

ANNEXURE A

SAZ52152

REPAIR FEEDER LINE AT Km 88 AND Km 594 ON THE SALDANHA – SISHEN RAILWAY LINE

1. SCOPE OF WORK

This project specification covers requirements for erecting 2 x 2m holes and planting of 2 concrete mast poles at km 88 and km 594. Replace 500m feeder wire, 2 x splice and reconnect lightning protection at km 594/6-7 near Kenhardt and 1120m earth wire at km 88 and 2 x in feed wires near Elandsbaai along the Shishen –Saldanha railway line. This work must be completed in the period of one month (30 Days).

2. SPECIFICATIONS:

2.1 Mast poles consisting of 1 x 12m (P-EM-0016 inland) and 1 x 13m (P-EM-0017 Coastal) 64kNm infraset feeder line concrete mast poles. Assembly of feeder wire and earth wire (Lion and Hornet) see appendix 1 and 2. See appendix 3 for pole foundations specifications.

3. GENERAL

- 3.1 Transnet Freight Rail will supply all the material except crimping splice and crimping tool for lion wire (ACSR 30/7/3, 18).
- 3.2 Contractor must supply crane and certified crane driver to erect the poles and labour.
- 3.4 Tenderer shall submit a "Schedule of Qualifications" of the staff that will be performing the work. Only qualified technical personnel shall perform the works on the electrical equipment or installations. Competence of on-site staff in terms of (i) generic skill, (ii) qualification and (iii) experience, must be stated for the following workers:
- 3.5 Responsible person(s) who must provide supervision of workers in terms of E7, E4E and Act 85.
- 3.5.1 Workers with rigger-, erector- or linesman competencies for the handling and erection of structures, steelwork and overhead wires under tensional force.
- 3.5.2 Transnet authorization held (if any) such as Category-C, stating the period of validity, which is 2 years after date of issue.
- 3.5.3 Tenderer shall note the following competency requirements:

3.5.4 A letter of competence for the responsible person(s) in charge of site supervision may be acquired at School of Rail Esselen Park training centre and involves the successful completion of a training module with a written test, presented over two days. It is valid for 2 years.

3.5.5 Transnet authorization Category-C is required of any person who works on electrification equipment near (within 3-m of) "live" equipment. For a worker to qualify for a Category-C authority certificate he requires:

(a) Successful completion of a training module and written test to persons who are qualified riggers, -erectors and -linesmen. The training module is presented over four days.

(b) Certification by an examining officer at the section where the work will be performed

3.5.6 The Tenderer shall allow for the provision of flagmen to warn train drivers of work-teams on the line, one flagman positioned 1.5-km from the work site on all railway lines approaching the work-site. Once-off training will be provided by Transnet Freight Rail free of charge, will require a minimum of 4 working days.

3.5.7 Safety awareness training is required for all workers who will work in the vicinity of the railway line. This is done once off by Transnet Freight Rail free of Charge, and is thereafter the responsibility of the Contractor.

3.5.8 During the execution of the contract, the Contractor will be required to inform the Technical Officer of any staff changes and provide the qualifications of the replacement

4.0 ERECTING OF MASTS

Observe section 208 of Electrical safety Instructions

4.1 Poles may be erected or removed near overhead wires if the distance at which the pole is going to be erected or removed near to exposed "live" equipment is more than the length of the pole plus 3 meters and supervised by responsible person.

4.2 If the distance is less, consult the electrical officer in charge.

5.0 USE OF CRANES, OTHER MACHINES AND EXCAVATION

Observe section 209 of the Electrical Safety Instructions

- 5.1 When work is being undertaken in such a position that is possible for crane, machine, or its load to make contact with exposed “live” overhead wires or other electrical equipment, the electrical officer in charge must be consulted, and he must arrange for an authorised person to supervise the work and to ensure that the crane or machine is adequately earthed.
- 5.2 The electrical officer in charge must also decide whether further safety measures are necessary.
- 5.3 When loads being handled by crane, non-metallic rope hand line must be employed, fixed to such loads to prevent their swinging and making contact with exposed “live” equipment.**
- 5.4 For digging, boring and trenching, the electrical officer in charge must familiarise themselves with the location of buried high voltage cables in their areas of jurisdiction.
- 5.5 Before digging, boring or trenching is performed, consideration must always be given to possible presence of buried high voltage cable and dangers involved in damaging them.
- 5.6 The electrical officer in charge must be consulted to indicate the location of cables and specify the precautions to be taken to prevent incidents.

6.0 INSTALLATION

- 6.1 The contractor shall be responsible for transport to site, off-loading, handling storage and security of material required construction /execution of the works.
- 6.2 Contractor requires permits to travel on Transnet Freight Rail service roads.
- 6.3 Strict observation on speed limits shall be maintained.
- 6.4 Contractor shall provide his own equipment, transport and accommodation for the execution of work.
- 6.5 The contractor shall ensure that his staff is properly trained and qualified to perform the work.

