



TERMS OF REFERENCE

CONDUCT OF GEOTECHNICAL INVESTIGATION FOR FY2024 INFRASTRUCTURE PROJECTS

I.0 INTRODUCTION

A. BACKGROUND:

The Department of Public Works and Highways intends to engage the services of a qualified and experienced Consulting Engineering Firm to provide the necessary engineering services that involve soil investigation.

The project aims to have the geotechnical investigation of various projects, so that a more reliable, safe and stable structure can be provided.

PROJECT DESCRIPTION and PURPOSE:

- a. Contract Name: Conduct of Geotechnical Investigation
For FY2024 Infrastructure Projects

FY2024:

1. Construction of Congw. Marisol C. Panotes Bridge 1 (Barangay Tabatabasa, Camarines Norte and Barangay Cayucuyan, Mercedes Camarines Norte) Phase 1 Connecting Municipality of Basud and Municipality of Mercedes Camarines Norte
 2. Construction of Congw. Marisol C. Panotes Bridge II Along Cong. Elmer Panotes Boulevard Connecting Barangay Tabatabasa and Barangay Magcamagong Phase I, Basud, Camarines Norte
 3. Construction of Bridge, Barangay Colasi, Mercedes, Camarines Norte
- b. Contract Location: Basud, Mercedes, Camarines Norte
- c. Description: Supply of Labor, Tools, Apparatus/Equipment and Laboratory Equipment for the Soil Boring/Soil Exploration of the site
- d. Contract Duration: 30 C.D.

B. OBJECTIVE:

1. To obtain information relative to the distribution and properties of soils, groundwater and surface drainage conditions and other pertinent data necessary for a rational and economic design of any infrastructure project.
2. To determine the arrangement of the soil strata or soil profile and engineering properties of the underlying soils, establish its compressibility strength and other characteristics, as well as the soil bearing capacities.
3. The results of geotechnical investigations which are among the basic data input/requirements in the detailed engineering design of infrastructure project in order that a safe and economical foundation and slope protection works may be designed.

C. PROJECT SCOPE:

The proposed PROJECT is subject for detailed engineering design and the results of geotechnical investigation is the basic data input/requirements for safe and economical foundation and protection works of the PROJECT.

II. SCOPE OF SERVICES

A. GENERAL

- 1.1 The Consultant shall coordinate with the Planning & Design Section during the conduct of geotechnical surveys and investigations along the proposed project specifically with bearing capacity and settlement requirements, scouring, liquefaction potential, and seismicity of the project site.
- 1.2 The Consultant shall provide all labor, instruments, materials, supplies, vehicles, etc., necessary to perform satisfactorily the investigation works. All expenses to be incurred are chargeable against funds allocated for preliminary/detailed engineering design.
- 1.3 The Consultant shall coordinate with the DPWH Camarines Norte Sub-District Engineering Office during the conduct of geotechnical investigations at proposed projects site. The Consultant shall conduct the following:
 - a. Collection of available Geological information such as aerial photographs, satellite imagery, reports, documents and maps for the projects areas.
 - b. Geological map of fault lines specifically active ones that could affect the stability of proposed project.
 - c. Determine if the proposed project site is prone to settlement, scouring, liquefaction potential, slope movements of and other foundation instabilities.

B. THE SERVICES

The conduct of geotechnical investigations shall consist of but not limited to, the following:

- a. At proposed project site deep drilling with Standard Penetration Tests (SPT) and rock coring shall be conducted at project location up to a depth of 30.00m, into moderate strength soil or as determined by the Engineer-in-charge. Standard Penetration Test (SPT) shall be made at a minimum interval of 1.50m and at every change of soil layer.
- b. The review and approval of the geotechnical investigations reports and plans (A4 size) by the DPWH Camarines Norte Sub-DEO do not relieve the Consultant(s) from the responsibility of determining the sufficiency and appropriateness of the geotechnical investigation works including the laboratory tests and evaluation of results.

III. IMPLEMENTATION

A. STAFFING

3.1 Organization and Qualification

The Consultant shall be composed of qualified staff with experience in the conduct of geotechnical investigation.

