Draft Environment and Social Impact Assessment

Project Number: 55205-001
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Lao PDR: Monsoon Wind Power Project
Part 5: Main Report

Prepared by Impact Energy Asia Development Limited (IEAD) for the Asian Development Bank.

Monsoon Wind Power Project, Sekong and Attapeu Provinces, Lao PDR

Environmental and Social Impact Assessment

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Significance of Impact				
Impact Significance	The combination of a Medium Receptor Sensitivity and Medium Impact Magnitude will result in an overall Moderate impact.			
Residual Impact Magnitude	Positive	Negligible	**Small**	Medium
Residual Magnitude Significance	Negligible	**Minor**	Moderate	Major
	As a result, the mitigation measures, residual negative impact will be of minor significance.			

8.3.7 Impacts to Landscape Values and Visual Amenity

8.3.7.1 Potential Impacts

Landscape Value

Landscape sensitivity can be assessed by the ability of a particular landscape character to absorb aesthetic alterations. Landscape impacts may occur upon a Landscape Characteristic Unit (LCU) as a direct result of the presence of the Project within an area of a particular landscape character. The LCU area identified for the Project has a predominant abundance of forest and agricultural area, with several hills nearby. The presence of the WTGs (and associated aviation lighting) and transmission line is likely to cause impacts to landscape value.

Visual

Visual impacts refer mainly to the visual character changes of available views resulting from project development, such as obstruction of existing views; removal of screening elements, thereby exposing viewers to unsightly views; the introduction of new elements into the views; and intrusion of foreign elements into the viewshed of landscape features. The presence of the WTGs and transmission line is likely to cause impacts to visual.

8.3.7.2 Significance of Impacts

Landscape Value

Methodology for Assessment of Impact Significance

The landscape impact assessment describes the nature and scale of changes to individual landscape elements and characteristics, and the subsequent effect on the landscape as a resource. To determine the significance of landscape effects it is necessary to consider the sensitivity of the landscape against the magnitude of landscape effects.

Landscape resources have been assessed in terms of their sensitivity, combining judgements on their susceptibility to the specific change proposed and the value attached to the resource. Susceptibility is the degree to which a particular landscape type or area can accommodate change arising from the Project, without detrimental effects on its character, and will vary with the:

- Existing land use;
- Pattern and scale of the landscape;
- Sense of enclosure and tranquility;
- Condition of the landscape; and
- Scope of mitigation, which would be in character with the existing landscape.

The value of landscape resources will, to some degree, reflect landscape designations and the level of importance they signify. The sensitivity of a landscape is judged based on the extent to which it can accept changes of a particular type and scale without adverse effects on its character. Sensitivity varies according to the type of development proposed and the nature of the landscape, such as its individual elements, key characteristics (land use, pattern and scale of landscape, enclosure /openness), inherent quality, condition, presence of detracting elements (e.g., pylons), value and capacity to accommodate change, and any specific values, such as designations, that apply. Grades of sensitivity can be defined as low, medium and high and are defined in ***Table 8.32***.

Table 8.32: Landscape sensitivity

Visual Receptors	Sensitivity
A moderately valued landscape, perhaps a locally important landscape, or where its character, land use, pattern and scale may have the capacity to accommodate a degree of the type of change envisaged.	Low
A landscape protected by a structure plan or national policy designation and/or widely acknowledged for its quality and value; a landscape with distinctive character and low capacity to accommodate the type of change envisaged.	Medium
A landscape protected by a regional (structure plan) or national designation and/or widely acknowledged for its quality and value; a landscape with distinctive character and low capacity to accommodate the type of change envisaged.	High

Judgements on the magnitude of effect have also been recorded on a scale (e.g., negligible, small, medium and large). More weight is generally given to effects that are greater in scale and permanent or long term. Therefore, a temporary change confined to a small area may be considered to be of low magnitude. Where planting is proposed as mitigation, its effectiveness during the early periods of a project should be taken into account in suggesting reductions in magnitude. The typical criteria in determining the magnitude of effect on the landscape are set out in ***Table 8.33***.