7.0 QUALITY ASSURANCE

- 7.1 The integrity of the sealing shall be kept to a 100% standard. Should Transnet Freight Rail find proof of any mistake, the whole of the completed work will be re-inspected, and rework will be at the cost of the contractor.

8.0 GUARANTEE

- 8.1 The Contractor shall undertake to repair all defects due to bad workmanship and /or faulty materials for a period of one year after acceptance of the completed work.
- 8.2 The Contractor shall undertake to attend to any defects during the guarantee period within two days after notification.

9. SPECIAL CONDITIONS

- 9.1 Material used must be according to Transnet Freight Rail specifications and approved beforehand by the Technical Officer.
- 9.2 The Contractor shall at all times comply with the requirements of specification No. E7/1 when working on, over, under or adjacent to a railway line.
- 9.3 All work methods, tools and equipment shall comply with the requirements of the Occupational, Health and Safety Act, Act No. 85 of 1993.
- 9.4 The contractor shall make his staff available for training in the safety conditions to work near high voltage electrical equipment and railway lines.

10.0 CONTRACTUAL OBLIGATIONS

- 10.1 Over and above the conditions mentioned in the General Conditions of Contract, the Contractor shall also be responsible for the conditions mentioned hereunder.
- 10.2 The Contractor shall not make use of any subcontractor to perform the works or parts thereof without prior permission from the Manager or Technical Officer.
- 10.3 The Contractor shall ensure that a responsible person is on site at all times. All safety measures prescribed by Transnet Freight Rail – Electrical Safety Instructions and the “Occupational Health and Safety Act 1993 (Act 85 of 1993)” associated with working on a project of this nature shall be adhered to.
- 10.4 The contractor shall ensure that his staff is properly trained and qualified to perform the work and they are aware of all relevant safety regulations that should be adhered to.
- 10.5 The Contractor shall supply a site diary (with triplicate pages). This book shall be used to record any unusual events during the period of the work. Any delays to the work shall also be recorded such as delays caused by poor weather conditions, delays caused by permits being cancelled etc. The appointed Manager or Technical Officer must countersign such delays. Other delays such as non-availability of equipment from 3rd party suppliers must be communicated to the Manager or Technical Officer in writing.
- 10.6 The Contractor shall supply a site instruction book (with triplicate pages). This book shall be used to record any instructions to the Contractor regarding problems encountered on site – for example the quality of work or the placement of equipment. This book shall be filled in by the Manager or Technical Officer and must be countersigned by the Contractor.
- 10.7 Both books mentioned in 8.5 and 8.6 shall be the property of Transnet Freight Rail and shall be handed over to the Manager or Technical Officer on the day of handing over.
- 10.8 A penalty charge will be 0.15% per day of the total value of the contract.
- 10.9 A 10% retention money will be paid a year after the completion date of the contract.
- 10.10 The Contractor shall supply all material as stipulated in the contract.

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Appendix 1

LION - ACSR 30/7/3, 16					wt = 1.093 kg/m						
Temperature (°C)	Tension (N)	Tension (kg)	Span (mm) for Span Lengths (m)			Temperature (°C)	Tension (N)	Tension (kg)	Span (mm) for Span Lengths (m)		
			160	140	120				100	80	
0	3,510	3,212	1,090	835	619	125	270	280	290	300	
2	30,730	3,133	1,415	865	638	135	280	290	300	310	
4	29,960	3,094	1,145	876	648	145	285	295	305	315	
6	29,190	3,076	1,175	900	660	155	295	305	315	325	
8	28,430	2,998	1,205	925	683	165	300	310	320	330	
10	27,680	2,922	1,240	950	705	175	305	315	325	335	
12	26,940	2,746	1,275	975	725	185	310	320	330	340	
14	26,220	2,673	1,310	1,000	745	195	320	330	340	350	
16	25,500	2,599	1,345	1,025	765	205	325	335	345	355	
18	24,800	2,524	1,385	1,050	780	215	335	345	355	365	
20	24,110	2,456	1,425	1,080	800	225	345	355	365	375	
22	23,430	2,386	1,465	1,120	825	235	355	365	375	385	
24	22,770	2,321	1,505	1,165	850	245	365	375	385	395	
26	22,130	2,256	1,550	1,185	870	255	375	385	395	405	
28	21,500	2,192	1,595	1,220	900	265	390	405	415	425	
30	20,880	2,128	1,645	1,260	925	275	405	415	425	435	
32	20,290	2,068	1,690	1,295	950	285	415	425	435	445	
34	19,710	1,992	1,740	1,295	980	295	425	435	445	455	
36	19,150	1,922	1,790	1,335	1,010	305	435	445	455	465	
38	18,610	1,897	1,845	1,370	1,010	315	445	455	465	475	
40	18,090	1,844	1,895	1,410	1,035	325	450	460	470	480	
42	17,580	1,792	1,950	1,450	1,085	335	455	465	475	485	
44	17,100	1,743	2,005	1,495	1,100	345	460	470	480	490	
46	16,630	1,693	2,065	1,535	1,130	350	465	475	485	495	
48	16,180	1,649	2,120	1,580	1,160	355	470	480	490	500	
50	15,750	1,606	2,180	1,625	1,195	360	475	485	495	505	

