

52ST.305



TENDER FORM

The Chairman – Tender Opening Committee

PNG Power Ltd

P. O. Box 1105

BOROKO 111 NCD

Papua New Guinea

Phone: (675) 324 3381

Fax: (675) 3250791

Email: supplyhelpdesk@pngpower.com.pg

We (*ill name of company).....

.....

.....

.....

hereby tender for the undermentioned goods and services subject to the conditions of tendering and at the prices quoted in the scheduled therein

TENDER No. 09/2019

CLOSING AT 4.00 PM FRIDAY 08TH MARCH 2019

FOR
**FOR THE SUPPLY & CONSTRUCTION OF
REINFORCED CONCRETE WALL STORM WATER
DRAINAGE & BACKFILL WITH SELECTED
MATERIALS TO TOWER 57 OF LINE 536 LOCATED
AT 6MILE SARAGA, PORT MORESBY.**



TOWER:60 of line 536 basement or foundation protection specs: 01019

File: 003

CIVIL WORKS SPECIFICATIONS

TECHNICAL REQUIREMENTS

PURPOSE: DESIGN & CONSTRUCTION OF REINFORCED CONCRETE RETAINING WALL, DRAINAGE & BACKFILLMENT TO TOWER NO. 57 OF LINE 536.

LOCATION: AT 6MILE SARAGA,ALONG THE BACKROAD LEADING TO BAUTAMA FROM SIX MILE, PORT MORESBY, NCD

FOR: TOWER PROTETION PROJECT - PNG POWER LIMITED

22/ January/2019

1. SCOPE OF SUPPLY

This work shall consist of design, assembling, and construction of reinforced concrete retaining wall, drainage works, earth works and backfill with selected materials with recommended compaction along the tower base. Onsite Supervision by an engineer from PPL Civil Team including other necessary drawings and specifications such as Department of Works (DOW) Specifications of Roads & Bridges are part of this SOW

2. PURPOSE OF THE WORKS

Due to heavy rainfall experienced, the basement and the foundation of the tower is severely threatened by erosion and slip at the bottom which is resulting in foundation failures and subsequently the tower will collapse. Therefore, the reinforced concrete retaining wall and drainage with backfill will protect further erosion and prevent tower from falling.

3. LOCATION

The tower is located at 6 Mile Saraga, Outside of Port Moresby which carries line 653 from Rouna to 6 mile Substation, Port Moresby, National Capital District.

4. SCHEDULE & PRELIMINARIES

4.1 GENERAL

The contractor shall carry out the works as detailed in the drawing and or inferred in this specification.

4.2 DESCRIPTION OF WORKS.

The works specified in this specification shall consist of construction of Reinforced Concrete retaining wall to tower 60 of line 536. In brief works shall consist of the following but not limited to:

- Mobilization & Demobilization of plants, equipment and workmen to site
- Site development including leveling, filling & compacting of tower foundation area about 20m away from the desired height.

4.7. TRANSPORT TO SITE

The Contractor is responsible for the transport of all materials and manpower to and from site.

4.8. DURATION OF THE PROJECT

All required works shall be completed in eight (8) weeks from the date of Possession of Site given in the Letter of Acceptance.

4.9. TERMS OF PAYMENT

As specified in point 7 of this specification.

4.10. POSSESSION OF SITE

The date of Possession of Site will be stated in the Letter of Acceptance. The Contractor shall be given such possession of site as is considered necessary to carry out these works but such possession shall not be deemed to mean exclusive possession.

5. CONSTRUCTION DETAILS

5.1. FOUNDATION PREPRATION

The foundation on which the reinforced concrete Retaining Wall are to be constructed shall be cut or filled and graded to the lines and grades shown on the drawings or as directed by the supervising engineer. Surface irregularities, loose materials, vegetation and all foreign matter shall be excavated and be removed from foundation surface area. When fill is required, it shall consist of materials conforming to the specified requirements. Retaining wall shall not be constructed until the foundation preparation is completed and the sub-grade surfaces have been inspected and approved by the engineer's representative or site engineer.

5.2. COMPLIANCE WITH STANDARDS

All works specify under this specification shall conform to the following standards:

- a) Department of Works (DoW) Specification for Road and Bridge Works – 1995
- b) AS/NZS 4671:2001. Steel Reinforcing Materials
- c) AS3600:2001. Concrete Structures
- d) AS 1554, Part 3: 2002. Structural Steel Welding – Welding of Reinforcing Steel

6. TOOLS AND EQUIPMENT

All tools and equipment that will be used shall not be limited to the following:

- a) Excavator
- b) 10 cu.m/6 cu.m/ 4cu.m/2 cu.m dump truck(s)
- c) Walker Packer
- d) And all other necessary tools for the construction of works specified in this specification must be made available for the satisfactory completion of works.

