AP – D

FLORA AND WILDLIFE SURVEY DATA

AP – D1

FLORA LISTING OF SELANGOR STATE PARK

Flora Listing of Selangor State Park

Objective

Primary surveys were not conducted at Selangor State Park as the proposed alignment will entirely tunnel through the Selangor State Park. Nonetheless, the floral diversity and composition of the State Park was still documented to emphasize the importance of conserving the whole area.

Methodology

The floral diversity and composition of the Selangor State Park was mostly documented through a thorough literature review. Data was also obtained from past inventories conducted by Forest Research Institute Malaysia (FRIM) within the State Park.

Based on records kept at FRIM on 872 plant speciments from Ulu Gombak FR, Templer FR and Serendah FR, more than 10% have important conservation concerns. They harbour 90 endemic species where 55 was recorded in Ulu Gombak FR, 15 in Serendah FR and 20 in Templer FR. There are also 23 IUCN Red List of Threatened Species recorded in these PRFs. From the 23 species, 11 species are categorised as Endangered (EN) and 12 species as Vulnerable (VU). Species categorised as EN was recorded in Ulu Gombak FR (6 species), Templer FR (2 species) and Serendah FR (3 species). While species categorised as VU was recorded in Ulu Gombak FR (9 species) and Serendah FR (3 species).

Site/ Criteria	**Ulu Gombak FR**	**Serendah FR**	**Templer FR**	TOTAL
Endemic	55	15	20	90

Site/ Criteria	**Ulu Gombak FR**	**Serendah FR**	**Templer FR**	TOTAL
Endangered (EN)	6	3	2	11
Vulnerable (VU)	9	3	0	12
TOTAL	15	6	2	23

The following lists literature reviewed pertaining to the floral composition of the park:

- A Proposal for the Establishment of the Selangor State Park (Draft Proposal). TrEES, 1999.
- Rancangan Perhutanan Negeri Selangor 2011 – 2020. Jabatan Perhutanan Negeri Selangor.
- Selangor State Park official blog (*www.selangorstatepark.blogspot.com*)

Results: List of Species Recorded in Selangor State Park

1. Serendah Forest Reserve

Family	Species	Vernacular Name	Endemism	IUCN Status
Adiantaceae	*Haplopteris ensiformis*	-	-	
Anacardiaceae	*Campnosperma auriculatum*	Terentang	-	
	Pistacia malayana	-	E	
Apocynaceae	*Kopsia*	-	-	
Araceae	*Arisaema fimbriatum*	-	-	
Araceae	*Scindapsus perakensis*	-	-	
Araliaceae	*Schefflera musangensis*	-	-	
Aristolochiaceae	*Thottea tricornis*	-	-	LC
Asclepiadaceae	*Hoya campanulata*	-	-	
	Marsdenia tinctoria	-	-	
Aspleniaceae	*Asplenium normale*	-	-	
Begoniaceae	*Begonia thaipingensis*	-	E	NT
Buxaceae	*Buxus malayana*	-	E	NT
Celastraceae	*Lophopetalum pachyphyllum*	-	-	
	Lophopetalum pallidum	-	-	
Cibotiaceae	*Cibotium barometz*	-	-	LC
Compositae	*Elephantopus mollis*	-	-	
Convolvulaceae	*Argyreia kunstleri*	-	E	LC
Cyperaceae	*Eleocharis trichophylla var. erecta*	-	-	
	Gahnia baniensis	-	-	
Dilleniaceae	*Dillenia excelsa*	Simpoh	-	
	Dillenia reticulata	Simpoh gajah	-	
	Dillenia suffruticosa	Simpoh	-	
Dipteridaceae	*Dipteris conjugata*	-	-	LC
Dipterocarpaceae	*Hopea sulcata*	-	E	NT
	Shorea curtisii subsp. curtisii	Seraya	-	NT
	Shorea leprosula	-	-	LC
	Shorea ovalis	-	-	
	Shorea resinosa	-	-	VU
	Shorea submontana	-	E	NT
	Vatica nitens	Resak daun panjang	-	NT
Elaeocarpaceae	*Elaeocarpus ferrugineus subsp. glabrescens*	-	-	
Ericaceae	*Vaccinium littoreum*	-	-	
Euphorbiaceae	*Blumeodendron tokbrai*	Gaham badak	-	
	Endospermum diadenum	Sesendok	-	
	Macaranga hullettii	Mahang	-	
Gentianaceae	*Duplipetala pentanthera*	-	-	
	Fagraea carnosa	-	-	
Gesneriaceae	*Codonoboea*	-	-	
	Paraboea elegans	-	E	VU