TIGER / ACSR 30/7/2, 36					wt = 0.605 kg/m						
Temperature (°C)	Tension (N)	Tension (kg)	Span (mm) for Span Lengths (m)			Temperature (°C)	Tension (N)	Tension (kg)	Span (mm) for Span Lengths (m)		
			160	140	120				100	80	
0	18,200	1,858	1,045	800	585	145	260	270	280	290	
2	17,720	1,810	1,070	820	600	155	265	275	285	295	
4	17,330	1,767	1,095	840	615	165	270	280	290	300	
6	16,900	1,723	1,125	860	630	175	275	285	295	305	
8	16,470	1,679	1,155	885	650	185	280	290	300	310	
10	16,060	1,636	1,185	905	665	195	285	295	305	315	
12	15,640	1,594	1,215	930	685	205	290	300	310	320	
14	15,230	1,552	1,245	955	700	215	295	305	315	325	
16	14,820	1,511	1,280	980	720	225	300	310	320	330	
18	14,420	1,470	1,315	1,010	740	235	305	315	325	335	
20	14,030	1,430	1,350	1,035	760	245	310	320	330	340	
22	13,650	1,391	1,385	1,065	785	255	315	325	335	345	
24	13,270	1,353	1,420	1,095	805	265	320	330	340	350	
26	12,900	1,315	1,450	1,125	830	275	325	335	345	355	
28	12,530	1,277	1,470	1,155	855	285	330	340	350	360	
30	12,180	1,242	1,500	1,195	875	295	335	345	355	365	
32	11,840	1,207	1,525	1,230	900	305	340	350	360	370	
34	11,500	1,172	1,550	1,265	925	315	345	355	365	375	
36	11,170	1,139	1,575	1,300	955	325	350	360	370	380	
38	10,860	1,107	1,600	1,340	985	335	355	365	375	385	
40	10,550	1,075	1,625	1,380	1,015	345	360	370	380	390	
42	10,250	1,045	1,650	1,420	1,045	355	365	375	385	395	
44	9,970	1,016	1,675	1,460	1,075	365	370	380	390	400	
46	9,720	988	1,690	1,500	1,100	375	375	385	395	405	
48	9,420	960	1,705	1,545	1,135	385	380	390	400	410	
50	9,170	935	1,720	1,595	1,165	395	385	395	405	415	

NOTE:

- 1 Rating Span (Equivalent Span) = 140m
- 2 Maximum Conductor Tension @ -5°C = 33.33% UTS
- 3 Values for intermediate temperatures and span lengths to be interpolated

FOR CONSTRUCTION
2010-07-20
NOTES

DRAWING NO		REFERENCE		EPC/CONSULTANT: HMG JV		ORIGINATOR: HMG JV		PROJECT NO. - DV - FBS - DIS - TYPE - DRGNO - SHT - REV - ID	
NO		DESCRIPTION		Title		Name		Date	
REVISIONS / ISSUE AUTHORIZATION		BY / CHK / APP / DATE		Title		Name		Date	
0		Issue for construction		Eng Coord		G. Lauer		12/12/10	
				Eng Mgr		S. Hill		12/12/10	
				Area Mgr		T. Seming		12/12/10	
				Div / Title		G. Lauer		12/12/10	
				Name		K. Yarron		12/12/10	
				Signature		I. Spahn		12/12/10	
				Date		PR. ENG. / PR. TECH.			
				Name		G. Lauer		12/12/10	
				Signature					
				Req No		17030		12/12/10	
				Sched		N/S		AS	
				Title		Name		Date	
				Checked		S. Hill		12/12/10	
				Eng Coord		T. Seming		12/12/10	
				Discp Eng		G. Lauer		12/12/10	
				Eng Mgr		T. Seming		12/12/10	
				Area Mgr		K. Yarron		12/12/10	
				Div / Title		I. Spahn		12/12/10	
				Name		G. Lauer		12/12/10	
				Signature					
				Req No		17030		12/12/10	
				Sched		N/S		AS	

ORE LINE RAIL EXPANSION PROJECT PHASE 1A
SISHEN SALDANHA FEEDER LINE (TFR)
50kV AC OHTE SYSTEM

SAG-TENSION TABLE 01: INLAND / 140M / 33.33% UTS
PROJECT NO. - DV - FBS - DIS - TYPE - DRGNO - SHT - REV - ID
H500110 - 3 - 760 - S - SC - 0042 - 01 - 0 - JV

“PREVIEW COPY ONLY”

