

SCOPE OF WORKS

Name of Project : Geotechnical Investigation for the Proposed Three (3) – Storey with Roof Deck Records Center Building (IRMO and ICTO)

Location : Civil Service Commission – Central Office (CSC-CO)
CSC Compound, IBP Road, Batasang Hills, Quezon City

Approved Budget for the Contract: Three Hundred Fifty Thousand Pesos Only
(Php 350,000.00) *Inclusive of tax*

I. General Background of the Project:

Overview:

For the proposed Three (3) Storey with Roof Deck Records Center Building (IRMO and ICTO) of the Civil Service Commission, the geotechnical investigation aims to provide a comprehensive understanding of the subsurface conditions at the project site to ensure the structural integrity and stability of the building.

II. Objective:

The objective of the Geotechnical Investigation for the Proposed 3-Storey Twin Building with Roofdeck of Civil Service Commission is to ensure the structural integrity, stability, and safety of the building by thoroughly assessing the subsurface conditions at the project site. This investigation aims to achieve the following specific objectives:

- **Site Suitability Assessment** - Determine the suitability of the site for construction by evaluating factors such as soil stability, groundwater conditions, and geological hazards;
- **Foundation Design Recommendation** - Provide recommendations for appropriate foundation types and design parameters based on the geotechnical characteristics of the soil and anticipated loads from the proposed office building;
- **Risk Identification and Mitigation** - Identify potential geotechnical risks, such as slope instability, liquefaction, or settlement, and propose mitigation measures to minimize the risk of structural damage during and after construction;

- **Construction Feasibility** - Assess the feasibility of construction activities considering the site-specific geotechnical conditions, including excavation, earthwork, and foundation installation;
- **Optimization of Building Design** - Collaborate with the project team to optimize the building design in accordance with the geotechnical recommendations, ensuring cost-effective and efficient construction practices;
- **Compliance with Regulatory Requirements** - Ensure compliance with relevant building codes, standards, and regulations governing geotechnical aspects of construction to meet safety and legal requirements;
- **Long Term Performance Consideration** - Evaluate the long-term performance of the building and its foundation under various loading conditions, including seismic events, to enhance durability and resilience;

III. General Scope of Works:

A. FIELD WORK:

The winning bidder 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 Work;
- b. Laboratory Test;
- c. Soil Investigation and Preparation Report; and
- d. Geotechnical Evaluation Report.

Borehole Location:

The geotechnical investigation shall also include a geotechnical assessment of of the boreholes (at least six (6)) at the proposed locations of the three (3) storey building.

Borehole Depth:

Borings shall be extended to 30 meters, or until three successive SPT N-Values > 30 are recorded. In case bearing layer is not encountered beyond 30 m, boring shall be continued until preferred layer is encountered and/or upon the instruction of the geotechnical engineer.

Borehole Procedure:

- a. Deep drilling with Standard Penetration Test (SPT) shall be conducted at 7.30 meters from centerline of existing building left and right at each column. Minimum depth shall be determined based on confirmation of

hard strata or bed rock. Drilling can be stopped after three (3) meters minimum penetration into hard strata or bed rock.

- b. The winning bidder shall perform analysis and testing on disturbed and undisturbed soil samples. These analyses and testing shall be performed in accordance with AASHTO and ASTM standards.
- c. The soil samples for foundation design shall be tested for the determination of the main characteristics (*grain size distribution and classification, moisture content, atterberg limits, etc.*).
- b. Submit design recommendations. foundation condition scheme, bearing capacity and settlement, groundwater table, hydrological influences, excavation stability, seismic design consideration and liquefaction potential.
- c. Geological structure, especially active faults which might traverse the area, should be delineated and potential mass movement areas should be identified. Analysis for liquefaction potential during earthquake and consolidation due to soft ground should be included.

Handling and Core Sampling:

The winning bidder shall provide all the materials, equipment and labor necessary for preserving samples.

B. LABORATORY TESTING:

The preparation of samples for testing shall be made in accordance with AASHTO. The following tests shall be conducted but are not limited to:

- i. **Standard Penetration Test (SPT)** – The test shall be carried out through ordinary soil encountered to the depths specified above. The standard penetration test shall be performed using 5.0 cm (2 in) outside diameter split spoon sampler, driven 63.60 kg (140 lbs) hammer falling 76.0 cm (30 in) at 1.5m interval or closer if necessary.

- ii. **Laboratory Test**

Moisture Density-Rotation – This test method shall be determining the relationship between the moist content and the density of soils compacted in a mold. The contractor shall conduct this procedure according to ND T 99 ND T 180.

Bearing Capacity Test – The test method covers estimation of the bearing capacity of the soil in placed by means of field loading test. This test method can be used as part of the procedure for soil investigation for foundation design. It gives information on the soil only to a depth equal to about two (2) diameters of the bearing plate, and takes into account only part of the effect of time.

Sieve Analysis – The contractor shall conduct this test in accordance with AASHTO T 27 and materials finer than No. 200 (75µm) in accordance with AASHTO T 11. The procedure combines the two test methods. Sieve analysis determines the gradation or distribution of aggregates particles within a given sample in order to determine compliance with design and production standards. Accurate determination of material smaller than no. 200 (75µm) cannot be made with AASHTO T 27 alone. If qualifying this material is required. It is recommended that AASHTO T 11, the sample washed through a no. 200 (75µm) sieve. The amount of material passing this sieve is determine by comparing dry sample masses before and after washing process. This procedure covers sieve analysis in accordance with AASHTO T 27 and materials finer than no. 200 (75µm) in accordance with AASHTO T 11: The procedure includes two method choices, A and B.

