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BMB TECHNICAL BULLETIN
NO. 2016- 03

SUBJECT: STANDARD AND CLIMATE-RESILIENT DESIGN OF PROTECTED AREA INFORMATION CENTER AND SIGNS AND MARKERS

In order to standardize the design of the Protected Area Information Center and sketch of selected signs and markers that may be installed and/or constructed within protected areas, pursuant to DENR Administrative Order (DAO) No. 2009-09 (Standard Design and Specification of Signs, Buildings, Facilities and Other Infrastructure That May Be Installed and/or Constructed Within Protected Areas), and to promote green infrastructure practices through climate-smart technologies, and climate proofing processes in the construction of facilities and infrastructure in the protected area, this Technical Bulletin is hereby issued and circulated for the information and guidance of all concerned.

I. PROTECTED AREA INFORMATION CENTER

A. Climate-related considerations

The general and specific considerations in the design and specifications of buildings, facilities, and other infrastructure provided under Items 5.1 and 5.2 of Section 5 of DAO 2009-09 should be considered in the construction of the buildings, facilities and other infrastructure. In addition, the construction of the information center for the terrestrial, coastal and marine ecosystems should consider the climate-related, weather-related and geophysical hazards of the specific area. The different geographic and management zones of protected areas offer varying levels of vulnerability to natural hazards in terms of their site locations, elevations and topographies. Most, if not all damages due to natural hazards can be avoided through proper site selection.

The following provides the essential climate-related considerations on site selection:

1. Flood
 - a) Check inundation levels from flood hazard maps. Building within risk areas requires appropriate site and building interventions to mitigate damages.



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- b) Check alluvial fan hazard maps and flood exit points to determine at-risk areas from heavy flood and debris flow as these areas may not be highlighted in flood hazard maps.
- c) Take note of flash floods that can occur in urban areas, mountains, hills and along rivers causing strong currents that bring debris
- d) Refrain from building in areas vulnerable to hydro-meteorological hazards; develop these areas to be a public/communal space that can also serve as refuge area for geophysical hazards.
- e) Take note of no-build zones and only build on safe distances from these:
 - i. Build three (3) meters away from the banks of rivers and streams.
 - ii. Definite distance from rivers, streams, lakes and seas based on land zone classification: Urban areas (3m), Agricultural areas (20m) and Forest Area (40m).
- f) Establish retention areas which are alternative options for stormwater storage. They allow neighborhoods to hold water in a safe place until it can be safely drained out. This lessens the amount of water going into the drains during a storm event, which decreases flooding risk.
- g) In cases when retention areas are not feasible, detention areas can be established which are similar to retention areas. The difference is that retention areas contain a permanent pool of water whereas detention areas hold water for a significantly shorter time frame, thus the alternative term 'dry basin.' Detention areas allow for extended storage time and help reduce downstream flooding.
- h) Vegetated swales or bioswales are depressed narrow channels that are utilized for briefly holding runoff. They have plants and/or gravel intended to filter pollution and sediments from stormwater. Bioswales provide an alternative to curbs and gutters and are used for controlling stormwater runoff.
- i) Build floodwalls and levees to avoid encroachment of flood waters into the site.

2. Wind

- a) Take note of peak wind velocities in the area. Provide necessary counter measures in the event of a strong typhoon.
- b) Take note of wind characteristics in coastal, upland and plains. Wind acceleration and movement fluctuate

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depending on various factors such as topography, proximity to bodies of water, as well as surrounding natural and built up forms.

3. Ground Rupture

Buildings should not be built on top of active faults or within a 5-meter buffer zone on either side of the fault line established by PHIVOLCS.

4. Ground Shaking

Take note of potential earthquake magnitudes in the area according NSCP Seismic Zone (Zone 2 and 4), especially those located within Zone 4 (Near-Source Factor)

5. Landslide

Take note of areas with landslide hazards, alluvial fan hazards and areas with unstable slopes and refrain from building in these locations.

6. Tsunami

Check tsunami hazard maps and build away from high risk areas.

7. Storm Surge

Check storm surge hazard maps and storm surge simulation maps. These simulation maps can identify which areas are vulnerable and should be avoided for construction.

These should be carefully considered first before implementing the architectural designs of PA Information Center presented in the succeeding pages. It is also worth noting that given a typical design of the PA Information Center, revisions are still warranted given the varying risks from the physical attributes of the PAs. Generally, construction program, building materials, and design of facilities should still be site specific.

B. Design

The recommended design provides specifications, requirements, and directive on how to establish or construct the PA Information Center to promote environmentally sustainable and green architecture design (**Annex A and Annex A1**). It aimed at reducing the negative impacts of the construction of buildings on the natural environment and at promoting the comfort, safety and well-being of its users. The construction of the PA information Center, as stated under Section I.A of this Technical Bulletin, should consider the impacts of climate-related events for greater resilience.