Appendix 2

COCKROACH - AAC 19/4,22

wt = 0.729 kg/m

Temperature (°C)	Tension (N)	Tension (kg)	Sag (mm) for Span Lengths (m)		
			160	140	120
0	12,870	1,312	1,360	1,000	595
2	12,390	1,253	1,345	1,040	445
4	11,830	1,216	1,470	1,080	460
5	11,500	1,172	1,525	1,120	480
8	11,090	1,129	1,580	1,160	485
10	10,700	1,081	1,635	1,205	515
12	10,330	1,053	1,695	1,245	535
14	9,990	1,018	1,755	1,290	555
16	9,660	985	1,815	1,335	575
18	9,360	954	1,870	1,375	590
20	9,070	925	1,930	1,420	610
22	8,800	897	1,990	1,465	630
24	8,550	872	2,050	1,505	650
26	8,310	847	2,110	1,550	670
28	8,090	825	2,165	1,590	690
30	7,870	802	2,210	1,635	705
32	7,680	783	2,255	1,675	725
34	7,490	764	2,280	1,720	745
36	7,310	745	2,340	1,760	765
38	7,140	726	2,395	1,805	785
40	6,990	713	2,455	1,840	800
42	6,840	697	2,500	1,880	820
44	6,690	682	2,560	1,925	835
46	6,560	669	2,620	1,960	850
48	6,430	655	2,725	2,000	870
50	6,310	643	2,775	2,040	890

HORNET - AAC 19/3,25

wt = 0.433 kg/m

Temperature (°C)	Tension (N)	Tension (kg)	Sag (mm) for Span Lengths (m)		
			160	140	120
0	7,090	723	1,915	1,470	750
2	6,840	697	1,985	1,520	480
4	6,600	673	2,060	1,575	775
5	6,370	649	2,135	1,635	805
8	6,160	628	2,205	1,690	535
10	5,960	608	2,280	1,745	550
12	5,770	588	2,355	1,805	890
14	5,590	570	2,430	1,865	920
16	5,420	552	2,510	1,920	950
18	5,260	536	2,585	1,980	980
20	5,110	521	2,660	2,035	645
22	4,970	507	2,735	2,095	665
24	4,830	492	2,815	2,155	685
26	4,710	480	2,895	2,210	705
28	4,590	468	2,960	2,265	720
29	4,480	457	3,035	2,325	740
32	4,370	445	3,110	2,380	760
34	4,270	435	3,185	2,435	795
36	4,180	426	3,250	2,490	815
38	4,090	417	3,325	2,545	836
40	4,000	408	3,400	2,600	850
42	3,920	400	3,470	2,655	865
44	3,850	392	3,530	2,705	885
46	3,770	384	3,605	2,760	900
48	3,700	377	3,675	2,815	920
50	3,640	371	3,735	2,860	935

NOTE:

- 1 Ruling Span (Equivalent Span) = 140m
- 2 Maximum Conductor Tension @ -5°C = 33.33% UTS
- 3 Values for Intermediate temperatures and span lengths to be interpolated

MASTER
2009-09-24

FOR CONSTRUCTION
2009-08-25

EPICM CONSULTANT: HANG JV

ORIGINATOR: HANG JV

TRANSNET

Ring No	Reference Drawings	Div / Title	Name	Signature	Date
1	REFERENCE	Div / Title	Name	Signature	Date
2	REFERENCE	Div / Title	Name	Signature	Date
3	REFERENCE	Div / Title	Name	Signature	Date
4	REFERENCE	Div / Title	Name	Signature	Date
5	REFERENCE	Div / Title	Name	Signature	Date
6	REFERENCE	Div / Title	Name	Signature	Date
7	REFERENCE	Div / Title	Name	Signature	Date
8	REFERENCE	Div / Title	Name	Signature	Date
9	REFERENCE	Div / Title	Name	Signature	Date
10	REFERENCE	Div / Title	Name	Signature	Date

Issue for construction	By	CHK	APP	DATE
1	HANG JV			20/1/10
2	HANG JV			20/1/10

REVISIONS / ISSUE AUTHORISATION	By	CHK	APP	DATE
1	HANG JV			20/1/10
2	HANG JV			20/1/10

ORE LINE RAIL EXPANSION PROJECT PHASE 1A

SISHEN SALDANHA FEEDER LINE (TFR)

50kV AC OHTE SYSTEM

SAG-TENSION TABLE - 11-COASTAL / 140M / 93.99% UTS
PROJECT NO - DV - FBS - DIS - TYPE - DRG NO - SHT - REV - ID
H500110 - 3 - 760 - S - SC - 0042 - 11 - 0 - JV

“PREVIEW COPY ONLY”

