

**TERMS OF REFERENCE  
FOR  
THE PROCUREMENT OF CONSULTANCY SERVICES FOR THE *TREE SURVEY  
WITH HEALTH ASSESSMENT***

**1.0 RATIONALE**

As a steward and implementing arm of the BCDA over Camp John Hay (CJH), JHMC is mandated to ensure the sustainable use and development of the forest watershed. To carry this out, it is basic and essential to generate an updated Tree Inventory and Health Assessment Report of all trees within the JHSEZ that shall provide the basis for the sound development and protection of the forest watershed. Comprising 53% of the remaining forest cover of Baguio City, the Camp certainly holds the best Ambient Air Quality Index (PM<sub>10</sub>) within the entire Baguio, La Trinidad, Itogon, Sablan, Tuba and Tublay areas, making the same the healthiest environment still to unwind to and/or do business.

**2.0 OBJECTIVES**

- 2.1. To generate data on tree locations, species composition and distribution, density and volume, the generated data shall, in turn, be analyzed and utilized to formulate a framework for the holistic approach in protecting and preserving the remaining forest cover vis-a-vis the developments within the JHSEZ.
- 2.2. To determine the present forest cover to development ratio. Although it is only the golf course that was required a 40:60 ratio based on the Environmental Compliance Certificate (ECC) issued for JHSEZ, it is desired that this ratio be maintained even beyond the full development of the economic zone. Upon determination of the forest cover, a Comprehensive Land Use Plan (CLUP) shall be prepared by JHMC. The CLUP shall be our primary guide for future developments.
- 2.3. Related to this project, an additional two (2) fixed-term environment staff shall be hired by JHMC. The purpose of hiring additional staffs is to fast-track the determination of the physical condition and health status of the pine trees within the zone. Upon determination of the condition and status of each pine tree, JHMC shall utilize the data in relation to item 2.1 above. Identified dead trees shall be requested for emergency cutting from the DENR to prevent damage to properties and/or injury/death.

### 3.0 COVERAGE:

The project shall cover the hereunder listed areas. However, areas that were assessed and inventoried for the previous years are deducted from the coverage of this project.

Ccs-131102-000030 (BCDA-Untitiled Properties)				
Lot No.	Description	Land Area	Approximate Forested Area (Ha.)	Estimated No. of Trees
		Has		
1	Golf Course Cluster	52.71	36.37	6,910
2	Halfway House	0.45	0.22	42
3	Mile Hi Center	2.02	0.47	89
4	Conference Cluster	2.07	0.96	182
7	Protected forest	7.41	7.41	1,409
13	U.S. Ambassador Estate	27.48	27.48	5,220
14	Voice of America	31.84	31.84	5,612
15	Protected Forest	57.45	57.45	10,915
	Sub-total	181.42	162.20	30,379

Psd-131102-002639 (Titled Properties)				
Lot No.	Description	Area	Forested area (Ha.)	Estimated No. of Trees
		Has		
3	Protected Forest	14.12	14.12	2,682
4	Hotel Cluster	4.4667	1.84	349
5	Golf Course Cluster	4.27	0.61	116
6	Accommodation Cluster	7.06	7.06	1,341
7	Protected Forest	13.76	12.32	2,340
9	Village Center	8.7037	3.53	670
10	Rec Cluster/Maintenance Services	8.76	3.16	600
11	Utilities/Transient Housing	5.20	1.45	275
14	Managed forest	13.57	13.57	2,578
15	Protected Forest	24.18	24.18	4,594
16	Accommodation Cluster	3.23	1.90	361
17	Accommodation Cluster	1.99	1.17	223
18	U.S. Ambassador's Estate	3.85	3.31	628
	<i>Sub-total</i>	99.99	88.20	16,757
	TOTAL AREA	281.41	248.098	47,136

### 4.0 SCOPE OF SERVICES

The Consultant shall perform the following scope of services:

- 4.1. **Demarcation and delimitation survey.** Establishment of a permanent boundary monuments on the ground and delimit the boundary of forestlands in accordance with existing survey standards and practices.
- 4.2. **Geo-Tagging and Inventory.** All trees with diameter-at-breast-height (dbh) of fifteen (15) centimeters and above shall be inventoried and tagged based on the procedures established by JHMC using the prescribed tally sheet provided.
- 4.3. **Geo-Tagging and Inventory of all trees below fifteen (15) centimeters** based on the procedures established by JHMC and using the prescribed tally sheet provided.
- 4.4. All data gathered from items 4.1 to 4.3 shall be in print and electronic copy.
- 4.5. **Post-Data & Information Gathering.** The Consultant shall perform the following services after the field data and information gathering activities:
  - 4.5.1. Organize and analyze all raw data and information with the end in view of producing all expected outputs/deliverables required under this TOR for submission to JHMC. All data gathered shall be in print and electronic copy using the prescribed pro-forma forms/templates.
  - 4.5.2 **Photo-documentation.** Individual photographs of every tagged/marked tree shall be taken, focusing the tree code/tree tag. And another photograph showing the full or almost-full appearance of every marked tree shall likewise be taken.

## 5.0 MINIMUM MANPOWER REQUIREMENTS AND QUALIFICATIONS

5.1 The Consultant shall provide **at least** two (2) teams to undertake this Project, each Team consisting of the following personnel and their qualifications:

Personnel	Qualification	Number
Team Leader	Licensed Geodetic Engineer with relevant experience	1
Senior Survey CAD/GIS operator	Engineering graduate with appropriate training and experience	1
Instrument man	Engineering graduate with appropriate training and experience	1
Rod man	Geodetic engineering aide	1

Tree markers/taggers	Laborers (local hired)	3
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## **6.0 EQUIPMENT /TOOLS AND OTHER ACCESSORIES AND SUPPLIES/MATERIALS**

The Consultant shall be responsible for the provision of all equipment, tools, accessories, office and field supplies and materials needed for the conduct and completion of this Project.

## **7.0 DURATION OF THE PROJECT**

This Project shall have a duration of six (6) months, commencing from the issuance of the Notice to Proceed.

## **8.0 DELIVERABLES/EXPECTED OUTPUTS OF THE PROJECT**

The Consultant shall submit to JHMC the following deliverables and outputs by the end of the contract period.

8.1 Terminal Report: It shall consist of the inventory method used, description of the area evaluated, duration of the inventory and tree health assessment work, discussion and/or analysis of data gathered from a forest management viewpoint, and recommendations, among others.

8.2 The following documentary reports shall be included in the Terminal Report:

- 8.2.1 An Overall Stand and Stock Table (SST)—It shall indicate the species common name, scientific name, family name, size classes, number and volume of each tree species.
- 8.2.2 Individual SST of each lot area mentioned under item 3 of this TOR also using the prescribed template provided.
- 8.2.3 Survey Maps: It shall show the locations of the forested areas, tying points established, the exact locations of all geo-tagged trees, among others.
- 8.2.4 Original Tally Sheets and the electronic copy containing the records of all trees inventoried and/or marked/tagged;
- 8.2.5 Photographs showing all trees marked and geotagged, the interior portion and the panoramic view of the inventoried area.
- 8.2.6 The Terminal Report shall be submitted in three (3) sets (one original and 2 photocopies) including an electronic copy.

8.2.7 Electronic Copy of the Computer-Aided Design (CAD) file. The CAD File shall be drawn to a scale of 1:1. The sketch Plan shall be on an appropriate scale.

## 9.0 PROJECT MONITORING

9.1 Unreasonable delays in project implementation shall not be condoned as these affects targeted project completion. However, should there be delays in the implementation due to meritorious reasons, the Consultant shall immediately inform JHMC along with the submission of a Catch-Up Plan within the extension period mutually agreed upon as reflected in an Amendment to the Contract to be approved by both parties with no addition in the original contract cost.