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C. Indicative Budget for the establishment of PA Information Center

The indicative budget provided in **Annex A2** is just a base recommendation on cost for the construction of PA Information Center. This may serve as a guide which can be adjusted to suit various situations within protected area. This allocation may also be a basis for future updating due to unstable price/costs of materials and labor based on the needs of protected areas.

II. SIGN AND MARKERS

A. General considerations and specifications

The general considerations on Item 4.1 of DAO 2009-09 and the specifications and requirements for the installation of signs and markers provided in Item 4.2 under Section 4 of DAO 2009-09 should be taken into consideration in the establishment of the uniform signs.

B. Design

The prescribed specifications and requirements of different signs to be installed in the protected areas such as protected area information board, boundary markers, administrative signs, directional signs, interpretive signs, and restrictive signs are provided in the attached **Annex B**.

III. TRANSITORY PROVISION

Existing PA information centers, signs and markers should be assessed based on specifications provided under 1B of this Technical Bulletin for future repairs and renovations. This should be done to improve the condition of the structures and to mitigate the negative impacts of man-made activities and structures to the environment and biodiversity.

For information and guidance of all concerned.



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Annex A. Design of the Protected Area Information Center



A SITE DEVELOPMENT PLAN

B EXTERIOR PERSPECTIVE

C LOCATION MAP

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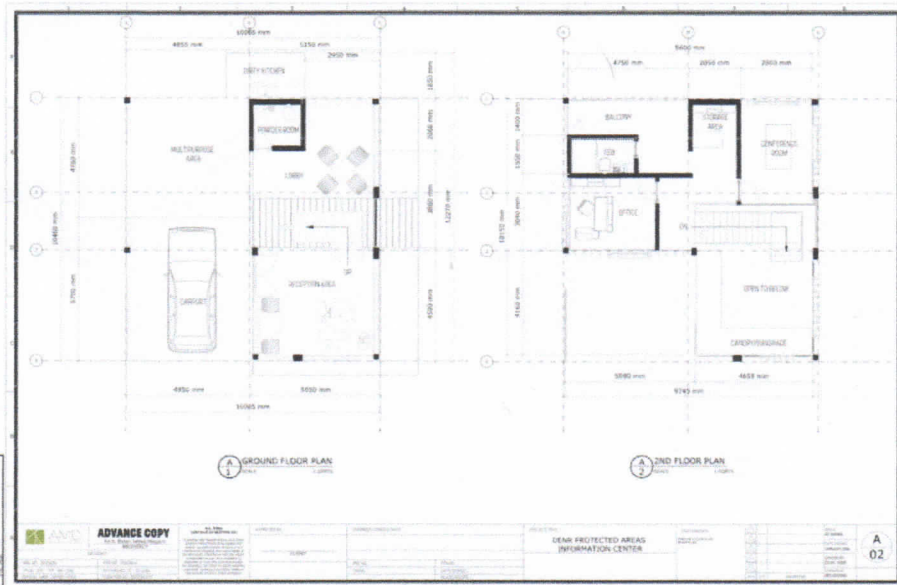
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PROJECT: DENR PROTECTED AREAS INFORMATION CENTER