Appendix 3

Sag and Tension Chart					
Span (m)	Temperature (°C)	Stringing tension (N)	Stringing sag (m)	Final tension (N)	Final sag (m)
EDT =	5701				
Limit = 3	l = -5 F = -5	11240.11 (700 PA)	1.22	* 10399.33 (700 PA)	1.32
160	-5	8891	1.54	7579.82	1.81
160	5	7721.72	1.77	6527.83	2.1
160	15	6730.94	2.03	5701	2.4
160	25	5918.26	2.31	5058.4	2.7
160	35	5284.65	2.6	4556.35	3
160	45	4741.87	2.88	4158.42	3.29
160	55	4321.57	3.16	3837.33	3.56
160	65	3979.83	3.44	3573.5	3.83
160	75	3698.08	3.7	3353.04	4.08
160	85	3462.44	3.95	3166	4.32
EDT =	5686				
Limit = 3	l = -5 F = -5	11164.42 (700 PA)	1.39	* 10400.19 (700 PA)	1.49
170	-5	8597.22	1.8	7397.03	2.09
170	5	7516.61	2.06	6440.25	2.4
170	15	6609.98	2.34	5686.01	2.72
170	25	5868.12	2.63	5093.79	3.03
170	35	5268.55	2.93	4624.89	3.34
170	45	4784.34	3.23	4248.15	3.63
170	55	4390.46	3.52	3940.32	3.92
170	65	4066.38	3.79	3684.81	4.19
170	75	3796.21	4.06	3488.91	4.45
170	85	3568.01	4.32	3284.44	4.7

Pole Foundations

1) 12m Poles 13.3 kN Tip Loads (For inland regions using ACSR Lion conductor)

Max Spacing of poles 160m, planting depth 2.2m.

Soil Type	Planting depth	Size of Foundation
Rock and Soft Rock	2200mm	0.5m
Soft Rock	2200mm	0.5m
Very Dense Sand 370 kpa	2200mm	0.9m
Dense Sand 180 kpa	2200mm	1.7m
Medium Dense Sand 70 kpa	2200mm	See note 3
Loose Sand 11 kpa	2200mm	See note 3
Very Loose Sand 9 kpa	2200mm	See note 3

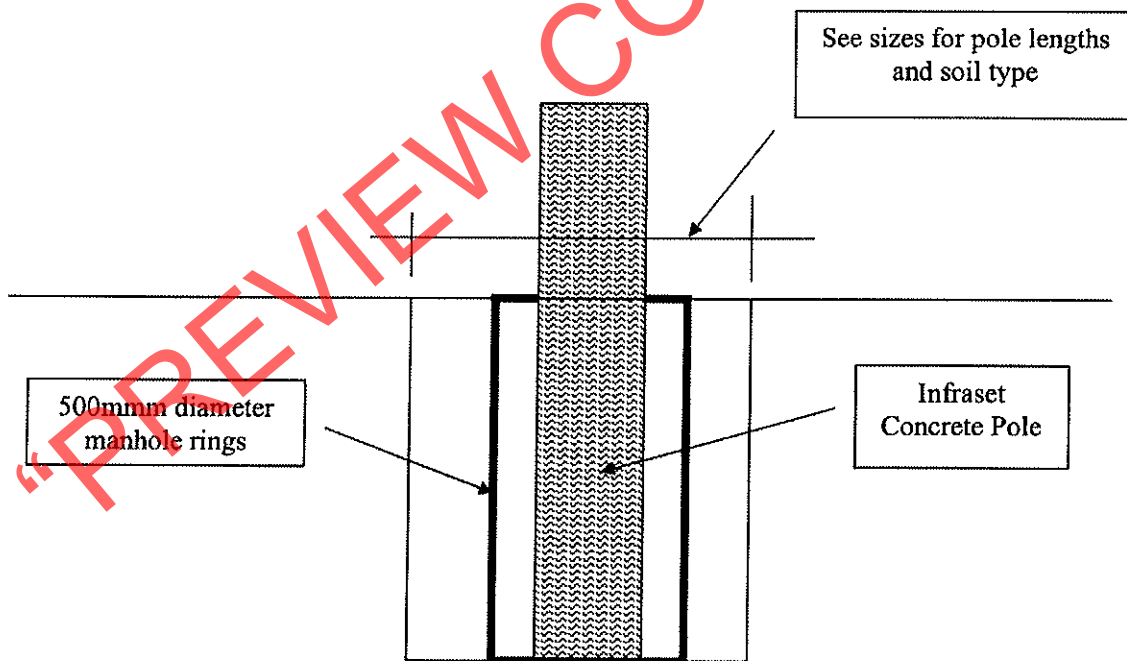
2) **13m Poles 13.3 kN tip loads** (For coastal regions using AAAC cockroach conductor)

