

Optimal Routing Options for the Telupid section of the Pan Borneo Highway by Coalition 3H | April 2021



OVERVIEW

- The Pan Borneo Highway (PBH) is one of the most significant infrastructure projects in Sabah, and ensuring implementation has maximum positive impact is the subject of considerable government and non-government effort in Sabah. One aspect is avoiding unnecessary environmental, ecological and social impact.
- Seeking to protect and conserve the remaining Bornean elephant population in Sabah, estimated to be not more than 1,000–1,500 individuals, the Bornean Elephant Action Plan for 2020-2029 was formulated by the Sabah Wildlife Department and approved by the state government in February 2020.
- The Bornean elephant in Sabah is totally protected under Schedule 1 of the Wildlife Conservation Enactment 1997 and listed as "Endangered" by the International Union for Conservation of Nature (IUCN Red List).
- The current alignment of the Telupid section of the PBH would run through 30 km of Bornean elephant range including their usual paths through the Tawai Forest Reserve and may result in an endless stream of high-profile harrowing incidents in which people and elephants are harmed on the road, generating public and likely global criticism, and impacting tourism.
- Tawai Forest Reserve, a Class 1 Protection Reserve, is a high biodiversity landscape and high El Niño fire risk area due to its ultramafic geology so a road would greatly increase risk of fire, smoke and haze as happened here in 1983.

- There is an urgent need to identify alternative routes which can also deliver socio-economic benefits without major ecological and environmental impacts as well as engineering and financial challenges.

OBJECTIVE OF DOCUMENT

- The Sabah NGOs and research institutions associated with Coalition Humans Habitats and Highways (Coalition 3H) suggest that the state government deliberate PBH routing options in Telupid to avoid negative impacts to the wildlife and human populations. Hence, the purpose of this paper is to provide the state government with ground data, options and a united recommendation on the best choice of PBH alignment for the Telupid section.

HISTORICAL BACKGROUND

- The initial alignment for WP31 (Work Package) and parts of WP30 and WP32 of the PBH in Telupid were to upgrade the existing Ranau-Sandakan road to a four-lane highway i.e. Route 2 (grey line) in [Appendix A](#).
- Opposition to this alignment emerged from villages that would be displaced from their homes and lands because these are in "ribbon development" area i.e. Route 2. As expected from "ribbon development", locals have built dwellings and conducted commercial activities along the existing road.

- The community petitioned that PBH should pass through Tawai Forest Reserve instead and the state government responded by rejecting widening of existing road and planned the Route 1 (red line) alignment that runs through the Tawai Forest Reserve. See [Appendix A](#).
- Consequently, a community consultation organized by the Telupid District authorities and Forever Sabah on 11th March 2019 re-affirmed the rejection of the initial Route 2 by Kg. Bauto and Kg. Gambaron, in favour of the current Route 1 coupled with aspirations of access to lands and opportunities in Tawai Forest Reserve.
- Northern villages, however, favoured a new Route 4 (yellow line in [Appendix A](#)) proposed on the opposite bank of Sg. Labuk designed to avoid elephant range that would improve their access to the outside world because the road would replace ferries over Sg. Labuk.
- Other comments from local officials and community members included that PBH should not bypass Pekan Telupid in the way proposed by the Routes 1 and 4.
- In response to the community consultation exercise on 11th March 2019, a new option Route 3 (blue line in [Appendix A](#)) was added. It would use the proposed Route 4 to avoid disrupting village lands but then pass near Pekan Telupid; thus, bringing socio-economic benefits to enterprises operating in the township.
- Routes 3 and 4 avoid most elephant habitats as these do not pass through Tawai Forest Reserve and Ulu Sapa Payau Forest Reserve.