Family	Species	Vernacular Name	Endemism	IUCN Status
Gesneriaceae	*Ridleyandra porphyrantha*	-	-	VU
Graminae	*Eriachne pallescens*	-	-	
Hamamelidaceae	*Rhodoleia championii*	-	-	
Labiatae	*Callicarpa angustifolia*	-	E	
	Mesosphaerum suaveolens	-	-	
	Vitex	-	-	
	Vitex siamica	-	-	
Lauraceae	*Actinodaphne*	-	-	
	Actinodaphne pruinosa	Medang	E	
	Nothaphoebe umbelliflora	Medang	-	
Leguminosae	*Archidendron bubalinum*	Keredas	-	
	Derris malaccensis	-	-	
	Koompassia malaccensis	Kempas	-	LC
	Mucuna biplicata	-	-	
Loranthaceae	*Macrosolen avenis*	-	-	
	Macrosolen cochinchinensis	-	-	
Melastomataceae	*Medinilla scortechinii*	-	E	
	Sonerila	-	-	
	Sonerila picta	-	-	
	Sonerila prostrata	-	-	
Moraceae	*Artocarpus integer var. silvestris*	Bangkong	-	
Moraceae	*Artocarpus lanceifolius*	Keledang	-	
	Ficus semicordata	-	-	
	Ficus sinuata	Ara	-	
	Ficus sundaica	-	-	
	Ficus trichocarpa	-	-	
	Ficus variegata	-	-	
Myrsinaceae	*Rapanea porteriana*	-	-	
Myrtaceae	*Decaspermum fruticosum*	-	-	
	Decaspermum parviflorum var. caudatum	-	-	
	Syzygium lineatum	Kelat	-	
Oleandraceae	*Oleandra cumingii*	-	-	LC
Orchidaceae	*Bulbophyllum vaginatum*	-	-	
	Eulophia graminea	Orchid	-	
	Pholidota imbricata	-	-	
Palmae	*Calamus ornatus*	Rotan manau	-	
	Johannesteijsmannia magnifica	Daun Sang	E	EN
	Maxburretia rupicola	-	E	
Phyllanthaceae	*Baccaurea macrocarpa*	Tampoi	-	
Polypodiaceae	*Pyrrosia piloselloides*	-	-	LC
	Selliguea stenophylla	-	-	LC
Pteridaceae	*Syngramma cartilagidens*	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Pteridaceae	*Taenitis blechnoides*	-	-	
Rhamnaceae	*Oreorhamnus serrulatus*	-	-	
	Rhamnus borneensis var. estellare	-	-	
Rosaceae	*Eriobotrya bengalensis*	-	-	
Rubiaceae	*Argostemma*	-	-	
	Chassalia pubescens	-	E	
	Hedyotis pinifolia	-	-	
	Indet. Rubiaceae	-	-	
Rutaceae	*Glycosmis calcicola*	-	-	
	Glycosmis crassifolia	-	E	
	Tetractomia tetrandra	-	-	
Salicaceae	*Scolopia spinosa*	-	-	
Sapotaceae	*Palaquium microphyllum*	Nyatoh	-	
	Pouteria obovata	-	-	
Schizaeaceae	*Actinostachys inopinata*	-	-	EN
Selaginellaceae	*Selaginella alutacia*	-	-	LC
	Selaginella intermedia var. intermedia	-	-	LC
	Selaginella mayeri	-	-	LC
	Selaginella padangensis	-	-	LC
	Selaginella ridleyi	-	E	EN
Tectariaceae	*Tectaria*	-	-	
	Tectaria keckii	-	-	
Woodsiaceae	*Diplazium*	-	-	
	Diplazium crenatoserratum	-	-	
	Diplazium tomentosum	-	-	

Note:
E - Endemic
LC - Least Concern
NT - Near Threatened
VU - Vulnerable
EN - Endangered

Source: Forest Research Institute Malaysia (FRIM) (2017)