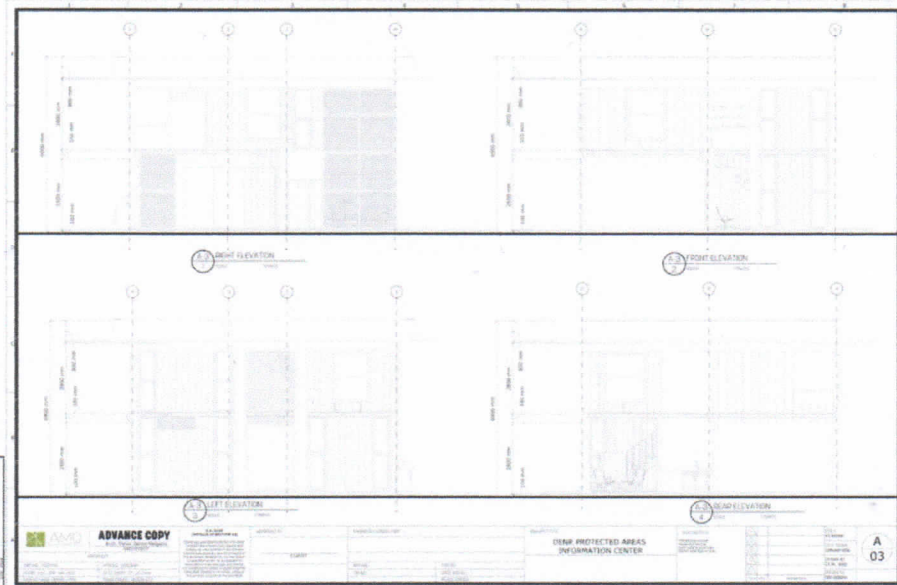
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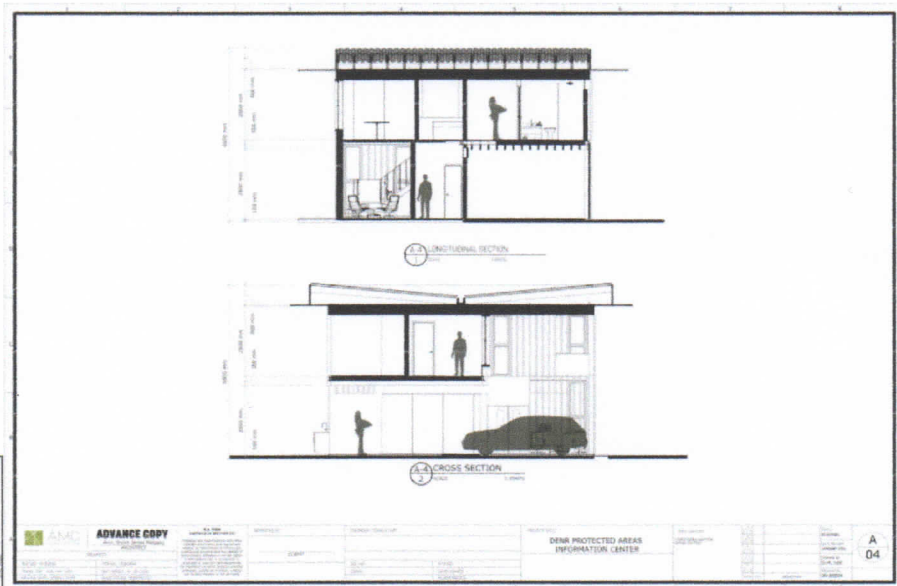
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Annex A1. Specifications and requirements of the Protected Area Information Center

1. Exterior finishes
 - a) Floor
 - Plain cement polished finish
 - b) Wall
 - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Reinforced CHB and Concrete Wall Panel
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - c) Roof and Canopy
 - Butterfly configuration with pre-cast concrete gutter at midspan with applied exposed type elastomeric waterproofing; provide perimeter edge flashing channel at all exposed junctions to be securely fastened to I-Beam support columns and beams.
2. Interior finishes
 - a) Pantry
 - Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Ceiling - 10mm (3/8”) thk. moisture resistant recessed edge gypsum board on metal furring channels
 - b) Display/ exhibit area
 - Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - Ceiling - 10mm (3/8”) thk. standard core recessed-edge gypsum board on metal furring channels, closed-joint and painted
 - c) Storage/ quarters
 - Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - Ceiling - 10mm (3/8”) thk. standard core recessed-edge gypsum board on metal furring channels, closed-joint and painted
 - d) Hallway with exhibit area
 - Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove

- at edge (consult an Architect for specific details)
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - Ceiling - 10mm (3/8") thk. standard core recessed-edge gypsum board on metal furring channels, closed-joint and painted
- e) Audio visual room
- Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - Ceiling - 10mm (3/8") thk. recessed edge gypsum board on metal furring channels, closed-joint and painted; provide 19mm wide reveal all around wall to ceiling terminations
- f) Toilets/laundry and utility room
- Floor - 600X600mm ceramic unglazed floor tiles
 - provide invisible drains
 - Wall - Painted plain cement plaster
 - Reinforced CHB and Concrete Wall Panel
 - Toilet partitions: Floor braced toilet partition systems and urinal screens, or approved equivalent
 - Ceiling - 10mm (3/8") thk. recessed edge moisture resistant gypsum board on metal furring channels, closed-joint and painted
 - provide 19mm wide reveal all around wall to ceiling terminations
- g) Reception
- Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Reinforced CHB and Concrete Wall Panel
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - Ceiling - 10mm (3/8") thk. standard core recessed-edge gypsum board on metal furring channels, closed-joint and painted
- h) Offices
- Floor - Plain cement polished finish
 - Wall - Louvered Reclaimed Wood Panel Wall – Tounge and groove at edge (consult an Architect for specific details)
 - Modular Tempered Glass Wall Panels hinged on I-Beam Steel Frame
 - Ceiling - 10mm (3/8") thk. standard core recessed-edge gypsum board on metal furring channels, closed-joint and painted

All finishes should observe the following:

1. All exterior glass panels will be low E rated
2. Paving materials are encouraged to have a Solar Reflectance Index (SRI) of at least 29 (based LEED Certification SS Credit 7.1)