Position/ Key Staff	No. of Staff	Job Description/ Responsibility	Required Qualifications
Geotechnical Engineer	1	Study and determination of items and method of soil investigation and laboratory test Perform necessary subsoil investigations on representative sections of the project site with samples to be taken at suitable intervals Investigate the physical properties of materials to facilitate the design of structure	BS in Civil Engineering; Doctoral or MS in related field is an added advantage; Duly licensed/registered civil engineer; At least 5-year experience on soil, sub-surface and geotechnical survey and study of roads, bridges, and related structures;

Position/ Key Staff	No. of Staff	Job Description/ Responsibility	Required Qualifications
Civil Engineer	1	Oversee the progress of works; Supervision of field staff and the methods of works; Assist the Geotechnical Engineer in the collection of necessary data and information, in carrying out detailed soil investigations along the identified borehole locations	BS in Civil Engineering; Doctoral or MS in related field is an added advantage; Duly licensed/registered civil engineer; At least 3-year experience on soil, subsurface and geotechnical survey and study of roads, bridges, and related structures;

3.2 Preparation and Submission of Reports

3.2.1 Partial Reports on Investigation Results

The Consultant is required to submit partial reports consisting of completed results of boring in the form of a final boring log and soil profile for immediate use in the preliminary design work.

3.2.2 Final Reports

Upon completion of the geotechnical services, the Consultant shall prepare and submit a final report to the DPWH Camarines Norte Sub-DEO. The final report shall consist of one (1) original copy and two (2) duplicate copies all duly signed and sealed by the geotechnical engineer of the consultant. All test reports shall also be duly signed by a civil engineer/materials engineer. The final report shall include but not limited to, the following:

- a. Field Investigation and Methodology
- b. Borehole Drilling/Coring and Sampling
- c. Laboratory Testing
- d. Regional Geology
- e. Vicinity Maps in scale of 1:50,000
- f. Final Boring Logs (BL)
- g. Final Laboratory Tests Results (FLTR)

- Mechanical Sieve Analysis (Grain-Size Analysis) Result
- Atterberg Limits Test Result
- Natural Moisture Content
- Soil Stratigraphy
- NGL Elevation
- Soil Strength Test Result
 - Triaxial/Direct Shear
 - Unconfined Compressive Strength

h. Borehole Location Plan in scale of 1:250

i. Soil Profile along structures showing boring/drilling/coring logs

- j. Evaluation and recommendation that includes the complete recommended geotechnical parameters relevant to design and construction of projects: i.e., total and effective shearing strength parameters, index properties, etc.
- k. Recommendation if called for such as type of proposed countermeasure/structure to address geotechnical problems and foundation instability of the structure.

3.2.3 Other Data to be submitted

- a. Boring logs
 - Job, borehole number, date, time, boring/drilling foreman and supervisor
 - Weather conditions
 - Depth of water level
 - Method of penetration and flushing system
 - Description of soil strata encountered

- Depth of soil boundaries
 - Size, type and depth of samples and sample number
 - Type and depth of in-situ test
 - Standard Penetration Tests Resistance, "N" values
 - Detailed notes on boring/drilling procedure, casing sizes and resistance to driving, description of wash water or spoil from boring/drilling tools
 - Depth of boring, borehole location (Station, Easting, Northing and Elevation). Other relevant information such as RQD, percent core recovery for rocks etc.
- b. Photographs
- Photographs with x & y coordinates showing the borehole drilling and sampling at each proposed sites shall be taken by the Consultant and form part of the report. The photographs to be taken shall depict the following:
- Equipment used
 - Core drilling operation
 - Water level measurements
 - Performance of SPT sampling
 - All cores and SPT samples placed in core boxes
 - Location or station
- c. The subsurface soil exploration works including laboratory tests shall be completed within time upon receipt of the Notice to Proceed.
- d. Electronic copy of Final Report

B. DURATION OF CONSULTANCY SERVICES:

The Consultant's contract period for undertaking the survey shall not be more than 30 Calendar Days and the Consultant shall commence work within seven (7) days after receipt of Notice to Proceed (NTP).

C. ASSISTANCE TO BE PROVIDED BY THE CLIENT:

In connection with the tasks of the Consultant that require inputs and assistance, the DPWH shall ensure that the Consultant has access to all relevant information necessary to the performance of the above services.

Submitted by:


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Approved:


BENJAMIN G. BUITRE, JR.
 Special BAC Chairperson