2. Templer Forest Reserve

Family	Species	Vernacular Name	Endemism	IUCN Status
Acanthaceae	*Justicia ptychostoma*	-	E	
	Pseuderanthemum crenulatum	-	-	
	Staurogyne cremostachya	-	-	
Achariaceae	*Hydnocarpus ilicifolius*	-	-	
Actinidiaceae	*Saurauia pentapetala*	Melunujob	-	LC
Adiantaceae	*Adiantum malesianum*	-	-	
	Antrophyum callifolium	-	-	
	Antrophyum parvulum	-	-	
Annonaceae	*Anaxagorea javanica*	-	-	
	Anaxagorea javanica var. tripetala	Mempisang	-	
	Anaxagorea javanica var. tripetala	-	-	
	Goniothalamus curtisii	-	E	
	Goniothalamus tenuifolius	Mempisang	E	
	Meiogyne virgata	-	-	
	Orophea	-	-	
	Orophea cuneiformis	-	-	
	Orophea maculata	-	E	
Annonaceae	*Platymitra macrocarpa*	-	-	
Annonaceae	*Trivalvaria pumila*	Mempisang	-	
Apocynaceae	*Kopsia griffithii*	-	-	
Araceae	*Alocasia inornata*	-	-	
	Arisaema roxburghii	-	-	
	Rhaphidophora beccarii	-	-	
	Schismatoglottis	-	-	
	Scindapsus hederaceus	-	-	
Araliaceae	*Schefflera elliptica*	-	-	
Asclepiadaceae	*Dischidia acutifolia*	-	-	
	Dischidia hirsuta	-	-	
	Heterostemma piperifolium	-	-	
	Hoya	-	-	
	Hoya coronaria	-	-	
	Hoya verticillata var. citrina	-	E	
	Secamone micrantha	-	-	
	Tylophora hirsuta	-	-	
Aspleniaceae	*Asplenium macrophyllum*	-	-	
	Asplenium phyllitidis	-	-	
	Asplenium salignum	-	-	
Blechnaceae	*Blechnum finlaysonianum*	-	-	
	Blechnum orientale	-	-	
Convallariaceae	*Peliosanthes teta*	-	-	
Dilleniaceae	*Tetracera scandens*	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Dracaenaceae	*Dracaena*	-	-	
	Dracaena congesta	-	-	
Dryopteridaceae	*Teratophyllum rotundifoliatum*	-	-	
Euphorbiaceae	*Croton erythrostachys*	-	E	
Euphorbiaceae	*Suregada*	-	-	
Fagaceae	*Castanopsis nephelioides*	-	E	
Gentianaceae	*Fagraea auriculata*	-	-	
Gesneriaceae	*Codonoboea parviflora*	-	-	
	Codonoboea platypus	-	-	
	Cyrtandra cupulata	-	-	
	Cyrtandra wallichii	-	-	
	Epithema parvibracteatum	-	E	
	Microchirita caliginosa	-	-	NT
	Monophyllaea hirticalyx	-	E	
	Monophyllaea horsfieldii	-	-	
	Paraboea paniculata	-	-	EN
	Paraboea verticillata	-	E	EN
Gleicheniaceae	*Dicranopteris curranii*	-	-	
	Dicranopteris linearis	-	-	
Gnetaceae	*Gnetum cuspidatum*	-	-	
	Gnetum latifolium var. funiculare	-	-	
Graminae	*Gigantochloa levis*	-	-	
Guttiferae	*Kayea kunstleri*	-	-	
Hymenophyllaceae	*Cephalomanes*	-	-	
	Cephalomanes javanicum var. javanicum	-	-	
	Cephalomanes obscurum	-	-	
Labiatae	*Vitex siamica*	-	-	
Lauraceae	*Alseodaphne perakensis*	-	-	
	Cryptocarya nitens	Medang	-	
	Dehaasia	-	-	
	Dehaasia pauciflora	-	-	
Leeaceae	*Leea aequata*	-	-	
	Leea indica	Mali mali	-	
Leguminosae	*Archidendron ellipticum*	-	-	
	Crudia curtisii	-	E	NT
	Crudia lanceolata	-	-	
	Derris elegans	-	-	
	Desmodium polycarpum	-	-	
	Entada scandens	-	-	
	Saraca declinata	Gapis	-	
	Saraca thaipingensis	-	-	
	Vigna	-	-	
Lindsaeaceae	*Lindsaea cultrata*	-	-	
	Lindsaea doryphora	-	-	
Loranthaceae	*Scurrula ferruginea*	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Loxogrammaceae	*Loxogramme scolopendrioides*	-	-	LC
Lycopodiaceae	*Lycopodiella cernua*	-	-	
Lygodiaceae	*Lygodium microphyllum*	-	-	LC
Malvaceae	*Abelmoschus moschatus*	-	-	
Marattiaceae	*Angiopteris elliptica*	-	-	
Meliaceae	*Aglaia argentea*	-	-	LC
Menispermaceae	*Pericampylus glaucus*	-	-	
Moraceae	*Ficus calcicola*	-	-	
	Ficus consociata var. murtoni	-	-	
	Ficus depressa	-	-	
	Ficus racemosa	-	-	
	Ficus semicordata	-	-	
	Ficus subulata	-	-	
	Ficus variegata	-	-	
Myrsinaceae	*Ardisia colorata*	-	-	
	Ardisia crenata	-	-	
	Ardisia solanoides	-	E	
	Rapanea porteriana	-	-	
Myrtaceae	*Decaspermum frutescens*	-	-	
Nephrolepidaceae	*Nephrolepis falciformis*	-	-	LC
Orchidaceae	*Adenoncos sumatrana*	-	-	
	Arundina graminifolia	-	-	
Orchidaceae	*Bulbophyllum membranaceum*	-	-	
	Dendrobium plicatile	-	-	
	Dendrobium salaccense	-	-	
	Flickingeria	-	-	
	Hetaeria alta	-	-	
	Plocoglottis gigantea	-	-	
	Spathoglottis plicata	-	-	
Palmae	*Arenga hastata*	-	-	
	Maxburretia rupicola	-	E	
	Salacca affinis	-	-	
	Salacca glabrescens	-	E	
Pandaceae	*Microdesmis caseariifolia*	-	-	LC
Phyllanthaceae	*Antidesma stipulare*	-	-	
	Bridelia pustulata	-	E	
	Cleistanthus macrophyllus	-	-	
	Glochidion obscurum	-	-	
Piperaceae	*Piper miniatum*	-	-	
Polygalaceae	*Xanthophyllum affine*	-	-	
	Xanthophyllum wrayi	-	-	
Polypodiaceae	*Microsorum membranifolium*	-	-	LC
	Pyrrosia angustata	-	-	LC
	Pyrrosia lanceolata	-	-	LC

