Appendix 4-6-2-(2)

JN5; Results of the site survey

① Overall geological condition

Regionally, NW-SE system of folding of Devonian-Permian Triassic sedimentary rocks as schist-shale or basalt porphyry is alternatively found (P2-T1 vn). The bedding of the sedimentary rocks has N70-80W strikes and nearly vertical dip. Schistosity of the schist have N10-20W strike and nearly vertically to the north dip. Rock condition is generally hard and massive. Weathering in the surface is 10-20m depths. Some outcrops are fractured strongly along the road near the Ban Pun village. Limestone bed as D2-D3bc is inter-bedded within the P2-T1vn, some eroded holes exist in the limestone bed along the river elevations.

②Site geology

A) Upper dam/reservoir

Geology around the Upper Reservoir is hard and massive green schist / basalt porphyry (P2-T1vn) and clayish shale / limestone (T2 lmt) is around the Upper reservoir and Dam site. These formations are contact with NW-SE strikes and the boundary cross the valley of Suoi on.

Hard and massive porphyry and schist outcrops in the river bed. The weathering on the slope of valley is about 5-15m. No spring points are found, but ground water level probably near the elevation of the river according the agriculture. Permeability of rock looks relatively low.

The rock around the geological boundary are limestone/shale and schist, there are no weak zone along the boundary.

There are narrow ridge in the left side of the reservoir, corn firm was found behind this ridge on the higher elevation than bottom of the reservoir level. The top of this field or firm has probably spring points but no seen. This narrow ridge is on the geological boundary of (P2-T1vn/T2 lmt)as NW-SE system, and topographical lineament indicates the weathering covered by surface. This boundary is not clear but probably vertical to slightly north.

B) Lower Dam/reservoir

Geology around the Lower reservoir is composed of mainly limestone (D2g-D3bc), condition of rock is hard and massive in general. The NW-SE system of structural line along the river is reported in the published map. Both side of the slope beside the river is steep of limestone.

The slope around the Dam site is 20-35 degrees of limestone with many open joints in the

river level. The permeability of rock is high, strength of massive limestone is nearly same as the other sedimentary rocks.

