



TERMS OF REFERENCE

GEOTECHNICAL EXPLORATION FOR FY 2025 FLOOD CONTROL STRUCTURE AND MULTI-PURPOSE BUILDING PROJECTS

I. INTRODUCTION / BACKGROUND

The Government of the Philippines (GOP), through the Department of Public Works and Highways (DPWH), Regional Office IX, Zamboanga del Norte 4th District Engineering Office has prepared these guidelines to assist the consultancy services in the planning, cost estimation and reporting of geotechnical investigations for the three (3) Flood Control Structures and two (2) Multi-Purpose Building Projects under FY 2025 General Appropriations Act (GAA).

The specific project will require the services of the Consultant who will conduct detailed geotechnical investigation of flood control structure and multi-purpose building project sites identified by the DPWH.

II. OBJECTIVES

1. To explore the sub-surface conditions of the area and to provide general data relating to the project
2. To give an outline of the surface and subsoil geology
3. To analyze the data obtained and give engineering consideration and recommendation on the selection and design of foundation/structure
4. To prepare the detailed geotechnical and geological investigation of project sites for the preparation of the foundation/structure design
5. To be able to provide a detailed sub-soil technical report.

III. PROJECT SUMMARY

The proposed projects for subsurface exploration work are listed hereunder.

BORING REQUIREMENTS FOR EACH PROJECT SITE		
NAME OF PROJECT	NO. OF BOREHOLES	DEPTH
Construction of Flood Mitigation Structure, Barangay Mamad, Baliguian, Zamboanga del Norte	1 Borehole	20.00 meters deep drilling
Construction of River Bank Protection Works, Lituban CIS, Siocon, Zamboanga del Norte	1 Borehole	20.00 meters deep drilling
Construction of Flood Control Structure along Siocon River, Package 8, Siocon, Zamboanga del Norte	1 Borehole	20.00 meters deep drilling
Construction of Flood Control Structure at Piacan River, Barangay Piacan, Sirawai, Zamboanga del Norte	1 Borehole	20.00 meters deep drilling
Construction of Multi-Purpose Building (Municipal Tribal Hall), Sibuco, Zamboanga del Norte	1 Borehole	20.00 meters deep drilling
Construction of Multi-Purpose Building, Barangay Poblacion, Baliguian, Zamboanga del Norte	1 Borehole	20.00 meters deep drilling

IV. SCOPE OF CONSULTING SERVICES / WORK

The Consultant shall coordinate with the Planning and Design Section (PDS) during the conduct of geotechnical investigation surveys and investigations of the listed projects for proper establishment of the location of boreholes.

*Geotechnical/Geological Investigation shall conform to **DPWH Department Order No. 75, series of 2024, Re: Guidelines for the Conduct of Geotechnical Investigation for all DPWH Infrastructure.***

The Consultant shall provide all the labor, instrument/equipment materials and supplies, vehicles, bunkhouses, etc., necessary to perform satisfactorily the sub-surface exploration herein required, viz:

- a. Field Works
- b. Laboratory Testing
- c. Soil Boring Exploration and Preparation of Report
- d. Geotechnical Investigation Report (GIR)

The Consultant shall be held solely responsible for the result of this boring/drilling exploration and other activities under this Terms of Reference (TOR).

V. DETAILED EXPLORATION REQUIREMENTS/SPECIFICATIONS

A. FIELD WORKS

1. Borehole Location

The Consultant shall coordinate with the Planning and Design Section (PDS) for proper establishment of the desired location of the proposed boreholes per project.

For Flood Control Structure Projects, boring/s or test pit/s are to be conducted at the center of the proposed slope protection structure location likewise for the Multi-purpose Building Projects, or as close as possible if there are obstruction that cannot be removed.

The location coordinates shall be recorded to 0.1 m accuracy (x,y,z) by global positioning system (GPS) device.

