

JS6 Geological section



Photo 1

Outcrop of granite.

Right side of the riverbed, massive and hard, fresh.



Photo 2

Outcrop of granite in the small stream of Suoi Dia Gor.

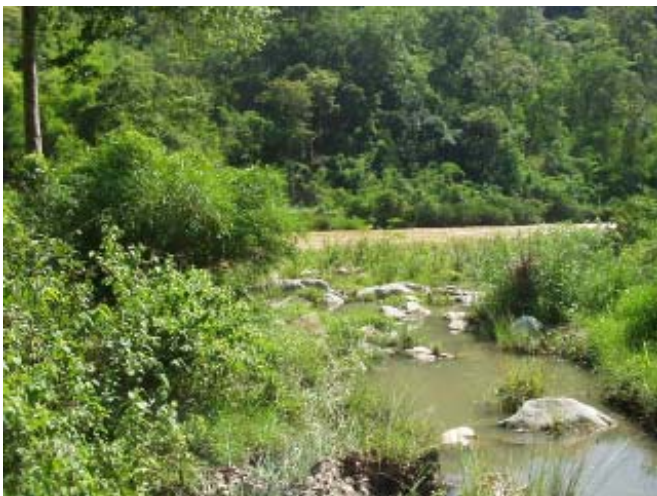


Photo 3

Opposite side of the small stream of Suoi Dia Gor. Gathering to the Song Cai.



Photo 4

Weathered zone in the granite area, right side of the Song Cai.



Photo 5

Granite outcrops on the left side of the Song Cai. Fresh, massive and hard.



Photo 6

Outcrop of andesite in the right side of Song Cai. Fresh, hard and massive.



Photo 7

Close up of the andesite outcrop.  
Fresh, hard and massive.



Photo 8

The large outcrop of andesite in the riverbed  
of Song Cai.



Photo 9

Weathering in the surface of the granite, right  
side of Song Cai near the Dam axis.  
The depth of the weathering is probably  
5-10m.

**Checklist of Environmental Parameters: JS6**

NOTE: The remarks are made based on the current plan. The assessments are based on the information obtained during the survey and should be reviewed and corrected, if necessary, at the next stage.

	Expected negative impacts			Remarks
	Major	Unknown or can be mitigated	No significant impact	
<b>A. Environmental Problems Due to Project Location</b>				
<b>A-1. Social Environment</b>				
1. Effects on ethnic minorities		×		<b>Upper dam / reservoir</b> No village exists at the site. <b>Lower dam / reservoir</b> The dam site is located at the northern part of Ta Lot village (RagLai minority), Phuoc Hoa commune.
2. Resettlement		×		<b>Upper dam / reservoir</b> No resettlement will occur. <b>Lower dam / reservoir</b> Although precise number of the resettling households is not identified yet, resettlement is expected to occur. The dam site will affect several households of Ta Lot village directly and the rests may be affected indirectly.
3. Loss of land (e.g. agricultural land)		×		<b>Upper dam / reservoir</b> No asset will be lost. <b>Lower dam / reservoir</b> Rice field and agricultural lands will be lost.
4. Encroachment into watershed			×	<b>Upper dam / reservoir</b> Forest will be lost but the impacts are expected to be limited. <b>Lower dam / reservoir</b> Forest along Cai river will be lost but the watershed is expected not to be affected.