Table 8.33: Landscape magnitude

Typical criteria and thresholds	Visual magnitude of effect
An imperceptible, barely, or rarely perceptible change in landscape characteristics.	Negligible
A small change in landscape characteristics over a wide area or a moderate change either over a restricted area or infrequently perceived.	Small
A moderate change in landscape characteristics, frequent or continuous, and over a wide area, or a clearly evident change either over a restricted area or infrequently perceived.	Medium
A clearly evident and frequent/continuous change in landscape characteristics affecting an extensive area.	Large

Receptor Sensitivity and Impact Magnitude

When determining the significance of landscape effects, the following should also be considered:

- The loss of mature or diverse landscape elements or features is likely to be more significant than the loss of new or uniform elements;

- Effects on character areas, which are representative, may be more important than the loss of areas in poor condition or degraded areas. The test of significance is not directly related to planning policy;
- The loss of landscape elements, features or characteristics will be given greater weight if they are identified as being of high value. Therefore, effects on nationally designated areas are likely to be more significant than effects on areas of local value; and
- The sensitivity of the landscape is dependent on both the attributes of the landscape and the characteristics of the Project. Landscapes with a high sensitivity to the type of change proposed are more likely to be seriously affected than those with a lower sensitivity.

The landscape sensitivity and scenic amenity values of the area are **medium**. The magnitude of impact of the construction activities on the landscape character is considered **medium**, for the following reasons:

- Construction yards will be highly visible in order to host more than 1,000 workers;
- Relatively small access roads will have several construction vehicles generating dust, noise and air emissions;
- The occasional vegetation will not hide any construction activities; and
- The landscape character unit identified is a virgin environment, where the human presence is sporadic and non-invasive. The ability of this landscape to adsorb the type of change envisaged by the Project is considered to be low.

Impact Significance

The impact of the Project on the landscape character is considered **moderate**, due to the following reasons:

- The high landscape sensitivity and scenic amenity value of the rural areas;
- The fragmented and limited extent of native vegetation with low-level local scenic amenity value; and
- The landscape character type identified has not been modified in a substantial way by human activities and it is considered to have poor capacity to absorb the type of change envisaged by the Project.

Visual

Methodology for Assessment of Impact Significance - Visual

The visual impact assessment describes changes in the character of the available views to people resulting from a given Project and their visual amenity. To determine the significance of visual effects it is necessary to consider the sensitivity of the visual receptors against the magnitude of visual effects.

Visual receptors include people and must be assessed in terms of their sensitivity, combining judgements on their susceptibility to the specific change proposed and the value attached to a view or their visual amenity. Susceptibility is the degree to which a particular visual receptor can accommodate change arising from the Project, without detrimental effects on the visual amenity, and will vary with the:

- Occupation or activity of people experiencing the view;
- Location and context of the view; and
- Extent to which their attention or interest may be focused on the view and their visual amenity.

Judgements about the sensitivity of visual receptors should be recorded on a scale (e.g., low, medium and high) with clearly stated criteria. ***Table 8.34*** indicates the relative sensitivities of a number of visual receptors.

Table 8.34: Sensitivity of Visual Receptors

Visual Receptors	Sensitivity
Small number of visitors with interest in their surroundings. Viewers with a passing interest, not specifically focused on the landscape, e.g., workers, commuters. The quality of the existing view, as likely to be perceived by the viewer, is assessed as being low.	Low
Small number of residents and moderate number of visitors with an interest in their environment. Larger numbers of recreational road users. The quality of the existing view, as likely to be perceived by the viewer, is assessed as being medium.	Medium
Larger number of viewers and/or those with proprietary interest and prolonged viewing opportunities, such as residents and users of attractive and well-used recreational facilities. The quality of the existing view, as likely to be perceived by the viewer, is assessed as being high.	High

There is no standard methodology for the scale or magnitude of effects on views and visual amenity. However, it is generally based on the:

- Scale of change, relating to the loss or additions of features in the view, including the proportion of the view occupied by the proposed development;
- Degree of contrast or integration of any new feature or changes in the composition of the view;
- Duration of the effect, whether temporary or permanent, intermittent or continuous;
- Angle of view in relation to the main activity of the receptor;
- Distance of the viewpoint from the Project; and
- Extent of the area over which the changes would be visible.

