
1	S159D CONCRETE FOOTING STUB
50	#14 STEEL REINFORCING BAR
-	#4 STEEL REINFORCING BAR
-	CONCRETE
8	2" DIAMETER SCHEDULE 40 PIPE



SECTION A 1 A 1

ESTIMATED WEIGHT OF ONE CONCRETE FOOTING STUB = 5380 LBS.
WEIGHT INCLUDES STUB ANGLE, CLIP ANGLES, BOLTS & PALNUTS,
PLUS 3½% FOR GALVANIZING.

GENERAL NOTES:

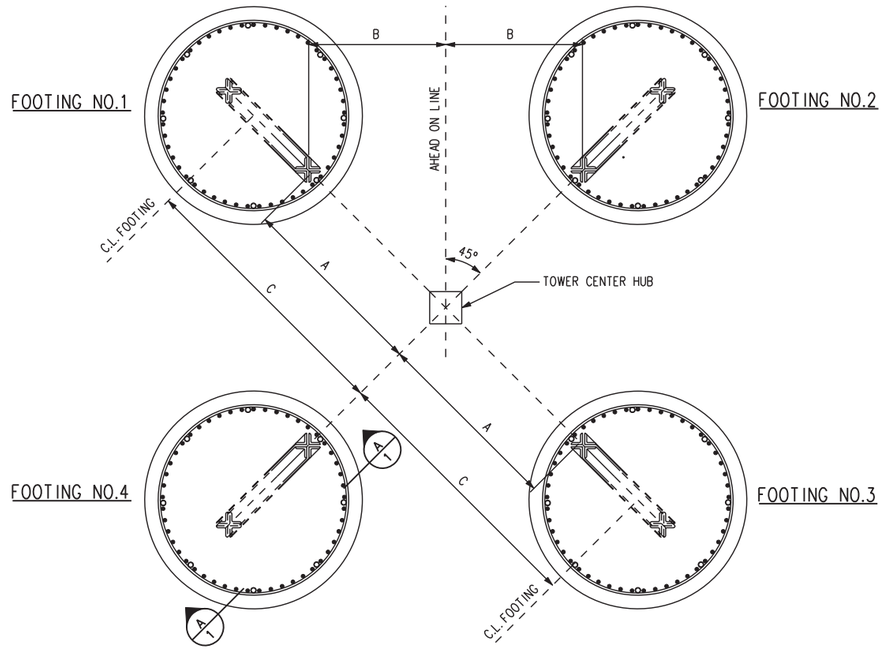
1. CONCRETE f'c=4,000 PSI.
2. REINFORCING STEEL fy=60,000 PSI.
3. ANY CHANGE IN THE FOOTING WORKING POINT ELEVATIONS FROM THOSE LISTED ON THE TOWER SITE SUMMARY LIST IS TO BE APPROVED BY THE PROJECT ENGINEER.
4. REFER TO STEEL TOWER LIST FOR TOWER STATIONS.
5. UNIFORMLY SPACE 2" DIAMETER SCHEDULE 40 PIPE AROUND INSIDE OF REINFORCING CAGE. PIPE MUST CONFORM TO ASTM A53 GRADE B.

   FOLLOW INSTALLATION PROCEDURES DEFINED IN ASTM D6760.

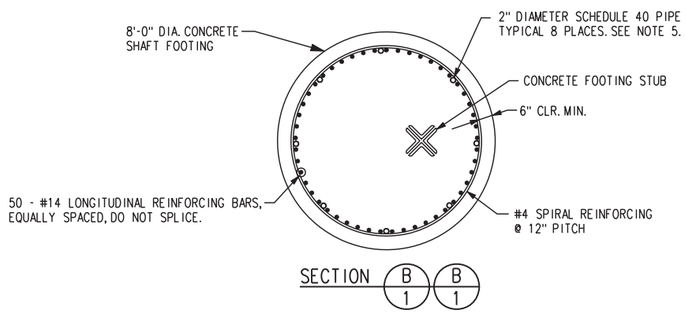
   SECURELY ATTACH PIPE TO INSIDE OF REINFORCING CAGE AS NEAR TO PARALLEL AS POSSIBLE AND MATCHING THE PATTERN SHOWN ON THE PLAN. EXTEND THE PIPES FROM THE BOTTOM OF THE REINFORCEMENT CAGE TO AT LEAST 4" ABOVE TOP OF SHAFT. CAP ENDS OF PIPE TO KEEP OUT CONCRETE AND DEBRIS AND RETAIN WATER.

   FILL PIPES WITH CLEAN WATER NO LATER THAN 1 HOUR AFTER PLACEMENT OF THE CONCRETE. REPLACE CAP.

   WHEN INSTRUCTED TO BY THE COTR, CUT PIPES FLUSH WITH TOP OF CONCRETE, APPLY GALVANIZING COMPOUND, AND FILL WITH GROUT.



TOWER FOOTING PLAN



SECTION B 1 B 1

PRELIMINARY
03/30/2011

NO.	*	W.O.	REVISION	BY	DATE	APPROVED
	C	00232575				

* C - CONTRACT CONSTRUCTION, FA - FORCE ACCOUNT, R - RECORD

DSGN	A. WILLIAMS
DRWN	A. WILLIAMS
CHKD	
REVW	
CNCR	
APPR	PROJECT MANAGER
DATE	

UNITED STATES DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
HEADQUARTERS, PORTLAND, OREGON

500KV DOUBLE CIRCUIT
TRANSMISSION TOWER
BIG EDDY-KNIGHT NO. 1
TOWERS AZE 31 & AZE 33
S159D CONCRETE SHAFT FOOTINGS

Serial	Source	Size	Sheet	Revision
295308	LFS	A1	1 OF 1	0

-------	-	MANUFACTURER'S ERECTION DWG.
295313-LFS-A1	9	S159D, S159DE FOOTINGS
DRAWING NO.	SHEET	TITLE

REFERENCE DRAWINGS

TRIM LINE

TRIM LINE