5. Encroachment on historical and cultural values			×	There is no historical and cultural site in both areas.
6. Impairment of navigation			×	<b>Upper dam / reservoir</b> The site is at the top of a mountain. <b>Lower dam / reservoir</b> There is no shipping traffic.
7. Inundation of mineral resources			×	There is no mineral resource in the both areas.
8. Decline of fisheries			×	<b>Upper dam / reservoir</b> The site is at the top of a mountain. <b>Lower dam / reservoir</b> Fishery may be practised for their own consumption. The affect is not precisely predicted but the scale of the impacts is thought to be small.
9. Downstream impacts		×		<b>Upper dam / reservoir</b> The site is at the top of the mountain and there is no downstream social environment. <b>Lower dam / reservoir</b> The downstream of Cai river is not studied.
<b>A-2. Natural Environment</b>				
1. Encroachment into precious ecosystem	×			The <b>terrestrial ecosystem</b> will be directly impacted by the project because the area of the upper dam / reservoir is well-conserved forests. The <b>aquatic ecosystem</b> will also be directly impacted. Cai river does not have a dam at all along its entire length, and the dam will separate its aquatic ecosystem. The dam site is located at a unique area. The river flows into a flat area from mountains, which makes the ecosystem complex and unique.
2. Encroachment into existing protected areas			×	Both areas are not in the national protected areas. There is a nature reserve (Phuoc Binh Nature Reserve established in 2002) in the north of the project site. Although some parts of the buffer zone along Cai river is encroached by the lower reservoir, the core zone of the nature reserve is not affected directly.
3. Migrating fish species	×			<b>Upper dam / reservoir</b>

				<p>Since the upper dam / reservoir site is a forested area, impact on the aquatic ecosystem is not expected.</p> <p><b>Lower dam / reservoir</b>  The aquatic ecosystem of Cai river is not fully understood. At the moment the project is the first one to build a dam for this river, and the aquatic ecosystem will receive the severe impacts by the project. A comprehensive study on the aquatic ecosystem needs to be undertaken and mitigation measures.</p>
4. Effects on scenic value			×	Impact on scenic value is limited.
5. Downstream impacts	×			<p>The <b>terrestrial ecosystem</b> of Cai river is fully studied yet, and since the project constructs the first dam of the river, impacts on the terrestrial ecosystem is not fully understood.</p> <p>The <b>aquatic ecosystem</b> of Cai river is not fully studied yet and impacts on it cannot be fully predicted. A comprehensive study on the aquatic ecosystem needs to be undertaken and mitigation measures.</p>
<b>A-3. Physical Environment</b>				
1. Watershed erosion / silt runoff			×	<p><b>Upper dam / reservoir</b>  Geologically it is unlikely that the site will suffer severe erosion.</p> <p><b>Lower dam / reservoir</b>  Although geologically it is unlikely that the site will suffer severe erosion, there is a structural line (fault line) and it is necessary to have a detailed study on the line.</p>
2. Effects on groundwater hydrology			×	<p><b>Upper dam / reservoir</b>  It is unlikely that there is severe impact to groundwater hydrology.</p> <p><b>Lower dam / reservoir</b>  Severe impact to groundwater hydrology is not expected.</p>
3. Downstream water flow variations			×	Once the reservoirs are filled with water, the water flows from the dams are regulated to the same as before. It means that there will be no change in water flow variations.
4. Change of sedimentation transportation balance		×		The sedimentation accumulation mechanism and its amount are under study and the details will be reflected to the study in the next stage.
<b>B. Environmental Problems Associated</b>				
		×		All the items in this section should be carefully considered and

<b>with Construction Stage</b>				<p>technical specifications must be given to contractors to conduct all necessary mitigation measures.</p> <p>Route of an approach road to the upstream villages should be carefully planned in order to give the minimum impacts to the forests. Workers' camp is expected to be big and its social impacts are to be carefully assessed and fully mitigated.</p> <p>Careful consideration should be paid to select disposal area to prevent secondary impacts. It is ideal to site the disposal area within the reservoir areas.</p> <p>Poaching and introduction of alien species must be fully controlled to prevent disturbance to the local ecosystem and biodiversity.</p>
<b>B-1. Construction Monitoring</b>				
1. Construction monitoring				
<b>B-2. Construction</b>				
1. Soil erosion / silt runoff				
2. Toxic wastes from equipment and cement factory				
3. Environmental degradation at quarry site				
<b>B-3. Workers</b>				
1. Safety of workers				
2. Sanitation at workers' camp				
3. Dust/ odors / fumes / noise / vibrations				
4. Quarrying hazards				
<b>B-4. Social Environment</b>				
1. Negative perception of local people				
2. Traffic accidents				
3. Traffic congestion and damage to road and bridge				
4. Environmental aesthetics				
<b>B-5. Natural Environment</b>				
1. Poaching by workers				
2. Firewood collection				
3. Introduction of alien species				