7. TERMS AND CONDITIONS

7.1. SUPPLY AND DELIVERY

A suitable Dispatch schedule will be confirmed with PNG Power before Confirmation of Order.

For budget purposes please allow approximately **20 – 24 Working Weeks Ex-Works**, from *receipt of confirmed, fixed and final, specifications*. Should this quoted delivery period be not satisfactory, please do not hesitate to contact us for our further consideration.

Delivery estimate is made in good faith with regard to the current manufacturing programs and reasonable assumption on your

requirements. Slight variations to these estimates may occur over the period leading up to your order, but will be confirmed within 4 weeks of your order as to the exact delivery expectation.

7.2. PAYMENTS

Subject to negotiation however our preferred method of payment would be by means of a confirmed irrevocable letter of credit (C/LC), to be established at the time of order from a vendor approved banking facility and shall allow for the following progress payments:

- 25% Down payment with your mobilization invoice and set up.
- 25% Payment for submission of drawings and confirmation of items as per scoped and foundation works.
- 40% Completion of construction of the Protection works & retaining wall to the tower foundation.
- 10% Final payment completion and commissioning and demobilization.

7.3. WARRANTY PERIOD

The foundation offers a defects liability period of 12 months from delivery from commissioning whichever is earlier. The mandatory defects liability period shall be the basis for payments and releases of securities.

CONTACT PERSONS

Forward your requests regarding clarification and or additional information should be directed to;

Mr. Jonah Kinta on Email: jkinta@pngpower.com.pg
Mr. Luke Malemba on Email: lmalemba@pngpower.com.pg

SUPPLY/TENDER

Supplier to submit Quote to:

Tenders Committee

PNG Power Ltd

P.O. Box 1105 BOROKO, NCD, Papua New Guinea

Email: supplyhelpdesk@pngpower.com.pg

Submission of quote/tenders shall be one (1) week. Quotations received after the closing date will not be considered.



PROTECTION OF TOWER FOOTINGS SCOPE

1.0 GENERAL:

- 1.1 Special measures for protection of foundations shall be taken in respect of location its location close to the road. Protection of foundations is also to be provided in the case of foundations located on the sloping ground or road or hills.
- 1.2 The above is to be done, based on site conditions, by employing any or a combination of the following three methods which are best suited for the site conditions.
- a) Benching.
 - b) Protection against cutting of soil by flow of rain water and road.
 - c) Rivetment

Note: A drawing showing the typical use of benching and revetment for protection of tower footings is given at Appendix – A.

2.0 BENCHING:

- 2.1 This method is generally used if the soil is gently sloping and there is no significant difference in the levels of the soil around the foundation. The soil at the higher level is cut and spread in the lower level so that the soil near the foundation becomes level.

3.0 PROTECTION AGAINST CUTTING OF SOIL BY FLOW OF WATER:

- 3.1 This method is generally used where the tower foundation is located at a distance from the edge of river / nalla, etc. The foundation is protected by providing suitable crate of galvanized wire netting and meshing packed with boulders.

4.0 RIVETMENT:

- 4.1 This method is generally used where the ground surface is irregular or where there is significant difference in the levels of soil around the tower foundation. The rivetment protection is provided in the form of stone masonry walls around those sides of the foundation where such protection is required.
- 4.2 Depending on the site conditions, the following are to be decided:
- a) The side or sides on which the rivetment is to be provided.
 - b) Height of the masonry wall.
 - c) Length of the masonry wall.
- 4.3 The rivetment is got constructed generally as given in the typical drawing enclosed at Appendix – B. This drawing also shows a cross section of the

masonry wall for the rivetment. The drawing is applicable only for a height of masonry wall not exceeding 5 metres.

4.4 The stone masonry wall is constructed at a distance from the tower legs which corresponds to the angle of repose of the soil. The stone masonry is constructed with 1:5 cement mortar. The size of stones used for masonry work shall be $300 \times 150 \times 150$ mm or below. The dimensions are calculated as given in the drawing. 4.5

4.5 A base of height 200 mm is first provided. The remaining part of the masonry wall is constructed on this base to a height of 75 mm above the ground level at the center of the tower. The width of the masonry wall at the top is 600 mm. Coping of height 75 mm is provided on the top of the masonry wall with M – 15 concrete (1:2:4 nominal mix). 130 Construction Manual for Transmission Lines .

