

The features of promising potential sites for PSPP

Site Name		JN 3	
Location (Name of River)		Upper dam/reservoir : Son La Province / Phu Yen District / Ban Lon Commune (None) Lower dam/reservoir : Son La Province / Phu Yen District / Muong Lang Commune (Song Mua River)	
Project Parameter	Installed Capacity P(MW)	1,000	
	Design Discharge Qd(m ³ /s)	240	
	Effective Head He(m)	530	
	Peak Duration Time T(hrs)	7	
Topography and Geology	(Overall geological condition)	<ul style="list-style-type: none"> - Surveyed area is located around the southeast most edge of NW-SE system folding. Triassic-Devonian limestones and Jurassic/Permian~Triassic volcanic rocks unconformity contact each other in this area. - From the Surveyed area to the Phu Yen to the west, shale dominant early-medium period of Devonian sedimentary rocks occur. Strikes of bedding are generally N45~60W and dips are variable disturbed by the volcanic intrusion. - Thin beds of serpentine in the certain formations of Devonian as shale and limestone (D1st) are reported in the published geological map (1:200,000). 	
	(Upper dam/reservoir)	<ul style="list-style-type: none"> - Devonian limestone (D2mt) occurs around the upper reservoir, the slope is gently around the ridge. There are little outcrops on the slope, but many of hard and massive shale-mudstone dominant containing limestone piece are found on the ground. - A relatively big structural line is reported in the published geological map (1:200,000) pass through the upper reservoir in southern part to southeastern part. This structural line is an ENE-WSW system of left-handed strike fault. Topography indicates this features on the hill. - Topography of the designed upper reservoir location is a about 1km² of flat area on EL.900m. Some small swamp and water on the surface, also seepage. It indicates the permeability of limestone around here is extremely low and surface weathering zone is probably less than 20m at the deepest point. - The upper dam site can be accessed by a vehicle through Route 32 about 3.0 km long and through an un-paved road, but these roads were under construction. Therefore the study group approached to the site by using about 50 km long of un-paved road from the south of Phu Yen to Ban Lan near the site. - The south part of the planned upper dam site is different from the topographical map. - Since a length of dam crest is more than 600 m when the H.W.L. is set to 900 m, it will be very costly to construct the dam. - Therefore, poundage constructed by excavation (full facing type) is suitable for this upper reservoir which reservoir area will be 0.5 km² and which H.W.L. will be 850 m based on the topographical condition. - There is a mountain composed of limestone in the west side of the reservoir, which has a very steep slant, it is necessary to build a bank by land filling so as not to affect the stabilization of the mountain. - A small hill around EL.870m exists in the east part of the reservoir, which can be made use of as a part of bank. - The total amount of excavation is presumed to be about 60 - 70 % of the reservoir capacity. 	

	(Waterway • Power Station)	<ul style="list-style-type: none"> - Three kinds of ages of the sedimentary rocks in Devonian period are occupy this area, the limestone in upper reservoir (D2mt) change into shale dominant limestone (D2ebn) in this area. - The access tunnel to powerhouse and a tailrace can be approached from the access road to the lower dam site, its new access road will be about 1 km long. - Since the horizontal distance of all waterways is about 3.5 km long, this layout has a high economical efficiency. - The location of the underground powerhouse should be determined based on economical comparison study between vertical shaft type and inclined shaft type of the penstock.
	(Lower dam/reservoir)	<ul style="list-style-type: none"> - The topography and geology of shale dominant rarely limestone containing sedimentary rock (D2ebn) is a fair to the construction. This rock is change into shale dominant serpentine containing sedimentary rock (D1st) 1km before the outlet. The pinched serpentine is probably out of the problem in civil work because the beds are quite partially and lenticular, and dips of the bedding is nearly vertical. - The lower dam site can be approached by a vehicle from Phu Yen to Ban Manh through Route 32 about 25 km long and the un-paved road about 12 km long. - Since there is no footpath to approach (about 4 km long) the lower dam site, the study group went to the upstream of the reservoir. - H.W.L can be lowered to the EL 300m in order to secure reservoir capacity of 10 billion m³. Based on this change, the lower dam site might be moved to the downstream of the river from the viewpoints of the economy. In this case, another small saddle dam might be required for the saddle part of the left-bank. - The river flow at the lower dam site is assumed to be 0.3 - 0.5 m³/s. (The river flow of a main stream is assumed about 1 m³/s) - The catchment area is as small as about 20 km².
Natural and Social Environment	Natural Park / Protected Area	The project site and its surrounding areas are not in any existing or proposed protected area.
	Prosperous fauna / flora	There is a local protected area, “Muong Lang” forest closed to the site in the distance of 1 km. The condition of the forest is good and it plays an important role as a watershed. There are some important plant species and large mammals in the area.
	Minority	The main ethnic groups are Muong and Thai, which consist 60%, of the population of the area. Others are Dao and H’Mong people. It is expected that some of them will receive negative impacts.
	Resettlement / Compensatory assets	There is a village, Thuong Lang, in the proposed lower reservoir. About 15 households need to be resettled. Compensation for agricultural land, forest garden, houses will occur. There is a possibility that resettlement occurs because of construction of an access road to the lower dam site.
	Historical / Cultural Heritage	There is no historical / cultural site in and around the project site.
	Road / Traffic condition	There is a good road to the upper dam site. It is necessary to construct a new one to the lower dam site.
Others’ Special Note		The site is situated about 70 km to Hoa Binh sub-station (500 kV).
Estimated Economic Value		760 mln US \$ (B/C=1.09)