As there is likely to be a variation in the degree of visibility of the Project, it is helpful to categorize those variations based on:

- The extent of the view that would be occupied by the Project: full, partial, glimpse, etc.;
- The distance of the viewpoint from the Project and whether the viewer would focus on the Project due to proximity or the Project would form one element in a particular view;
- The proportion of the Project or particular features that would be visible: full, most, small amount, none;
- Whether the view is transient or one of a sequence of views as from a moving vehicle or footpath.

Consideration may also be given to the time of day and seasonal differences in effects. The worst case may need to be demonstrated (i.e., during wet season, when the moisture reduces visibility). The typical criteria and thresholds for determining the magnitude of effect on visual receptors are set out in ***Table 8.35***.

Table 8.35 Magnitude of Visual Effect

Typical criteria and thresholds	Visual magnitude of effect
A change, which is barely or rarely perceptible, at a very long distance, or visible for a short duration, perhaps at an oblique angle, or which blends in with the existing view. The change may be short term.	Negligible

A subtle change in the view, at long distances, or visible at a short distance, perhaps at an oblique angle, or which blends in with the existing view. The change may be short term.	Small
A noticeable change in the view at an intermediate distance, affecting a substantial part of the view, part a more wide-ranging, less concentrated change across an expansive area. The change may be medium to long term and may not be reversible.	Medium
A clearly evident change in the view within a short distance, affecting a substantial part of the view, continuously visible for a long duration, or obstructing important elements of the view. The change may be medium to long term and would not be reversible.	Large

Receptor Sensitivity and Impact Magnitude

When determining the significance of visual effects, the following is taken into account:

- Large scale changes which introduce new discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present in the view;
- Changes in views from recognized and important viewpoints or amenity routes are likely to be more significant than changes affecting less important paths and roads; and
- Changes affecting large numbers of people are generally more significant than those affecting a relatively small group of users. However, in wilderness landscapes the sensitivity of the people who use the areas may be very high and this will be reflected in the significance of effect.

The visual impact is a product of the magnitude of change to the existing baseline conditions, the landscape context, and the sensitivities of Visual Sensitive Receptors (VSRs).

The viewshed analysis (***Figure 8.8*** and ***Figure 8.36***) shows that the proposed wind turbines have the potential to be visible in the nearby areas, although not continuously due to the variability of the landscape for the area surrounding the Project.

Receptor Sensitivity, Impact Magnitude and Impact Significance

Specific considerations were made for each VSR, and the results can be viewed in the graphic sheets presented below and the impact significance, receptor sensitivity, and impact magnitude is summarized in ***Table 8.36***.

Table 8.36: Summary of Visual Impact

VSR	Village	Distance to nearest wind turbine	Project visibility	Sensitivity of receptor	Magnitude of visual effect	Significance of visual effect
VSR1	Ban Namtiap	20.5 km	Visible	Medium	Negligible	Negligible
VSR2	Ban Paor	7.6 km	Not visible	Medium	Negligible	Negligible
VSR3	Ban Daska	8.2 km	Visible	Medium	Negligible	Negligible
VSR4	Ban Chaling	6.3 km	Not visible	Medium	Negligible	Negligible
VSR5	Ban Daktreb	1.0 km	Visible	Medium	Medium	Moderate
VSR6	Ban Dakdor	1.5 km	Visible	Medium	Small	Minor
VSR7	Dak Cheung	1.5 km	Visible	Medium	Medium	Moderate
VSR8	Ban Chalernxay	6.8 km	Visible	Medium	Small	Minor
VSR9	Ban Maithavone	6.2 km	Visible	Medium	Small	Minor

VSR	Village	Distance to nearest wind turbine	Project visibility	Sensitivity of receptor	Magnitude of visual effect	Significance of visual effect
VSR11	Laos / Vietnam border	15.3 km	Visible	Low	Small	Minor
VSR12	Ban Saoksavang	19.2 km	Not visible	Medium	Negligible	Negligible
VSR13	Road	1.5 km	Visible	Low	Medium	Minor
VSR15	Xekaman 3 HPP	11.8.5 km	Not visible	Medium	Negligible	Negligible
VSR16	Ban Chavik - Nalaiy	23.4 km	Not visible	Medium	Negligible	Negligible
VSR17	School	0.5 km	Visible	Medium	Medium - Large	Moderate - Major
VSR18	Village	0.8 km	Visible	Medium	Medium - Large	Moderate - Major
VSR19	Dakyen	0.5 km	Visible	Medium	Medium	Moderate