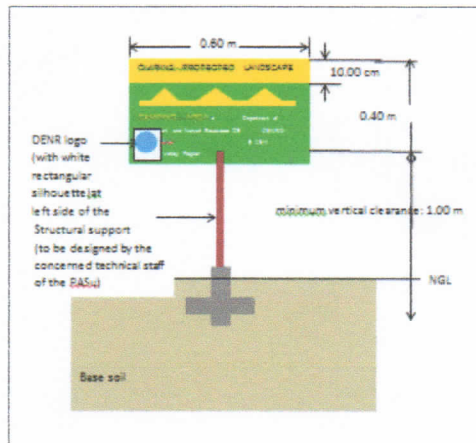
Surface	Approximate Percentage Reflected (Albedo)
Sand, dry	18-30
Dry grass	32
Green leaves	25-32
Brick (depending on color)	23-48

3. All adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) are encouraged to be low-VOC materials (based on LEED Certification EQ Credit 4.1)
By: DOW CORNING – Dindo Diaz (635-2797)
Ex. Dow Corning sealants and adhesives
Dow Corning Silicone roof Coating at 220g/L
Dow Corning Silanes (for construction chemicals)
4. Paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) are encouraged to be low-VOC paints and coatings (based on LEED Certification EQ Credit 4.2)
Ex: Boysen Paint – Virtuoso, Healthy Home, Lo-Odor Latex paint
Best Paint Company
Ecos Organic Paint (Europe)
5. All carpet, carpet cushion, and carpet adhesive installed in the building interior are encouraged to meet the testing and product requirements of Carpet and Rug Institute's Green Label Plus Program and of EQ Credit 4.1:VOC limit of 50g/L. (based on LEED Certification EQ Credit 4.3)
6. All composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) are encouraged to contain no added urea-formaldehyde resins (based on LEED Certification EQ Credit 4.4)
7. Building material or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project are encouraged to be used for a minimum of 10% (based on cost) of the total materials value (based on LEED Certification MR Credit 5.1)
8. Wood-based materials and products, which are certified in accordance with the Forest Stewardship Council (FSC) Principles and Criteria, for wood building components are encouraged to be used in Interior Finishes (based on LEED Certification MR Credit 7): Possibly Armourwood (verify wood source)

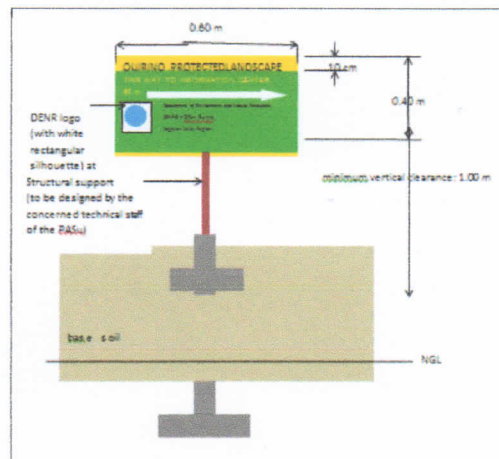
Annex A2. Indicative Budget for the establishment of PA Information Center

PARTICULAR	MATERIAL AND LABOR	TOTAL COST/ITEM
Mobilization and Site Works	100,000	100,000
Structural Frame	800,000	800,000
Wall	250,000	250,000
Finishes	200,000	200,000
Electrical	150,000	150,000
Plumbing	100,000	100,000
Cabinetry	-	-
Roofing	150,000	150,000
Accessories	30,000	30,000
DW	100,000	100,000
	TOTAL	Php 1,880,000

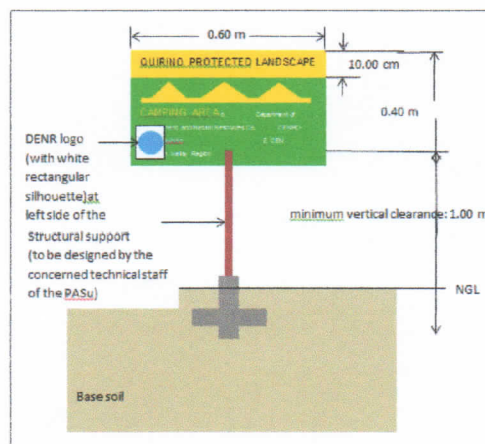
- Administrative signs – a sign inscribed with the information on the protected area, its boundaries and facilities



- Directional signs – a sign inscribed with the symbols showing the location and direction of the different facilities and important featured sites in a protected area.



- Interpretive signs – a sign written, visual or interactive way which relates a story or a message to improve the visitors' understanding and appreciation of the features of a particular area.



6. Restrictive signs – a sign inscribed with symbols for limiting the activities or access of visitors in a protected area or some places within it.