Site Name: JN3



Upper reservoir
HWL: 850m
LWL: 830m

Power House

Lower reservoir
HWL: 300m
LWL: 280m

Original map No. 5951-II
Scale: 1:50,000

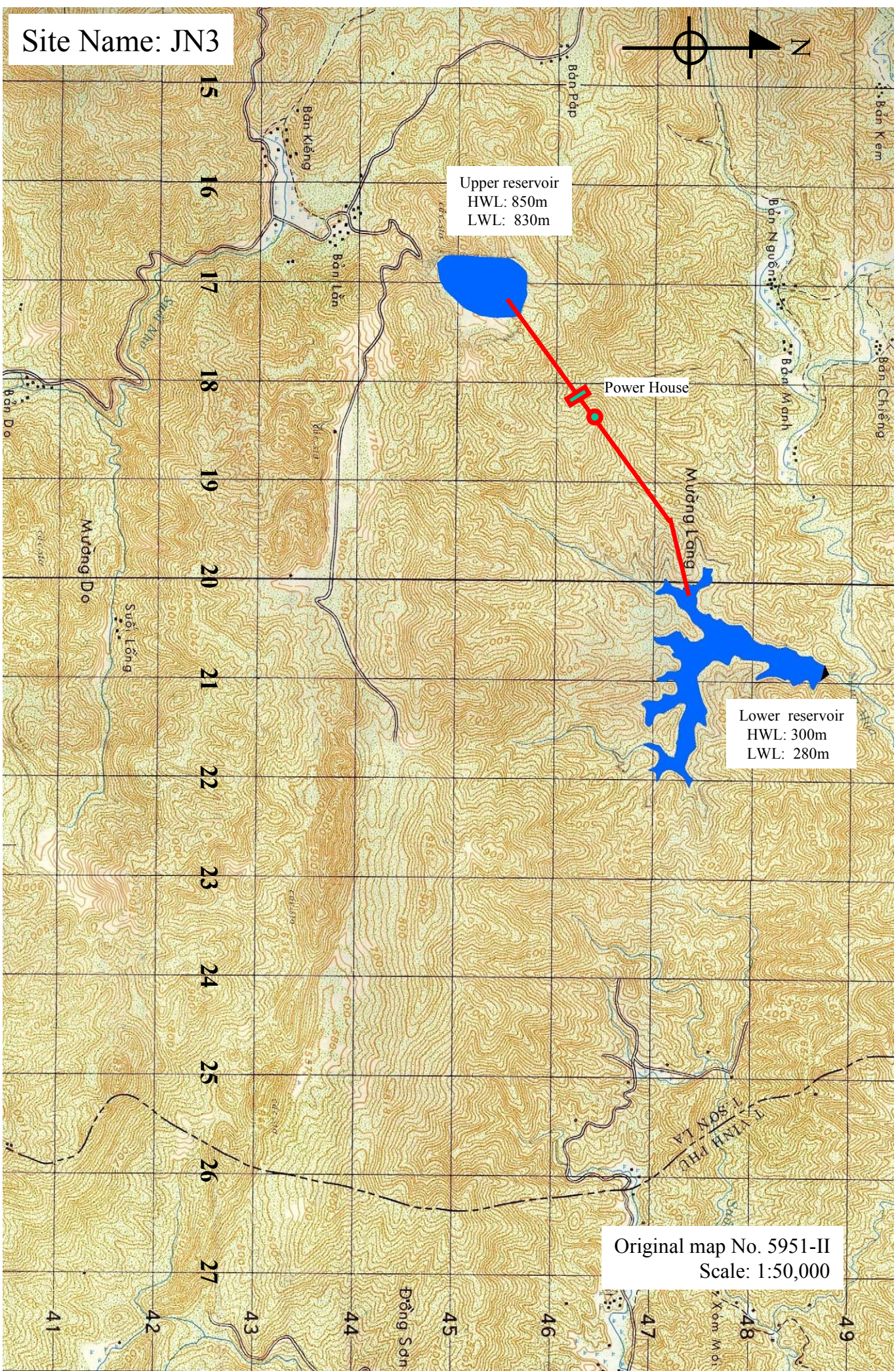




Photo 1

The length of dam crest is more than 600 m when the H.W.L. is set to 900 m (View from the east of the reservoir (EL. 870m))



Photo 2

Poundage constructed by excavation (full facing type) is suitable for this upper reservoir which reservoir area will be 0.5 km² and which H.W.L. will be 850 m based on the topographical condition. (View from the east of the reservoir)



Photo 3

There is a mountain composed of limestone in the west side of the reservoir.



Photo 4

H.W.L can be lowered to the EL 300m in order to secure reservoir capacity of 10 million m³.
(View from the upstream (EL.270m))



Photo 5

Based on Photo 4, the lower dam site might be moved to the downstream of the river from the viewpoints of the economy.



Photo 6

The river flow at the lower dam site is assumed to be 0.3 - 0.5 m³/s.



Photo 7

The proposed upper reservoir.



Photo 8

Thuong Lang village in the proposed lower reservoir.

JN3 – Environmental issues