9.2 JHMC reserves the right to monitor the progress/status of the Project independently as needed and to inform the Consultant of its evaluation for the latter's appropriate action.

## 10.0 PROJECT COST

The Approved Budget for the Contract (ABC) for this Project is **PhP26,826,000.00 inclusive of all applicable taxes.**

## 11.0 MANNER OF PAYMENT

11.1 Subject to the review and acceptance of milestone accomplishments submitted by the Consultant, JHMC shall pay the former through progress billing in accordance with the following schedule,

<b>Progress Billing</b>	<b>Activities</b>	<b>Weighted Accomplishment</b>	<b>Percentage of Contract cost</b>
First Billing	<ul style="list-style-type: none"> <li>● Upon submission of outputs/deliverables relative to all survey works /activities as defined in the Scope of Services of this TOR, and</li> <li>● Upon submission of all outputs/deliverables and tree measurements relative to Tree Marking/Tagging.</li> </ul>	25%	15%
Second progress billing	<ul style="list-style-type: none"> <li>● Upon submission of all outputs/deliverables relative to Geo-tagging, including photogrpahs of all trees.</li> </ul>	25%	35%

Third progress billing	<ul style="list-style-type: none"> <li>• Upon submission of the <u>initial complete</u> Terminal Report to JHMC for review and perusal.</li> </ul>	25%	10%
Fourth and final billing	<ul style="list-style-type: none"> <li>• Upon submission of the Final Terminal Report to the satisfaction/acceptance of JHMC.</li> </ul>	25%	40%
	Total	100%	100%

9.2 Progress Billings shall be acted upon the submission by the Consultant of a Request for Billing and Statement of Work Accomplished subject to the requisite inspection/s and validation by the implementing unit.

## 11.2 OTHER CONDITIONS

11.2.1 The Consultant shall possess the necessary expertise, manpower, equipment/tools, and materials and supplies to perform all the obligations stated herein and is duly registered entity to conduct land surveys.

11.2.2 Nothing herein shall be construed as establishing an employer-employee relationship between JHMC and the Consultant. The consultant shall be directly responsible and accountable for its personnel under its employ at all times.

11.2.3 The consultant shall be bound to answer and/or indemnify JHMC for the cost of any damage to or loss of any JHMC property or property of third parties which is due or sustained through the fault or negligence of its personnel.

11.2.4 JHMC may pre-terminate the service Contract for any violation committed by the Consultant in any of the provisions of the Contract.

11.2.5 JHMC reserves the right to conduct a performance evaluation on the consultant as it deems necessary. A rating of unsatisfactory performance on the part of the consultant shall be a ground for termination of the contract, subject to applicable provisions of R.A. 9184 and its 2016 Revised Implementing Rules and Regulations particularly Annex "I" *Guidelines on Termination of Contracts*.

## 12.0 DUTIES AND RESPONSIBILITIES OF JHMC

12.1 Provide the reference maps and other documents needed by the Consultant for the conduct of the said Project.

12.2 Ensure free access to the project site to undertake the project.

12.3 Provide assistance to the Consultant as needed through its fixed-term environment staffs relative to the tree health assessment activities.

12.4 Conduct meetings with the consultant as necessary towards the smooth implementation and/or when other issues and concerns arise during project implementation.

12.5 JHMC reserves the right to identify and designate alternative tree inventory and health assessment areas in the event of any problem and constraints within the coverage area stated in item 3.0 of this TOR such that the total coverage area as stated in item 3.0 of this TOR be retained. In no case shall the contract amount be increased.