WILDLIFE AND ENVIRONMENTAL ISSUES

- The current planned PBH alignment (i.e. Route 1) runs through 30 km of elephant range, with a long section of this being on a migration route along a steep-sided valley in Tawai Forest Reserve. Evidence of elephant presence is shown by green dots (view [Appendix B](#)) representing movements of GPS collared elephants.
- Experience from Malaysia and elsewhere show the dangers in putting highways in elephant ranges for construction workers, for road users, and for elephants. High-speed collisions at night are a worrying possibility as elephants may roam along the planned PBH alignment.
- Endangered and endemic species such as orangutans, sunbears, otter civet, Bornean peacock-pheasant and Bornean ground-cuckoo have also been sighted in areas near the planned PBH alignment (see [Appendix C](#)) Any ecological degradation to the areas that collectively form the Telupid Forest Complex will have a negative impact to their populations.
- The Sabah Structure Plan 2033 (item 11.2, 11.7, 14.2.2 and 14.3.2) emphasizes maintenance of Total Protected Area integrity in infrastructural development to avoid fragmentation of forest and wildlife habitat. The Plan prioritizes protecting from infrastructure the three most important High Conservation Value (HCV) contiguous forests in Sabah, and one of these is the Ulu Telupid-Trus Madi block (Map 14.11; page 289).
- The Sabah Structure Plan 2033 recommends the use of tunnels and overpasses when necessary to traverse environmentally important

areas like this one. We believe re-routing this particular road away from elephant habitat is much cheaper and more effective than seeking to mitigate a road with expensive tunnels or over-passes.

- Fragmentation of Tawai Forest Reserve will cause other environmental issues including increased access for poachers and increased danger of forest fires during dry periods on these ultramafic soils.
- Tawai Forest Reserve is the watershed that supplies potable water for Pekan Telupid's population consumption.
- The Environmental Impact Assessment for WPs 28-35 has not yet been approved by the Environment Protection Department.

Much success is being achieved in Telupid with managing Human-Elephant Conflict by collaboration between Sabah Wildlife Department, Sabah Forestry Department and *Kopisuladan di Aki* (the local Community Elephant Ranger Team), with support from Forever Sabah, Seratu Aatai, Hutan and Danau Girang Field Centre. Meanwhile, *Kopisuladan di Aki* and the Responsible Elephant Conservation Trust (RESPECT) are planning restoration efforts to increase the availability of elephant food-plants at Laju Cahaya, a former sawmill and log storage site and along the old logging road within Tawai Forest Reserve. This can only be undertaken if the PBH is realigned. These elephant conservation efforts are in connection with reducing Human-Elephant Conflict in the Telupid region.

PROPOSED REALIGNMENT ANALYSIS

The attached [Table 1](#) summarizes the differences between various route options for the PBH alignment across the Telupid region. We compare factors related to:

- (a) length, engineering challenges and likely costs
- (b) local socio-economic impacts, positive and negative
- (c) wildlife and environmental impact

The cadastral information on the maps ([Appendix A](#) and [B](#)) enables stakeholders to see precisely whom the impacts will fall and potential scale of land compensation requirements. Every option has advantages, disadvantages, while savings and costs for the different options are incompletely known. Nonetheless, Route 3 and Route 4 emerge as the strongest options; view [Table 1](#) for comparison details. In summary,

- Environment and ecology impact: The new options, namely Routes 3 and 4, successfully mitigate elephant, forest fire and other environmental risks around Tawai Forest Reserve. Also critically, by not having PBH passing through Tawai Forest Reserve watershed, the main source of potable water for Pekan Telupid and the surrounding human settlements will remain undisturbed.
- Social impact: Route 4 avoids significant loss of land by resident indigenous communities; Routes 1 and 4 require least land acquisition and associated costs; bridges on Route 3 and Route 4 over Sg. Labuk replace busy ferry crossings and so deliver major developmental benefits for palm oil companies and communities alike isolated north

of the river. The existing road (Route 2) and Route 3 maintain Pekan Telupid strategic function as a private and public transport stopover (e.g. bus).

- Economic impact: The planned Route 1 and Route 4 avoid Pekan Telupid therefore reducing traffic in the township but damaging local businesses.
- Engineering impact: Route 4 is likely the best option in terms of engineering cost as the route is direct with the least sharp curves, has less small bridges and is 8 km shorter than other routes thus saving time and cost during construction. However, Route 3 and Route 4 require negotiations with some oil palm plantations as the routes leverage on some existing paths through the plantations. The routes also require construction of two bridges across Sg. Labuk. Initial assessment of prospective bridge sites indicates that underlying geology and topography are favourable. The bridges will need to be high and long to deal with flooding events, likely with midstream piers to reduce span length.