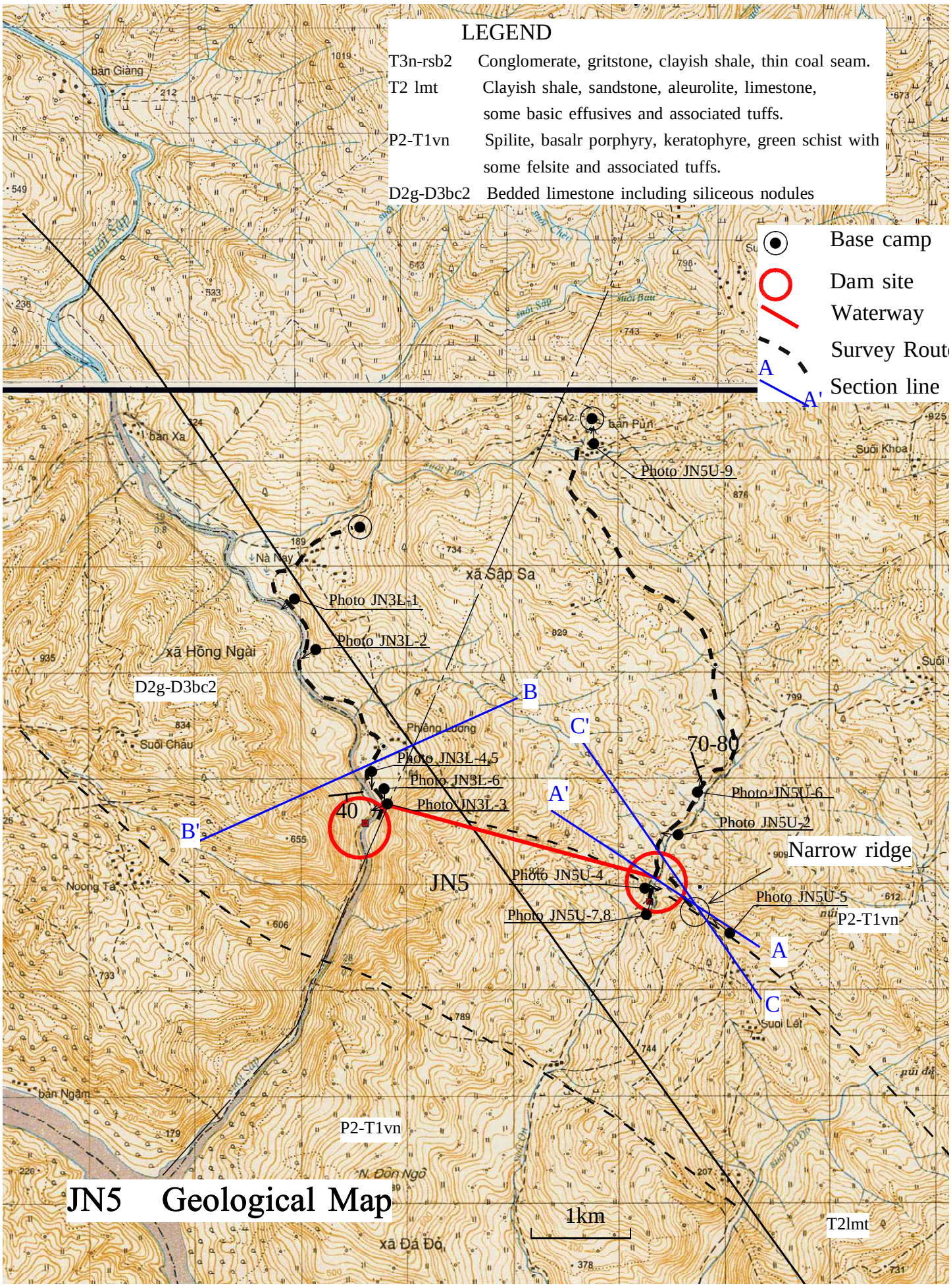
Structural line of NW-SE system along the river is reported in the published geological map, and the NE-SW fault also probably crosses from the river through the lower reservoir to the ban Pun village. There are many fractured outcrops along the road near the village.