Prepared by:

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## **ANNEX TO THE TERMS OF REFERENCE OF THE CONSULTANCY SERVICES FOR TREE SURVEY WITH HEALTH ASSESSMENT**

### ***GUIDELINES FOR THE CONDUCT OF TREE MARKING AND TREE MEASUREMENTS AND USE OF THE STAND AND STOCK TABLE***

#### **A. Tree Marking**

1. All trees with diameter-at-breast-height (dbh) of **fifteen (15) centimeters and above** shall be inventoried and tagged/marked in accordance with the following procedures and all data and information shall be recorded in the prescribed *Tally Sheet* provided.
2. White enamel paint shall be used to paint the tree tags/codes on the bole of the tree;
3. The tree code/tag shall be painted at the DBH-level, or approximately 130 centimeters (1.3 m) from the base of the tree. However, if the tree is standing on sloping ground, the dbh level shall be reckoned from the upper slope portion of the tree's base;
4. The tree tags shall be of uniform size, to wit:
  - a. Individual letters and numbers shall be 25 mm in width and 140 mm in length.
  - b. The spacing between the letter and the tree number shall be 20 mm, and between each number shall be 10 mm. Hence for ease and uniformity, a pre-fabricated *number-and-lettering-guide* shall be used by the Consultant to paint the tree codes.
5. Prior to painting the tree tag, only slight cleaning or scraping of the tree's outer bark shall be allowed just so the marking/painting of the tree tag is done smoothly and evenly on the tree's bole;
6. Damaging/injuring the tree's *cambium* or inner bark is absolutely prohibited.
7. The tree tags shall be painted horizontally on the bole of the tree as far as the tree's DBH can accommodate (i.e . 20 centimeters and above). However, for trees with smaller DBH (e.g. 15-20 centimeters), the tree tags shall be painted vertically.
8. The painted tree tags shall be of sufficient density/thickness as to be readable for at least five (5) years.

#### **B. DBH, TOTAL AND MERCHANTABLE HEIGHTS MEASUREMENTS**

1. The DBH (in centimeters), total height and merchantable height (in meters) of each tree shall be measured and recorded in the prescribed *Tally Sheet*;
2. For facility, the consultant may initially take the circumference of the tree's bole at 1.3 meters above the ground, and later on convert this to dbh using the formula,  $\text{Diameter} = C/\pi$ ;



3. The following additional information shall also be taken for all marked trees, and recorded in the Tally Sheet:

- Tree Tag/Tree Number
- Common Name of the tree
- Scientific Name of the tree
- Family Name

4. The volume of every tree recorded shall be computed based on the “Regional Volume Equations for Standing Trees.” For Northern Luzon and for Non-Dipterocarp, the volume equation to be used is:  **$V=0.00005109 (D^2 * Height)$** , where: V = tree volume in cubic meters; D= DBH in centimeters; and H= Merchantable height in meters

5. From the Tally Sheets, an **overall Stand and Stock Table<sup>1</sup> Report** for the entire Project Area shall be submitted using the following format:

<b>STAND AND STOCK TABLE</b>									
Lot No. Inventoried : _____							Intensity of tree inventory: 100%		
Total Area Inventoried (ha): _____									
Species	Diameter Classes In Centimeters								
	10		20		30		N <sup>th</sup> ....	Total	
	T	V	T	V	T	V		T	V
Benguet Pine									
Other species									
Grand Total									
Average /ha.									

- The standard diameter classes are structured in multiples of ten (10) such as 10,20,30,40, etc. Each of these diameter classes includes specific range of diameter sizes hereunder illustrated:

DBH Classes (cm)	Diameter Ranges (cm)	Remarks
05	Below 4 cm	No tree tagging/markings shall be done. Only inventory and geo-tagging using Total Stations.

<sup>1</sup> Stand and Stock Table (SST): Shows the summary list of species recorded within the specific area that was inventoried which are arranged into species groups and diameter classes. It likewise shows the total number of trees for each species group recorded and its corresponding volume for each diameter class and species group.

10	5-14	No tree tagging/marking shall be done. Only tree inventory and geotagging using Total Stations.
20	15-24	
30	25-34	
40	35-44	
50	45-54	
60	55-64	
70	65-74	
80	75-84	
90	85-94	
100	95-104	
110	105-114	
120	115-124	

6. Individual Stand and Stock Table for every Lot Area indicated in item 3 of this TOR shall likewise be submitted using the same SST format.