4.6 Weep holes, staggered horizontally and vertically, for draining of water from inside the rivetment are provided in the masonry at every 2 metres interval. These are generally in the form of 100 mm dia. A. C. pipes. These are given a fall of 1 in 8 from the back to the face of the masonry. The top most weep hole is at a minimum distance of 300 mm below the top. The lowest weep hole shall be 300 mm above the ground outside the masonry wall. A stone packing of size $1000 \times 1000 \times 1000$ mm using river shingles or stones of size 75 mm to 150 mm is provided inside the masonry wall at the opening of each weep hole.

4.7 The inside of the rivetment is filled with earth upto the reference ground level. The earth is rammed to compaction in layers of 150 mm.

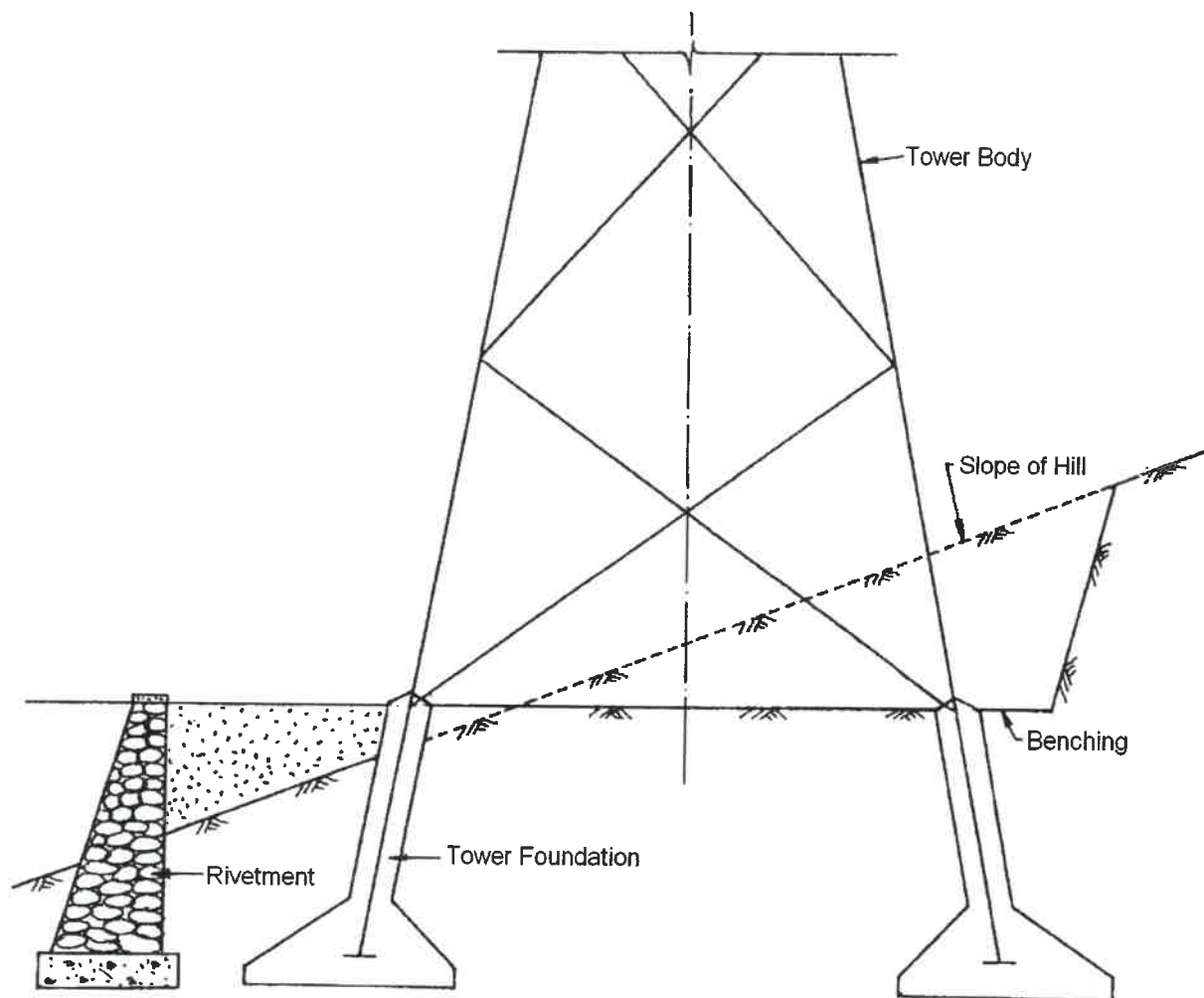
4.8 The pointing of the face of the stone masonry wall is done using 1:6 cement mortar.