Max spacing of poles 160m, planting depth 2.2m

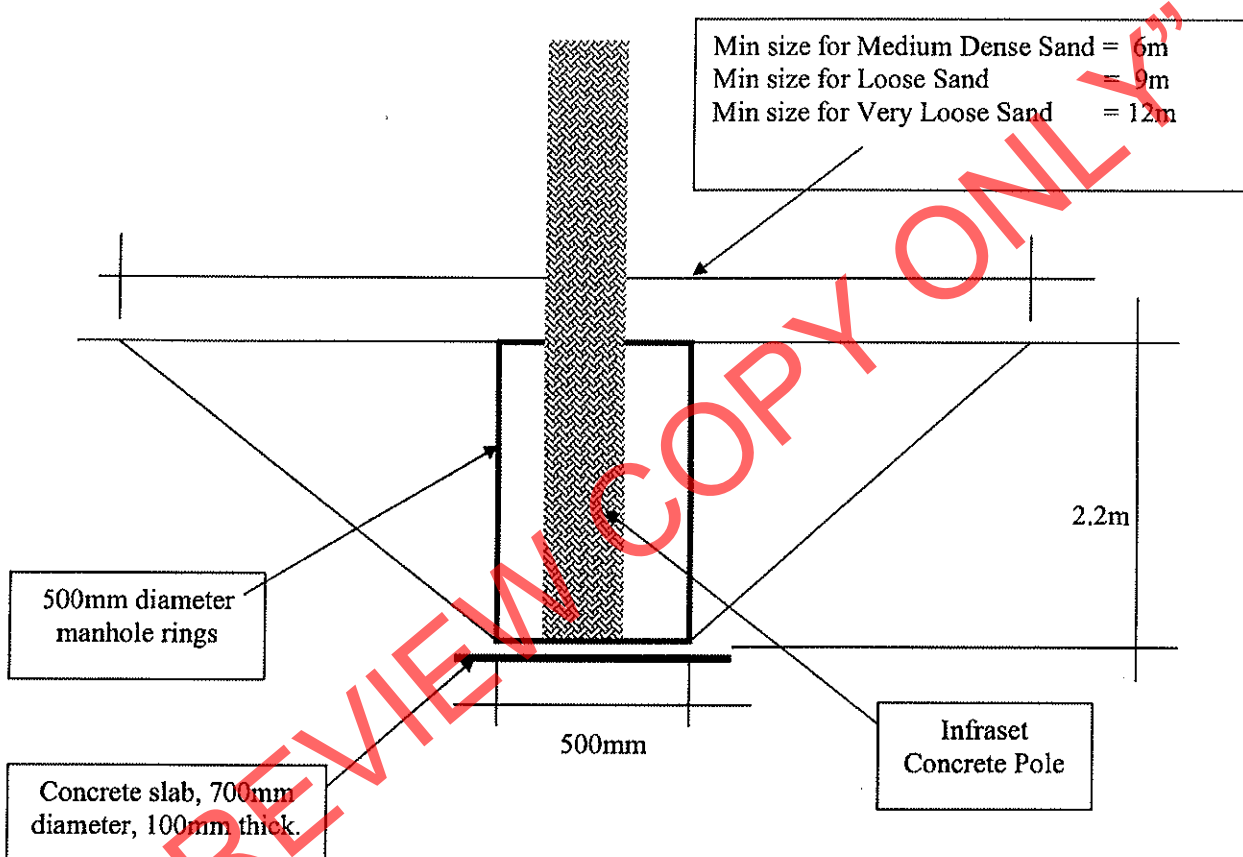
Soil Type		Planting depth	Size of Foundation (diameter)
Rock and Soft Rock		2200mm	0.5m
Soft Rock		2200mm	0.5m
Very Dense Sand	370 kpa	2200mm	1.0m
Dense Sand	180 kpa	2200mm	1.8m
Medium Dense Sand	70 kpa	2200mm	See Note 3
Loose Sand	11 kpa	2200mm	See Note 3
Very Loose Sand	9 kpa	2200mm	See Note 3

Notes for Pole Foundations

- 1) All poles to be planted in 500mm diameter concrete rings
- 2) For the soils Medium Dense Sand, Loose Sand and Very Loose Sand, a 15 Mpa concrete slab 700mm diameter to be cast as a foundation to the manhole rings with a steel mesh ref 245 placed in the middle of the slab.
- 3) For Very dense soils and dense soils the concrete rings are to be planted in the excavated soil area and the soil excavated is to be used to compact around the manhole rings. The soil is to be moistened and compacted in 150mm layers with a mechanical plate compactor until no further settlement occurs, once compacted the next 150mm layer of excavated soil is to be added and compacted, this to continue until ground level.



- 4) For Medium Dense Sand, Loose Sand and Very Loose Sand, the pole is to be planted in the excavated area, no shoring is to be used in the excavation to ensure the excavated hole is large enough. An import soil that is similar or better to a G4 material is to be used to compact around the manhole rings. This G4 material is to be moistened and compacted in 150mm layers with a mechanical plate compactor until no further settlement occurs, once compacted the next 150mm layer of excavated soil is to be added and compacted, this to continue until ground level.