Figure 8.7 outlines how the graphic sheets below are organized, with sections matching these numbered descriptions:

1. Location and direction of VSR;
2. Distance and visibility of turbines within view;
3. Photo current state;
4. Photo simulation;
5. Wireframe view; and
6. Summary of visual impact.

Figure 8.7: Legend of Visual Graphic Sheets

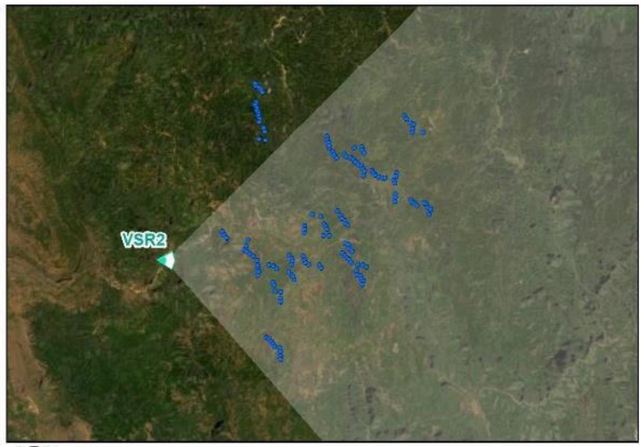
Figure 8.8: Photomontage for VSR1

Figure 8.9: Photomontage for VSR2

Coordinate system
WGS84-UTM 48N
X 711277 Y 1694801

VSR2

Ban Paor



VSR view direction: 92°

WTG nearest 7.6 km
WTG farther 34.5 km
WTGs in the field of view (FoV) 131
WTGs visible only considering terrain surface
⇒ at tip height 0
⇒ at hub height 0

The view is taken from a road in the local community of Ban Paor near a school. Being a resident area with a small number of viewer with proprietary interest Sensitivity is Medium.

The change from this point of view is unnoticeable, not a turbine is visible. It is considered that magnitude as Negligible.

Sensitivity	Magnitude	Significance
Medium	Negligible	**Negligible**

Environmental and Social Impact Assessment – Landscape and Visual Component

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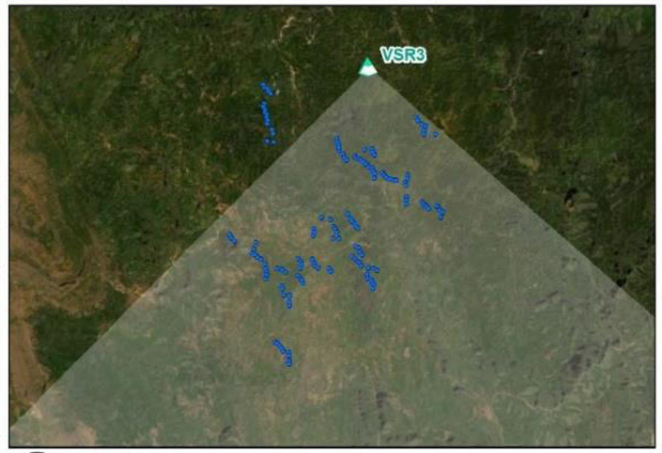
Figure 8.10: Photomontage for VSR3

Coordinate system
WGS84-UTM 48N
X 734409 Y 1717973

VSR3

Ban Daksa



VSR view direction: 178°

WTG nearest 8.2 km
WTG farther 36.3 km
WTGs in the field of view (FoV) 131
WTGs visible only considering terrain surface
⇒ at tip height 7
⇒ at hub height 3

The view is taken in the local community of Ban Daksa surrounded by hills and forest. Sensitivity is Medium.

The change from this point of view is unnoticeable, not a turbine is visible. It is considered that magnitude as Negligible.