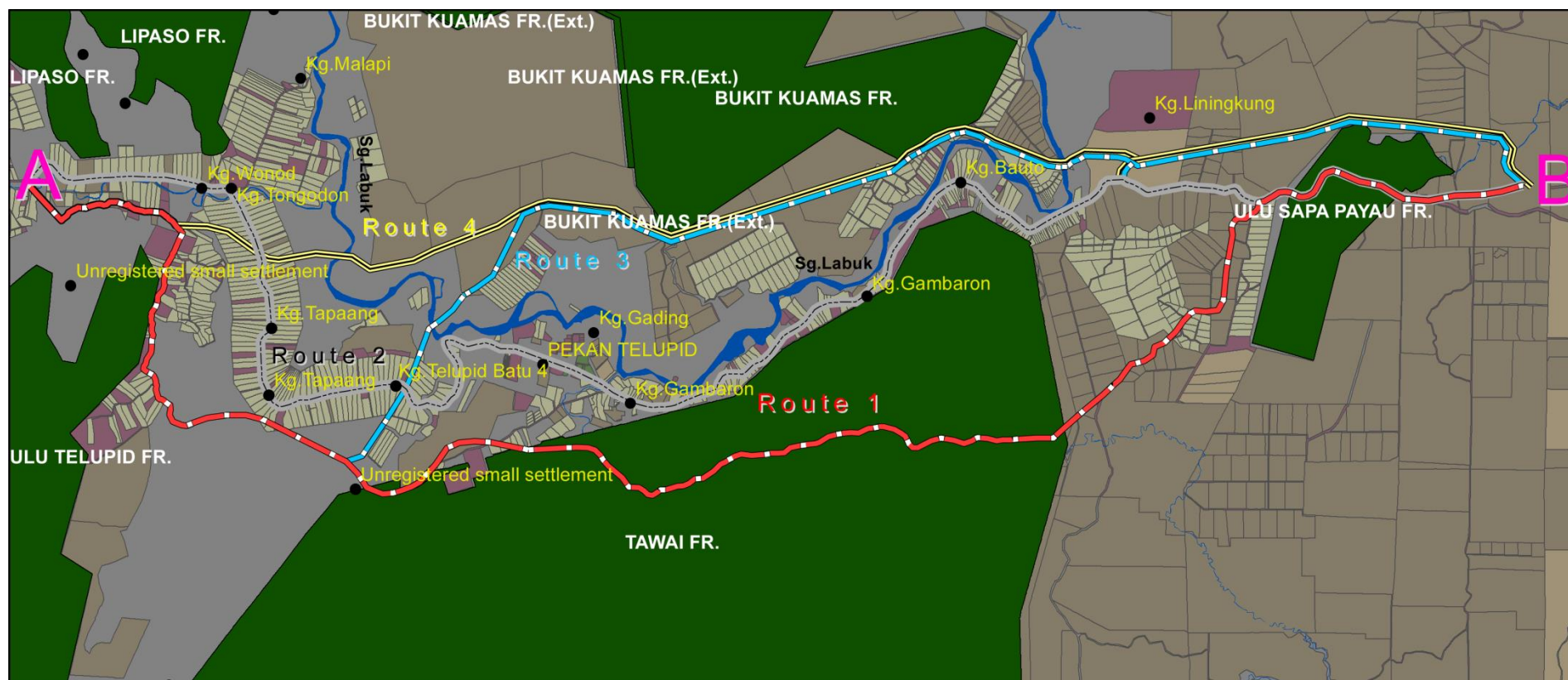
FINANCIAL IMPLICATIONS

Financial implications are unknown pending a comparison by qualified experts. The direct Route 4 is likely significantly cheaper than Route 3, and likely not much more expensive than existing Route 1. Re-routing the road north of Sg. Labuk and out of elephant range would be much cheaper than mitigation with over-passes etc. as per Sabah Structure Plan recommendations. Oil palm plantations north of Sg. Labuk will benefit from the new bridge access.