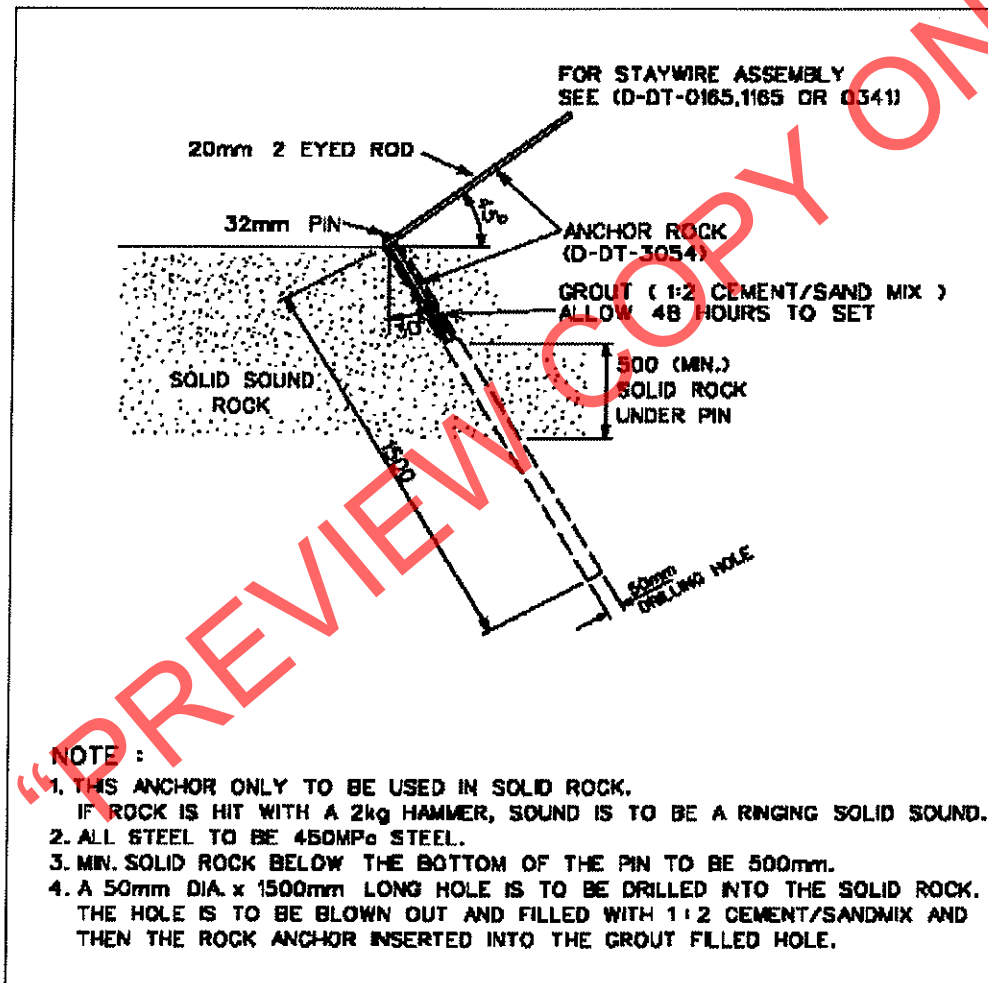


- 5) Where Clay is encountered, note 3 to be used and the minimum size of the foundation at groundline is to be 7m.
- 6) Once the manhole rings are planted and soil is compacted around the manhole rings the concrete pole is to be planted in the manhole rings and a 15Mpa concrete is to be poured around the concrete pole inside the manhole rings, the concrete pole is not to be tensioned on before 7 days after pouring the concrete.

Stay Foundations

Soil Type		Planting depth	Size of Foundation
Rock		2200mm	Rock anchor
Soft Rock		2200mm	2.0 m deep x 0.6m x 0.6m
Very Dense Sand	370 kpa	2200mm	2.0m deep x 1.5m x 1.5m
Dense Sand	180 kpa	2200mm	2.0m deep x 1.8m x 1.8m
Medium Dense Sand	70 kpa	2200mm	3.0m deep x 2.8m x 2.8m
Loose Sand	11 kpa	2200mm	3.0m deep x 3.2m x 3.2m
Very Loose Sand	9 kpa	2200mm </td <td>3.0m deep x 3.6m x 3.6m</td>	3.0m deep x 3.6m x 3.6m

1) For Rock a rock anchor to be used:



2) All other stays are to be excavated to the required size, the stay plate to be placed at the bottom of the hole, a suitable soil similar to a very dense or dense soil that is compactable is to be used for compaction, the soil is to be moistened and then placed in 150mm layers and compacted with a mechanical plate compactor until no further settlement occurs, then another 150mm layer is to be placed and compacted, this to continue until the ground level.

- 3) Where Medium Dense Sand, Loose Sand and Very Loose Sand is encountered, a G4 material is to be imported and used as compaction material for the stay
- 4) Stay rods for Very dense soils and dense soils are to be 24mm diameter and 2.4m long being a minimum of 300Mpa steel, Stay plates to be a minimum size of 600 x 600mm x 6mm thick. The stay rod assembly is to be hot dipped galvanised to the required SANS standard and thickness.
- 5) Stay rods for Medium Dense Sand, Loose Sand and Very Loose Sand is to be 3.0m long being a minimum of 300Mpa steel, Stay plated to be a minimum size of 600 x 600mm x 6mm thick. The stay rod assembly is to be hot dipped galvanised to the required SANS standard and thickness.
- 6) Where clay is encountered the size of the stay hole is to be doubled and compactable soil is to be imported that is of a quality of very dense soils and dense soils and compacted as per number 2.
- 7) The stay rod must be planted at 45° and may not be bent, the stay rod eye may not protrude more than 150mm above the ground line.
- 8) Stay wire to be 19x2.65 1100Mpa steel wire or equivalent. (115kN)