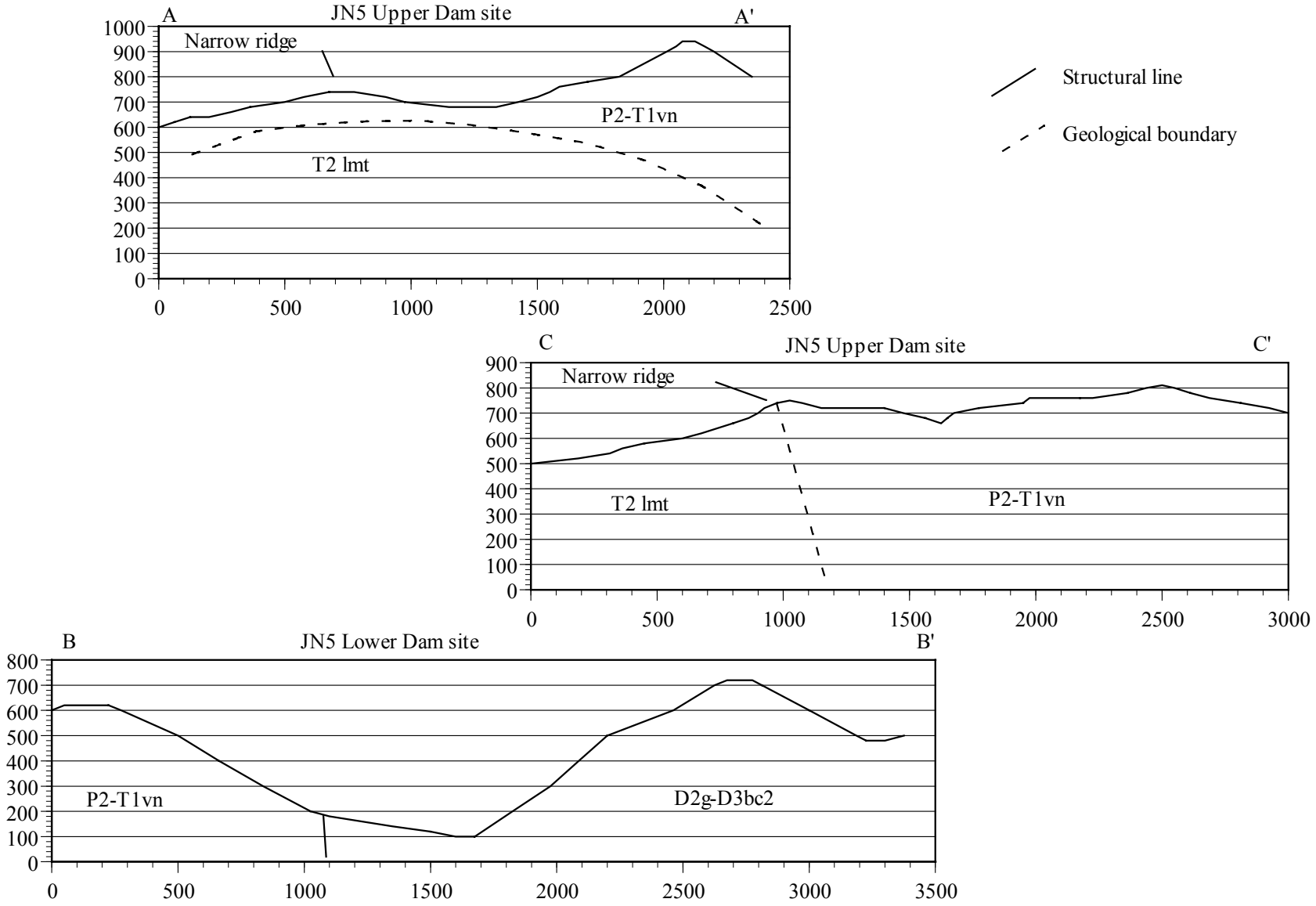
C) Waterway/Underground power station

Designed waterway route runs under the boundary of limestone and basalt porphyry/schist zone, the conditions of these rocks are massive and hard with some open joints in the limestone. The permeability of rock seems probably high. There are no features of the fault in the surface.

D) Others and problems

- Investigation for the weathering grade of the geological boundary on Upper Reservoir will be needed.
- Investigation for the conditions of structural line along the river around the Lower Reservoir will be needed.
- Limestone around the Lower Reservoir is hard and massive, probably high permeability.


LEGEND
T3n-rsb2 Conglomerate, gritstone, clayish shale, thin coal seam.
T2 lmt Clayish shale, sandstone, aleurolite, limestone, some basic effusives and associated tuffs.
P2-T1vn Spilite, basalr porphyry, keratophyre, green schist with some felsite and associated tuffs.
D2g-D3bc2 Bedded limestone including siliceous nodules
Base camp
Dam site
Waterway
Survey Route
Section line
A
A'
bản Giàng
bản Xa
bản Pủn
Suối Khoa
Photo JN5U-9
Nà Nay
xã Sập Sa
Photo JN3L-1
Photo JN3L-2
xã Hồng Ngài
D2g-D3bc2
B
B'
C'
A'
Phiêng Lương
Suối Châu
Photo JN3L-4,5
Photo JN3L-6
Photo JN3L-3
40
70-80
Photo JN5U-6
Photo JN5U-2
Narrow ridge
JN5
Photo JN5U-4
Photo JN5U-5
Photo JN5U-7,8
núi P2-T1vn
A
C
Suoi Lat
Noong Ta
bản Ngâm
P2-T1vn
N. Đồn Ngô
xã Đá Đỏ
1km
T2lmt
JN5 Geological Map



JN5 Geological section