2. Borehole Depth

If foundation type has not been specified, boring shall be carried out to a minimum depth of 20-meter in ordinary soil or to 10-meter into sound rock if rock is encountered above the depth.

In case bearing layer is not encountered beyond 20-meter, boring shall be continued until preferred layer is encountered and/or upon the instruction of the geotechnical engineer.

3. Procedure

- a. The Geotechnical Investigation (GI) shall only be based under this Term of Reference. A Coordination meeting shall be scheduled between the Consultant and the DPWH Zamboanga del Norte 4th District engineering Office GI Team to discuss the GI Plan and methodology report, and shall conduct site inspection together to define the scope of the project.
- b. The conduct of field and laboratory tests for the project shall be witnessed and certified by the duly designated representative from the GI Team. During the conduct of the GI activities, photos shall be taken and geotagged

accordingly and shall be attached as annexes or shall be part of appendices of the GIR.

- c. The Consultant shall perform analysis and testing (refer to laboratory Testing) in accordance with AASHTO and ASTM standards. They shall utilize the standard format for Final Borehole Log and Test Pit/Auger Hole Drilling provided in D.O. 75, series 2024 and legends for soils/rocks shall be in accordance with DPWH DGCS Volume 2C 2015 Edition and/pr its latest edition.
- d. The GIR shall include design recommendations, foundation condition scheme, bearing capacity and settlement, groundwater table, hydrological influences, excavation stability, seismic design consideration and liquefaction assessment and other parameters stipulated in Annex "E" and "F" of D.O. 75, series 2024.
- e. The GIR shall be duly signed by the Geotechnical Engineer on-record of the Consultant subject for review of the GI Team and approval of the DPWH Zamboanga del Norte 4th District Engineering Office. Once the GIR has been finalized and approved, the Consultant shall prepare the Geotechnical Plan in accordance with D.O. 75, series 2024. Regarding the preparation of the *DED Plan*.

4. Handling and Core Samples

The consultant shall provide all the materials, equipment and labor necessary for preserving samples. Rock core samples need to be handled such that its properties are not altered in a way due to mechanical damage or changes in ambient conditions of moisture and temperature or other environmental factors.

All soil and rock samples must be clearly, accurately and properly labeled to show all pertinent information necessary in identifying the samples.

B. LABORATORY TESTING

The preparation of samples for testing shall be made in accordance with AASHTO. The following tests shall be made on samples obtained from boring and drilling.

Standard Penetration Test

The test shall be carried out through ordinary soil encountered to the depths specified above. Standard penetration test shall be performed using 5.00 cm (2.0 inch) outside diameter split spoon sampler, driven by a 63.60 kg (140 lbs) hammer falling 76.00 cm (30 inch) at 1.50-meter interval or closer if necessary.

Moisture-Density Rotation

This test method determines the relationship between the moisture content and the density of soils compacted in a mold. The consultant shall conduct this procedure according to ND T 99 or ND T 180.

Bearing Capacity Test

The test method covers estimation of the bearing capacity of soil in place by means of field loading tests. This test method can be used as part of a procedure for soil investigation for foundation design. It gives information on the soil only to a depth equal to about two diameters of the bearing plate, and takes into account only part of the effect of time.

Sieve Analysis

The consultant shall conduct this test in accordance with AASHTO T 27 and materials finer than No. 200 (75 μm) in accordance with AASHTO T 11. The procedure combines the two test methods.

Liquid Limit

Liquid Limit test shall be performed on material passing the 0.430 mm (No. 20) sieve. AASHTO T 89 & T 90 27. There are two methods approved by AASHTO, any of the two methods can be used by the contractor. Blow count must be within 22-28 blows. Liquid Limit is a calculation based on moisture content and number of blows to closure.

Soil Classification

This standard classifies soils from any geographic location into categories representing the results of prescribed laboratory tests to determine the particle-size characteristics, the liquid limit, and the plasticity index.