Stay Requirements

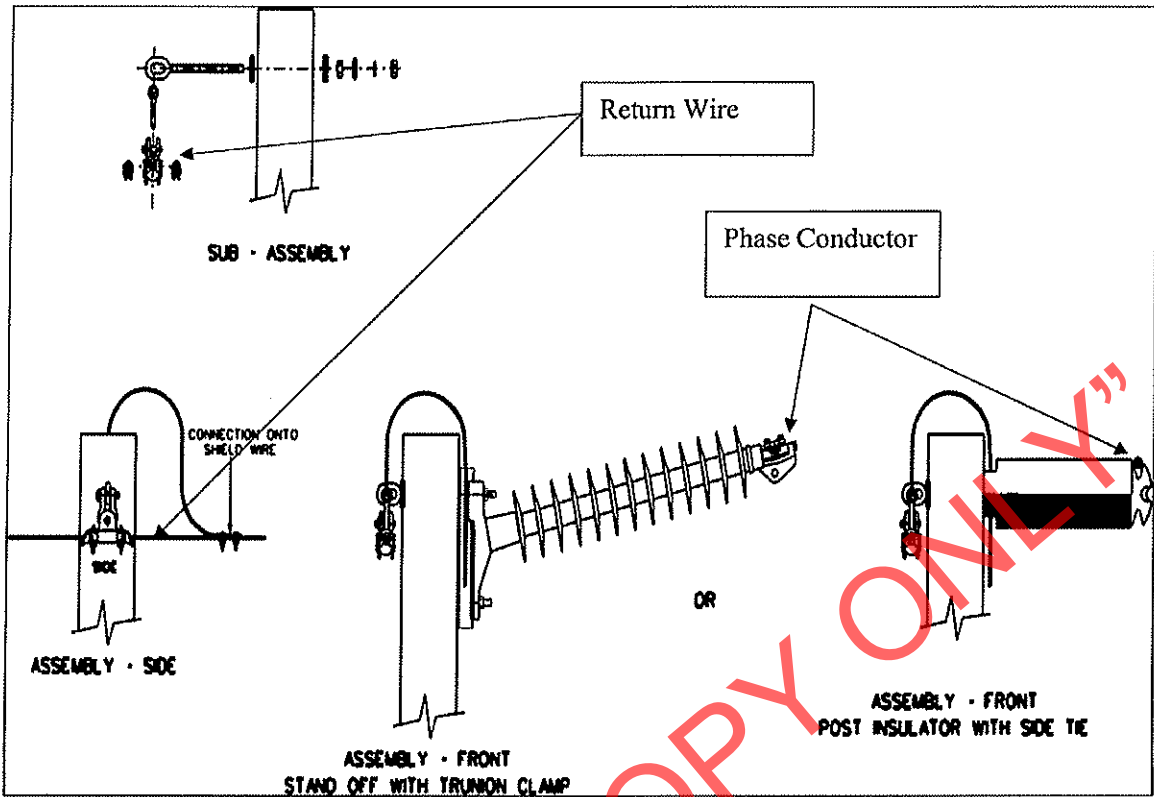
Deviation angle	Number of Stays
0-10 degrees	One stay
11-20 degrees	One Stay
21- 30degrees	Two Stays
31- 45degrees	Two Stays
46- 60degrees	Three Stays

Note for Stays

- 1) Where more than 1 stays are required, the stays to be splayed apart and not to be closer than 2.0m apart.
- 2) Stays to be placed in the bisector of the angle.
- 3) Construction stays may be required during stringing, these stays to be the same size as specified above, they may remain or be removed once the conductor is tensioned correctly, if the construction stays are removed the conductor tension either side of the pole must be the same.

Notes on Insulators

- 1) The final configuration of the Return wire and bonding to the insulator bolt to be determined by the client and their requirement.
- 2) The minimum cantilever load of the stand off and post insulator is to be 5.5kN.
- 3) If a stand off insulator is used the conductor is fixed by a trunion clamp, if a post insulator is used the conductor to be attached by a top tie for the relevant conductor size.
- 4) For coastal regions the insulation level to be 31kv/mm, on inland regions the insulation level to be 20kv/mm
- 5) The stand off insulator can be purchased from Eberhardt Martin tell 082 255 0853 (Roger Martin)
- 6) The post insulator and side tie can be purchased from Tyco Electronics, 078 451 3506 (David Bavin)



Regards

signed

BP Hill Pr Eng (900 250)

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ANNEXURE B

SUBSTANCE ABUSE TESTING

The OHSA (Act 85 of 1993) clearly states in the Safety Regulations 2A **“INTOXICATION”** An employer or user, as the case may be, shall not permit any person who appears to be under the influence of intoxicating liquor or drugs, to enter or remain at a workplace. Transnet Freight Rail enforces this legislation by means of its Substance Abuse Policy, and therefore reserves the right to do substance abuse testing on anyone who enters their premises.

Substance abuse testing

“PREVIEW COPY ONLY”