Protection of Tower Footings 131

APPENDIX – A

132 Construction Manual for Transmission Lines

APPENDIX – B



ELEVATION

Typical Use of Benching and Rivetment for Protection of Tower Footing

CAD Filename	Rev	Revision	By	Out	Date	Drawn	Q. DLE	Location
C:\PWA\PNG\COREL SUB						Designed	Q. DLE	TDR
Date Drawn: DECEMBER, 2015						Checked	H. MORELA	A2
Date Placed: DECEMBER, 2015						Estimated	Y. PLANAMJE	Number
Scale: AS SHOWN						Approved	D. BATHA	Revision



PNG POWER Ltd

PO Box 1185 BOKIRO NCD Papua New Guinea

Telephone: (675) 324 3205

Facsimile: (675) 325 0185

E-mail: pngpower@pngpower.com.pg



PNG POWER Ltd

Report for Tower Foundation For
Towers 57,59 & 60 of line 536
Located at 6mile, Saraga Port
Moresby, NCD.



CIVIL TEAM, TRANSMISSION &
DISTRIBUTION



Complied by : Jonah Kinta

Civil Specialist Engineer

16th of January, 2019

TABLE OF CONTENT

Contents

TABLE OF CONTENT	1
1. INTRODUCTION.....	2
2. CONDITION OF EACH TOWER.....	2
3. SUMMARY TABULATED	5
4. ECONOMIC JUSTIFICATION	5
5. CONCLUTION & REMARKS	5

1. INTRODUCTION

The purpose of this report is to show the conditions of Towers 58,59 & 60 of Line **536** which carries 66kv from the Rouna To Boroko Substation after the massive rainfall which Port Moresby has ever experienced days after the new year of 2019.

These towers pass through the ATS back road to 6mile Saraga area. However, due to the massive rainfall has affected the foundations of these 3x towers along the chain as they sit right on a newly excavated or open cut road recently constructed which leads from Saraga to Boutama . The site visit was conducted by Civil Specialist Jonah Kinta and Graduate Engineer, Janson Wakma on the 12/01/2019.