Sensitivity	Magnitude	Significance
Medium	Negligible	**Negligible**

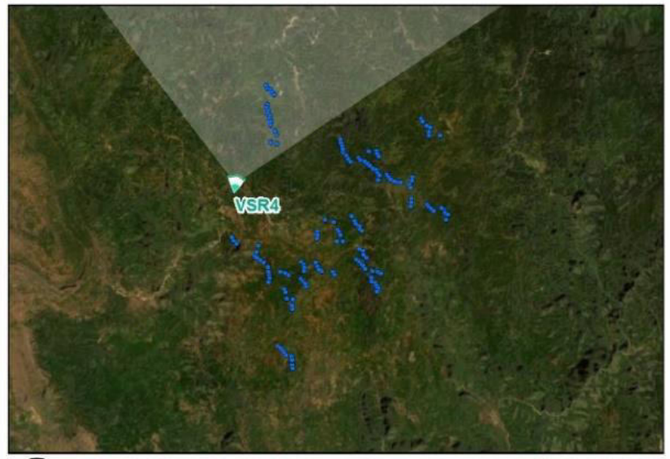
Environmental and Social Impact Assessment – Landscape and Visual Component

Figure 8.11: Photomontage for VSR4 (1)

Coordinate system
WGS84-UTM 48N
X 718458 Y 1704417

VSR4 (1 of 2)

Ban Chaling



VSR view direction: 10°

WTG nearest 6.3 km
WTG farther 12.0 km
WTGs in the field of view (FoV) 17
WTGs visible only considering terrain surface
⇒ at tip height 0
⇒ at hub height 0

The view is taken in the local community of Ban Chaling surrounded by forest and nearby a river. Sensitivity is Medium.

The change from this point of view is unnoticeable, not a turbine is visible. It is considered that magnitude as Negligible.

Sensitivity	Magnitude	Significance
Medium	Negligible	**Negligible**

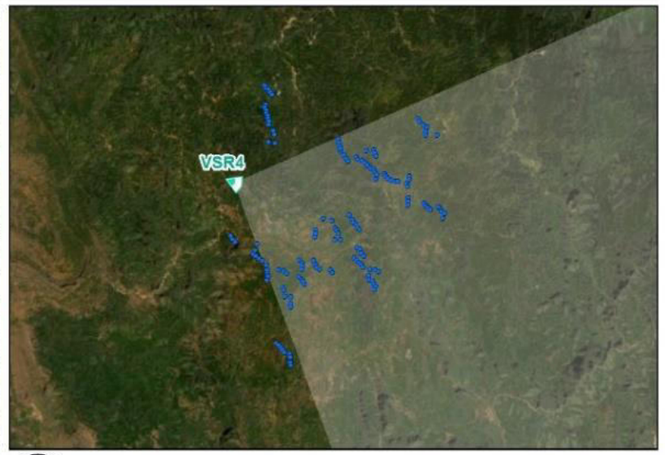
Environmental and Social Impact Assessment – Landscape and Visual Component

Figure 8.12: Photomontage for VSR4 (2)

Coordinate system
WGS84-UTM 48N
X 718458 Y 1704417

VSR4 (2 of 2)

Ban Chaling



VSR view direction: 113°

WTG nearest 11.0 km
WTG farther 24.9 km
WTGs in the field of view (FoV) 108
WTGs visible only considering terrain surface
⇒ at tip height 0
⇒ at hub height 0

The view is taken in the local community of Ban Chaling surrounded by forest and nearby a river. Sensitivity is Medium.

The change from this point of view is unnoticeable, not a turbine is visible. It is considered that magnitude as Negligible.