<b>C. Environmental Problems Related to Project Operations</b>		×		<p>All the items in this section should be carefully considered and necessary mitigation measures must be undertaken by operation organisation to reduce impacts as much as possible.</p> <p>Insect vector / waterborne diseases are at the moment not prevailing in the areas. The water levels of reservoirs of PSPP change everyday, which may not make insects (e.g. mosquito) actively breed. It is therefore likely that the diseases will not prevail. However, necessary caution should be given to the local people.</p> <p>Impacts on natural environment should be carefully assessed and necessary countermeasures should be undertaken.</p>
<b>C-1. Operation Monitoring</b>				
1. Operation monitoring				
<b>C-2. Operation</b>				
1. Warning system				
2. Downstream erosion				
3. Eutrophication of the reservoir				
4. Downstream water quality				
5. Reservoir bank stability				
<b>C-3. Social Environment</b>				
1. Insect vector / waterborne diseases hazards				
2. Estuarine and marine fisheries impacts				
<b>C-4. Natural Environment</b>				
1. Poaching due to new access methods				
2. Illegal logging due to new access methods				
3. Encroachment due to new access methods				
<b>D. Additional Consideration for Hydropower Projects</b>		×		<p>All the items in this section should be carefully considered and necessary mitigation measures must be undertaken.</p> <p>At the moment, it is unlikely that avian hazards from transmission lines and towers occur. This is because large birds such as <i>Ciconia</i> spp. do not migrate in the region.</p> <p>At the moment, it is unlikely that aircraft hazards from transmission lines and towers occur. This is because there is not an airfield in the</p>

				region.
<b>D-1. Transmission Lines</b>				
1. Encroachment on precious ecosystem				
2. Impairment of wildlife movement				
3. Avian hazards from transmission lines and towers				
4. Impairment of environmental aesthetics				
5. Soil erosion from construction and areas left exposed				
6. Inviting new encroachment				
7. Aircraft hazards from transmission lines and towers				
8. Induced effects from electromagnetic fields				



Photo 1

An interview survey was conducted at Ta Lot village.



Photo 2

A view of the upper dam / reservoir site. The site is covered with good secondary forest.

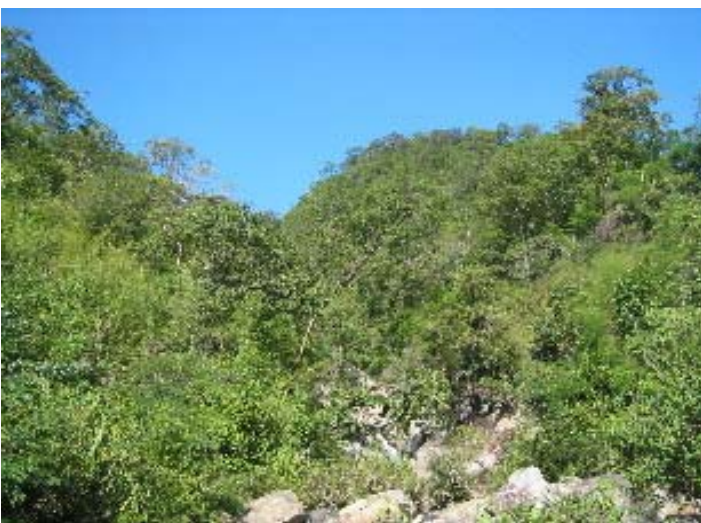


Photo 3

Several streams flows into Cai river. The slope is covered with good secondary forest.