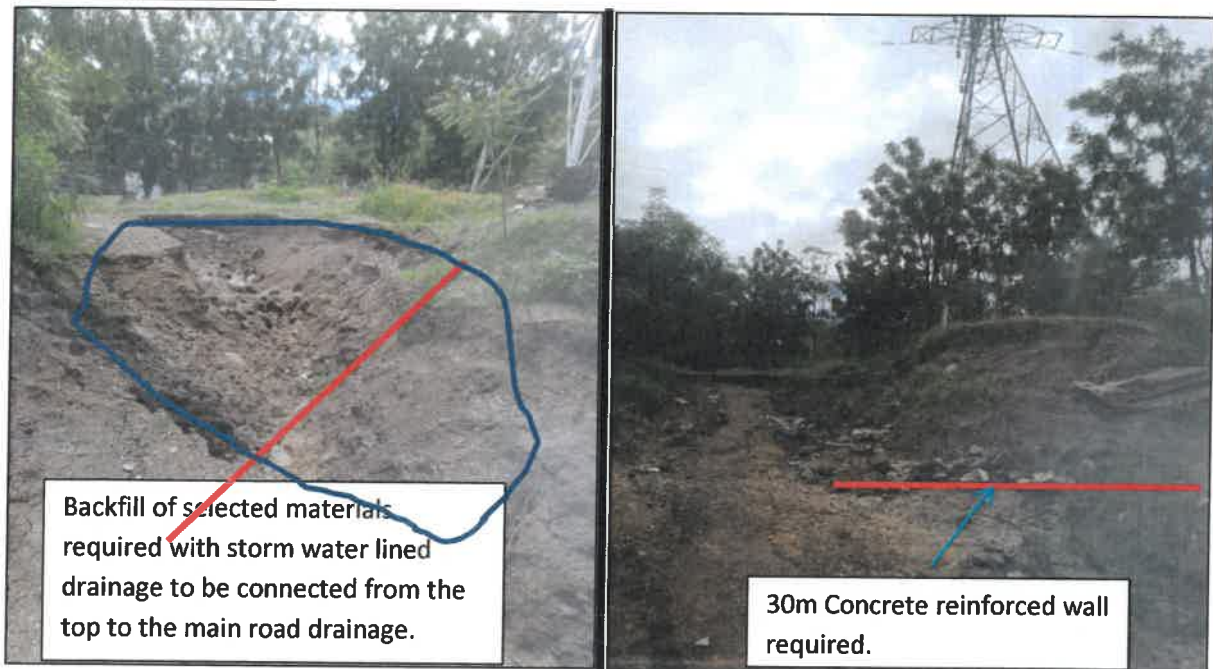
2. CONDITION OF EACH TOWER

I. Tower 57 of Line 536

Location: 6mile Saraga

Current Condition: This specific tower was badly affected by the heavy rainfall. Its foundations were either sink or eroded. A selected fill materials is required urgently to stronger compaction, drainage construction and a 30m reinforcement of concrete wall is recommended.

Photos Of Tower 57.





II. Tower 59 of Line 536

Protection to Tower 59 foundation was a bit of an urgent problem to its foundation due to its location which is very close to fall. This specific tower is badly affected by the newly road construction and its some 2-3 meters away from the slope. Due to the recent rain more slips happened threatened the based of the tower. The construction of a reinforced concrete wall is highly recommended and backfill of selected materials and drainage to cater for storm water.

Photos of tower 59



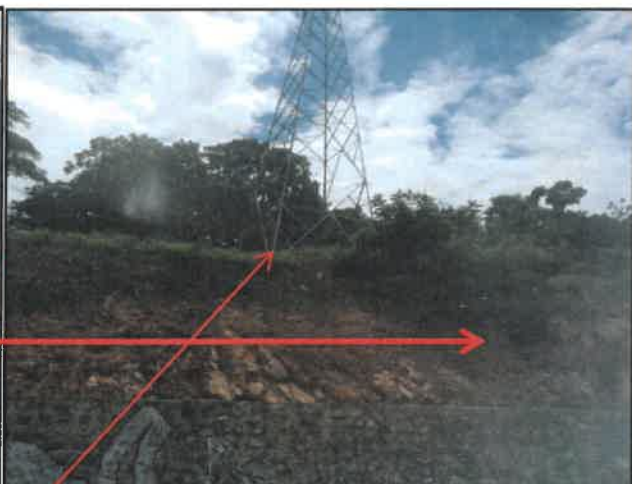


III. Tower 60 of Line 563

Protection to Tower 60 foundation is also urgent due to its location which is very close to fall. This specific tower is badly affected by the newly road construction and is some 2-3 meters away from the slope. Due to the recent down pour of rain more slips happened threatening the base of the tower. The construction of a reinforced concrete wall is highly recommended and backfill of selected materials and drainage to cater for storm water.



Backfill of selected materials required with storm water lined drainage to be connected from the top to the main road drainage.



Sign of one leg or tower footing already exposed. A reinforced concrete wall is required



3. SUMMARY TABULATED

Tower No.	Condition	Tendency of falling within the next 6-12 months	Remarks
Tower 57 of Line 563	Badly affected at foundation	90-100%	Protection works should commence immediately
Tower 59 of Line 563	Badly affected at foundation	90-100%	Protection works should commence immediately
Tower 60 of Line 563	Badly affected at foundation	90-100%	Protection works should commence immediately

4. ECONOMIC JUSTIFICATION

There is one transmission line, namely 563, that transport power from Rouna to 6mile Substation inside Port Moresby. If Tower 57, 59 & 60 of line 563 collapses due to unattended protection works other towers would also collapse as well therefore Lines 563 will not transmit power.

It would take four weeks to construct a bypass and restore power. Assume that the shortfall can be supplied by thermal generation and the cost of diesel generation is. Additionally the cost of constructing one single is about K500,000.00 - K600,000.00 depending on the site conditions. Therefore it is technically and economically beneficial to undertake proactive maintenance urgently.

5. CONCLUSION & REMARKS

Urgent scope of protection works should be commenced and approvals should be given for works to commence. Management should also budget for the following towers protection works

as these towers are of pivotal in supplying power to the National Capital District and Port Moresby.