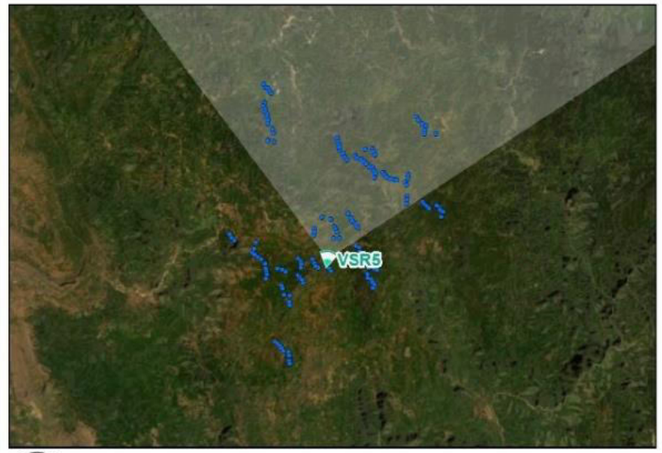
Sensitivity	Magnitude	Significance
Medium	Negligible	**Negligible**

Figure 8.13: Photomontage for VSR5 (1)

Coordinate system
WGS84-UTM 48N
X 729578 Y 1695290

VSR5 (1 of 4)

Ban Daktreb



VSR view direction: 10°

WTG nearest 2.5 km
WTG farther 22.0 km
WTGs in the field of view (FoV) 75
WTGs visible only considering terrain surface
⇒ at tip height 0
⇒ at hub height 0

The view is taken in the local community of Ban Daktreb near a school. Sensitivity is Medium.

The turbines are visible visible at a short distance. It is considered that magnitude as Medium

Sensitivity	Magnitude	Significance
Medium	Medium	**Moderate**

Figure 8.14: Photomontage for VSR5 (2)

Coordinate system
WGS84-UTM 48N
X 729578 Y 1695290

VSR5 (2 of 4)

Ban Daktreb

VSR view direction: 100°

WTG nearest 2.9 km
WTG farther 14.7 km
WTGs in the field of view (FoV) 28
WTGs visible only considering terrain surface
⇒ at tip height 16
⇒ at hub height 12

The view is taken in the local community of Ban Daktreb near a school. Sensitivity is Medium.

The turbines are visible visible at a short distance. It is considered that magnitude as Medium

Sensitivity	Magnitude	Significance
Medium	Medium	**Moderate**

Figure 8.15: Photomontage for VSR5 (3)

Coordinate system
WGS84-UTM 48N
X 729578 Y 1695290

VSR5 (3 of 4)

Ban Daktreb

VSR view direction: 190°

WTG nearest 1.0 km
WTG farther 13.1 km
WTGs in the field of view (FoV) 20
WTGs visible only considering terrain surface
⇒ at tip height 20
⇒ at hub height 15

The view is taken in the local community of Ban Daktreb near a school. Sensitivity is Medium.

The turbines are visible visible at a short distance. It is considered that magnitude as Medium

Sensitivity	Magnitude	Significance
Medium	Medium	**Moderate**

Figure 8.16: Photomontage for VSR5 (4)