There should be assigned group name and symbol(s) along with the descriptive information. Practice D2488 can be used to describe a soil to aid in the evaluation of its significant properties for engineering use. Engineering behavior of the soils must be seen.

C. KEY PERSONNEL'S QUALIFICATION AND REQUIREMENTS

The Consultants shall be composed of qualified staff with experience in the conduct of geological and geotechnical investigation.

Designation	Minimum Years of Experience	Qualification Requirements
Team Leader (Sr. Geotechnical Engineer – CE)	10	<p>Must be a Licensed Civil Engineer with an advanced degree in the field of Geotechnical Engineering.</p> <p>Must have at least ten (10) years of experience in carrying out geotechnical investigation and surveys. Must be familiar with the interpretations and laboratory results and appropriate solutions/interventions.</p>
Sr. Soils/Materials Engineer	5	<p>Must be Licensed Civil Engineer with an advanced degree in the field of Geotechnical Engineering.</p> <p>Must have at least five (5) years of experience in carrying out geotechnical investigations and surveys. Must be familiar with the interpretations of the laboratory results and appropriate solutions/interventions.</p>

VI. IMPLEMENTATION

1. Final report

The Consultant is required to submit the final Geotechnical Investigation Report (GIR) Eighteen (18) Calendar Days from the commencement of work in three (3) hard bound copies to be DPWH Zamboanga del Norte 4th District Engineering Office, M. Francisco, Siocon, Zamboanga del Norte. The final GIR shall not be limited to the following:

- a. Field Investigation Report and Methodology
- b. Borehole Drilling and Sampling
- c. Laboratory Testing
- d. Regional Geology
- e. Vicinity Maps in scale of 1:50,000
- f. Final Boring Logs (BL)
- g. Borehole Location Plan in scale of 1:250
- h. Idealized Soil Profile (Correlated cross section of all boring logs)
- i. Final Boring Logs with SPT graph (Standard format in accordance to D.O. 75, series 2024)

- j. Geology and Geohazard Aspects
- k. Geotechnical Aspects
- l. Final Laboratory Test Results
- m. Recommendation if called for, such as type of proposed countermeasures/structures to address geological/geotechnical problems and foundation type
- n. Appendices, photographs and References

2. Other Data to be Submitted

Boring Logs

- a. Job, boring, hole number, date, time, boring/drilling, foreman, supervisor
- b. Weather Condition
- c. Elevation and Depth of Boring
- d. Water level in casing at start of day
- e. Method of penetration and flushing system
- f. Description of soil strata encountered
- g. Depth of Soil boundaries
- h. Size, type and depth of samples and sample number
- i. Type and depth of in-situ tests
- j. Standard Penetration Test Resistance, "N" value
- k. Recovery ratios samples
- l. Detailed notes on boring/drilling procedure, casing sizes and resistance to driving, description of wash water or spoil from boring/drilling tools
- m. Depth of Boring
- n. Other relevant information such RQD, percent core recovery, angle of friction etc.

Photographs

Photographs at each borehole site and laboratory testing shall be taken by the Consultant and incorporated in the report. Photographs shall be taken each borehole location depicting the following:

- a. Equipment used
- b. Core drilling operations
- c. *Water level measurements*
- d. Performance of SPT sampling
- e. All core and SPT samples placed in core boxes with depth
- f. Geotagged photos
- g. Location or station and markers


VII. PAYMENT

There should be no Advance payment for Consultancy. The final payment shall be made only after the acceptance of the Final Report of the six (6) aforementioned projects from the DPWH Implementing Office.

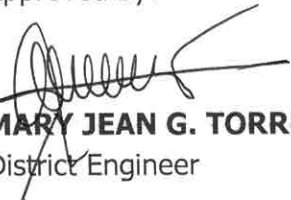
VIII. WORK SCHEDULE

The Consultant's contract period for undertaking the subsurface exploration works including laboratory tests shall be **Eighteen (18) Calendar Days** and the Consultant shall commence work after receipt of Notice to Proceed (NTP).

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