RECOMMENDATIONS

- We recommend cancellation of Routes 1 and 2 on grounds of environmental and socio-economic impact.
- We recommend the state government to discuss the importance of the PBH access to Pekan Telupid and carry out engineering and cost studies on either Route 3 if connection with Pekan Telupid is considered important and worth the likely extra expense, and Route 4 if this is not.
- We recommend that a relevant government agency champions the formation of a Joint Committee dedicated to consolidating field data for enhancing infrastructure development in Sabah. Together with other stakeholders, Coalition 3H can contribute our ground knowledge effectively with the state government through the Joint Committee.

APPENDIX A. Routes and options described in this document. Note that Kg. Gambaron is a linear village extending along existing road (Route 2)



Legend

- Villages
- ▬ Route 1: PBH as current proposed alignment
- ▬ Route 2: PBH as initially planned along existing road
- ▬ Route 3: PBH new proposal to minimise risks with elephants and connect Telupid
- ▬ Route 4: PBH new proposal to minimise risks with elephants
- Totally Protected Forest Reserves
- Rivers

- Unknown title type
- Country Lease
- Provisional Lease
- Native Title
- Field Register
- Town Land
- Unknown title/state land

0 1 2 4 6 8 Kilometers



APPENDIX B. Elephant presence in areas along the planned Pan Borneo Highway alignment (i.e. Route 1)



Legend

- Villages
- Elephant locations from GPS collared elephants (DGFC) & field data (CERT)
- Route 1: PBH as current proposed alignment
- Route 2: PBH as initially planned along existing road
- Route 3: PBH new proposal to minimise risks with elephants and connect Telupid
- Route 4: PBH new proposal to minimise risks with elephants
- Totally Protected Forest Reserves
- Rivers

0 1 2 4 6 8 Kilometers



APPENDIX C. Rare, endangered and endemic species such as orangutan, sunbear, otter civet, Bornean peacock-pheasant and Bornean ground-cuckoo have been sighted near the planned Pan Borneo Highway alignment (i.e. Route 1). Observation data via camera traps were acquired by Seratu Aatai in collaboration with Community Elephant Ranger Team (*Kopisuladan di Aki*) based in Telupid



TABLE 1. Comparison of environmental, socio-economic and potential costs of routing options

		Route 1	Route 2	Route 3	Route 4
	Route Description	Planned Alignment: runs through Class I Tawai Forest Reserve	Existing road: follows existing Ranau to Sandakan road	New Proposal: combines current alignment with a Northern Bypass to avoid key elephant areas & Tawai FR	New Proposal: runs north of Labuk river avoiding most known elephant range & Protected Areas
Alignment and Costing	Section Length (from A to B on Map)	40km	39km	39km	32km
	Survey Status	Already surveyed.	Unclear if any survey was made (potentially 33km still needed).	Survey required for new section (23km needed).	Survey required for new section (28km needed)
	Minor bridges	8 minor bridges (7 new, 1 existing)	3 minor bridges (all existing)	6 minor bridges (4 new that would be in the Route 1 section; 1 new, and 1 existing on the blue alignment)	3 minor bridges (2 new that would be in Route 1 section; 1 existing on the yellow alignment)
	Major bridges	No major bridges required.	No major bridges required.	Two major bridges required at existing ferry terminals: (1) Ribobonus Ferry Terminal (river width approx 152m); (2) IJM Ferry Terminal (river approx 115m).	Two major bridges required: (1) new site across Sg. Labuk (river width approx 50m); (2) at IJM Ferry Terminal (river width approx 115m).
	Land acquisition/ compensation necessary (linear kms, prelim estimate)	MEDIUM: Requires 27kms compensation both smallholder/Native Title) (13kms) and estate lands (12kms). 15kms would be Forest Reserve	HIGH: Requires 30.5kms compensation (25.5kms smallholder/Native Title & 5kms of estates) plus additional 2.5 kms of Town Land compensation. About 2.5km is in Forest Reserve and 3kms unknown land (likely State land/Land Application)	MEDIUM/HIGH: Requires at least 26kms of compensation (14kms of estates and 12kms smallholder/Native Title). About 11km is not clear (PL, LA, State Land) and there is about 1km of Forest Reserve.	MEDIUM/LOW: Requires 22kms compensation (Estate - 17kms and 5kms of smallholder/Native Titles). Some 8kms is State Land/LA or PL that may or may not need compensation.
Environmental/Biodiversity	Cutting into Totally Protected Areas	Runs through Protected Areas: new road through Tawai Class I Protection Forest Reserve; and expands existing road in Ulu Sapa Payau Virgin Jungle Forest Reserve.	Runs north of Tawai Class One Forest Reserve and on existing route through Sapa Payau Virgin Jungle Forest Reserve.	Avoids all Protected Areas	Avoids all Protected Areas
	Elephant Range	Runs through known elephant hotspot areas of high elephant usage, totalling around 30km of highway through known elephant range. Devastating.	Avoids some elephant hotspot areas. Runs through around 17km of known elephant range. High risk.	Avoids most elephant hotspot areas. Runs through around 8km of most northerly elephant range, and 9km of westerly range, but avoids key areas. Medium risk.	Avoids all elephant hotspot areas. Runs through around 8km of most northerly elephant range. Low risk.
	Orangutan & Other Protected Species	Substantial negative impact.	Some negative impact.	Minor negative impact.	Minor negative impact.