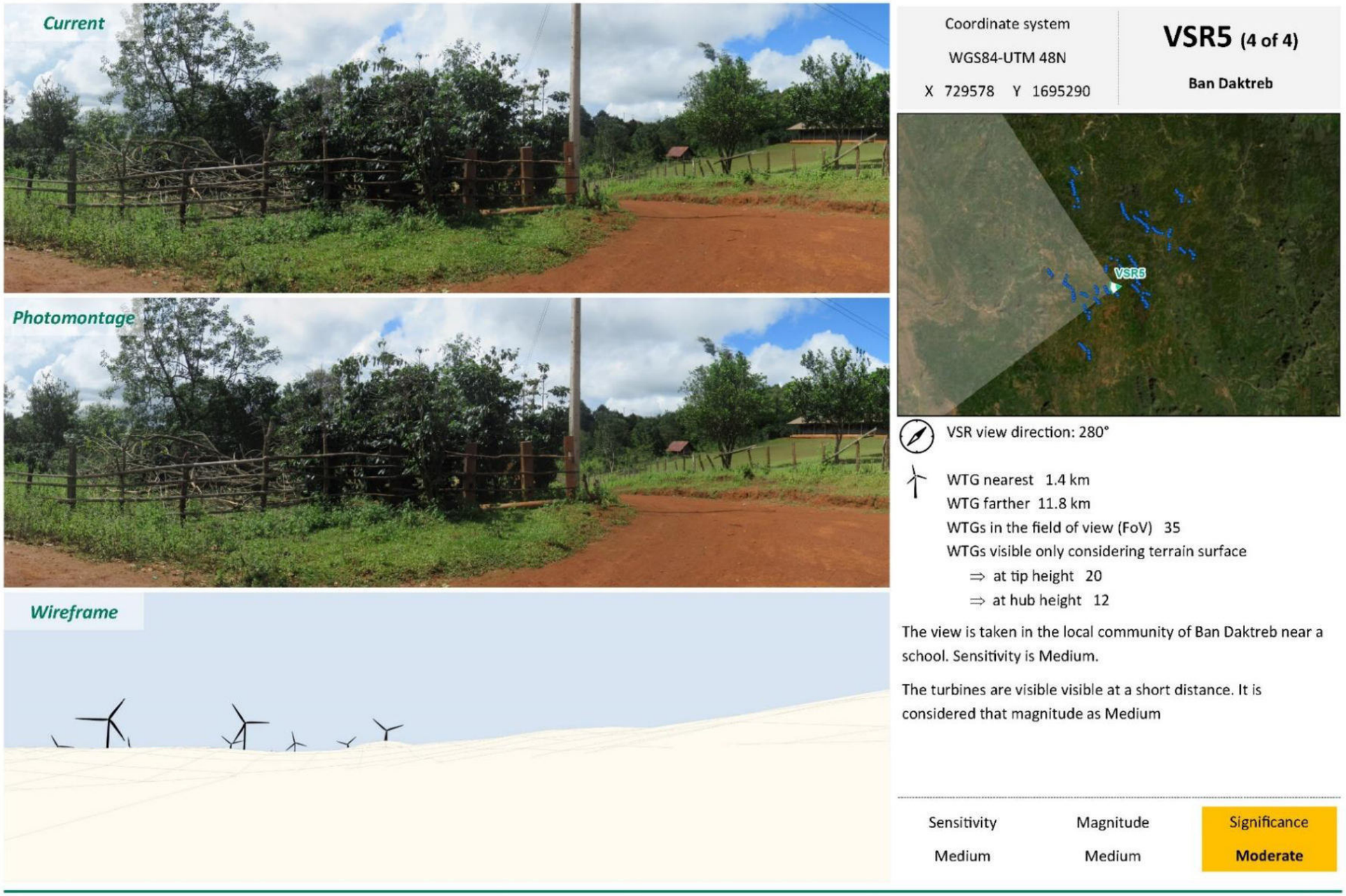
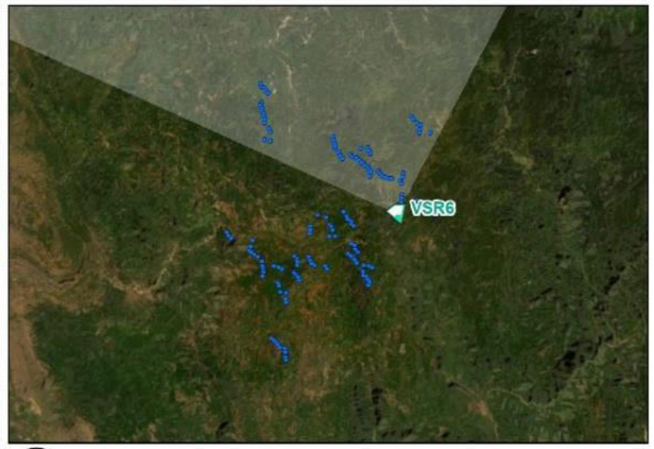


Figure 8.17: Photomontage for VSR6 (1)

Coordinate system
WGS84-UTM 48N
X 738363 Y 1700377

VSR6 (1 of 2)

Ban Dakdor



VSR view direction: 341°

WTG nearest 1.5 km
WTG farther 22.5 km
WTGs in the field of view (FoV) 59
WTGs visible only considering terrain surface
⇒ at tip height 0
⇒ at hub height 0

The view is taken in the local community of Ban Dakdor surrounded by hills and forest. Sensitivity is Medium.

Due to the topography and the distance, from this point not all wind turbine are visible and they are only exposed from the upper portion of the rotor. It is considered that magnitude as Small.

Sensitivity	Magnitude	Significance
Medium	Small	**Minor**

Environmental and Social Impact Assessment – Landscape and Visual Component