Liquid Limit – this test shall be performed on material passing the 0.425 (No. 40) sieve. AASHTO T 89, 90 and 27. There are two (2) methods approved by AASHTO, any of the two (2) method can be used by the contractor. Blow counts 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 geographic location into categories representing the results of prescribe laboratory tests to determine the particle-size characteristics, the liquid limit, and the plasticity index.

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

Other required test are follows:

1.	Visual Identification of Soil
2.	Index Property
2.1	<i>Moisture Content</i>
2.2	<i>Specific Gravity</i>
2.3	<i>Sieve Analysis</i>
2.4	<i>Hydrometer Analysis</i>
2.5	<i>Atterberg Limits</i>

2.6	<i>Soil Classification</i>
3.	Moisture Density Relation
4.	Strength Test
4.1	<i>Unconfined Compression Test</i>
4.2	<i>Triaxial Test</i>
4.3	<i>Direct Shear Test</i>
5.	Consolation Test (if soft test encountered)
5.1	<i>One-Dimensional Consolidation</i>
5.2	<i>Swell-Potential of Clay</i>
5.3	<i>Collapse Potential of Soil</i>

IV. Implementation

A. OUTPUT/DELIVERABLES

Inception Report:

The Contractor is required to submit one (1) week after commencement of services. It shall outline a detailed work program and briefly describe the methodology and project schedule (GANTT and S-Curve) proposed to meet the scope of work. The report shall include the initial findings as well as preliminary layout of the forms to be used for various investigations and calculations. Inception Reports shall be submitted in soft-bound copy with title of the report written at the spine.

Final Report:

The Contractor shall prepare the final report three (3) bound copies to be submitted after the completion of consulting works/service. It shall include, but not limit to the following.

- a. Field Investigation and methodology;
- b. Borehole Drilling and Sampling;
- c. Laboratory Test;
- d. Regional Geology
- e. Vicinity Map in scale 1:50
- f. Final Boring Logs (BL)
 - i. Job, boring, hole number, date, time, boring/drilling foreman and supervisor
 - ii. Weather condition
 - iii. Depth of water level
 - iv. Method of penetration and flushing system – description of soil strata encountered
 - v. Depth of soil boundaries
 - vi. Size, type, and depth of sample and sample number
 - vii. Type of depth in situ test
 - viii. Standard Penetration Test Resistance “N” values

- ix. Detail notes on boring/drilling procedure, casing sizes and resistance to driving, description of wash water or spoil from boring/drilling tools
- x. Depth of boring
- xi. Other relevant information such as RQD, percent core recovery, etc.
- g. Final Laboratory Test Result (FLTR)
- h. Borehole Location Plan in scale of 1:250
- i. Soil Profile along structures showing boring/drilling logs
- j. Recommendation if called for, such as type of proposed countermeasures/structure to address geological/geotechnical problems and foundation type.
- k. Other relevant data

i. Photographs showing the borehole drilling and sampling at each proposed site shall be taken by the contractor 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 sample place in core boxes
- Date of photographs were taken
- Location or station

B. DURATION OF CONSULTANCY SERVICE

The contractor contract period for the undertaking the geological and geotechnical investigation is **forty-five (45) calendar days (CD)** and the contractor shall commence work upon receipt of Notice to Proceed (NTP).

C. SCHEDULE

Indicative schedule of Activities and key personnel:

Activities	No. of Days					
	1-7	8-14	15-21	22-28	29-36	37-45
I. Report						
Drilling						
Laboratory						
F. Report						

Key Staff.	No. of Days					
	1-7	8-14	15-21	22-28	29-36	37-45
Team Leader (Geo. Engineer)						
Lab. Technician						
Tech. Staff						

V. Manpower Requirements

The contractor shall compose of qualified staff with experience in the conduct of geological and geotechnical investigation.

Position/Key Staff	No. of Staff	Detail Task/ Responsibility	Required Qualification
Team Leader	1	<ul style="list-style-type: none"> • Overall guidance, direction, supervision and coordination of the members of the Team; • Collection and evaluation of geological information on the project site; • Study and determination of item and method of soil investigation and laboratory test; • Perform necessary subsoil investigation on representative section of the building with sample to be taken at suitable interval; • Investigate the physical properties of materials to facilitate the design of structure. 	<ul style="list-style-type: none"> • BS in Civil Engineering; Doctoral or MS in related field is an added advantage; • Duly license/registered civil engineer; • At least 10 years' experience on soil, sub-surface and geotechnical survey and study of building and other vertical related structure;
Laboratory Technician	2	<ul style="list-style-type: none"> • Investigate the physical properties of materials to facilitate the design of structure; 	<ul style="list-style-type: none"> • Must have a Bachelor's Degree in Civil Engineering, MS or Doctorate

		<ul style="list-style-type: none"> Assist the Team leader in the collection of necessary data and information, in carrying out detail soil investigations within the proposed area of construction 	<ul style="list-style-type: none"> degree is an advantage; Duly - license/registered civil engineer; At least five (5) years' experience on soil, sub-surface and geotechnical survey and study of building and other vertical related structure.
Technical Staff	2	<ul style="list-style-type: none"> Assist the Team leader and laboratory technician in executing the geological and geotechnical investigation 	<ul style="list-style-type: none"> Must be with training on carrying the execution of work for geological and geotechnical investigation At least with one (1) year experience on soil, sub-surface and geotechnical survey and study of building and other vertical related structure

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