TABLE 1 (con't)

		Route 1	Route 2	Route 3	Route 4
	Route Description	Planned Alignment: runs through Class I Tawai Forest Reserve	Existing road: follows existing Ranau to Sandakan road	New Proposal: combines current alignment with a Northern Bypass to avoid key elephant areas & Tawai FR	New Proposal: runs north of Labuk river avoiding most known elephant range & Protected Areas
Social & Economic	Impact on Pekan Telupid	Bypasses/marginalises Pekan Telupid & puts town water supply catchment in Tawai Forest Reserve at risk.	Serves Pekan Telupid but will bring heavy traffic.	Could serve Pekan Telupid.	Bypasses/Marginalises Pekan Telupid.
	Impact on Villages & Community Land	MEDIUM: Cadastral data is limited in parts of this section but smallholdings occur along western areas of proposed route.	WORST: Will significantly displace villages along existing highway (Kg. Wonod, Tongudon, Kg. Tapaang, Kg. Telupid Batu 4, Kg. Gamabron & Kg. Bauto).	MEDIUM: May displace a few homesteads in Kg. Gambaron. Will go through some Kg. Liningkung land. Will improve access to smallholdings north of Sg. Labuk but may go through some smallholdings.	LEAST: Will displace some homesteads between Kg. Tapaang & Kg. Tongodon & go through some Kg. Liningkung land. Will improve access to smallholdings north of Sg. Labuk but replace some smallholdings.
	Impact on Highway Connectivity of Villages and Oil Palm Estates North of Sg. Labuk	No benefit	No benefit	Would replace two busy ferry linkages used by commercial oil palm states & many villages in the Kg. Ansuan area	Would replace one busy ferry linkages used by commercial oil palm states & many villages in the Kg. Ansuan area
	Impact on Oil Palm Estate Land	LEAST: New roads/road widening between Tawai FR and Ulu Sapa Payau FR will use plantation land.	MEDIUM: Some road widening between Tawai FR and Ulu Sapa Payau FR will take plantation land.	MEDIUM: New roads/road widening will take plantation land.	WORST: New roads/road widening will take plantation land.
SUMMARY	Environmental Impact	DEVASTATING	VERY NEGATIVE	NEGATIVE	MINIMAL
	Socio-Economic Impact	MIXED - NEGATIVE	MIXED - NEGATIVE	MIXED - POSITIVE	MIXED - NEGATIVE
	Additional Road Construction Costs	Significant costs of managing elephants during construction.	Further surveying & costs of managing elephants during construction. Savings as expanding existing 2-lane highway and fewer minor bridges.	Significant further surveying & costs of two additional major bridges.	Significant new surveying costs; road shorter; two additional major bridges, fewer minor bridges, lowest compensation.

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