Family	Species	Vernacular Name	Endemism	IUCN Status
Psilotaceae	*Psilotum nudum*	-	-	LC
Pteridaceae	*Pteris*	-	-	
	Pteris ensiformis	-	-	
	Pteris venulosa	-	-	
	Taenitis blechnoides	-	-	
Rhamnaceae	*Gouania javanica*	-	-	
	Ziziphus pernettyoides	-	E	
Rhizophoraceae	*Carallia euryoides*	Membuloh	-	
Rosaceae	*Eriobotrya bengalensis*	-	-	
	Prunus maingayi	-	-	
Rubiaceae	*Aidia densiflora*	-	-	
	Canthium glabrum	-	-	
	Diodia	-	-	
	Indet. Rubiaceae	-	-	
	Mitracarpus	-	-	
	Psychotria	-	-	
	Psychotria angulata	-	-	
	Psychotria rostrata	-	-	
	Richardia scabra	-	-	
	Uncaria lanosa	-	-	
Rutaceae	*Clausena excavata*	-	-	
	Glycosmis calcicola	-	-	
	Glycosmis chlorosperma var. chlorosperma	-	-	
	Glycosmis crassifolia	-	E	
Salicaceae	*Casearia clarkei*	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Sapotaceae	*Palaquium gutta*	Nyatoh	-	
	Pouteria	-	-	
Selaginellaceae	*Selaginella*	-	-	
	Selaginella frondosa	-	-	LC
	Selaginella intermedia	-	-	
	Selaginella padangensis	-	-	LC
	Selaginella roxburghii	-	-	
	Selaginella roxburghii var. roxburghii	-	-	LC
	Selaginella stipulata	-	-	LC
	Selaginella wallichii	-	-	LC
	Selaginella willdenowii	-	-	LC
Smilacaceae	*Smilax lanceifolia*	-	-	
Stemonuraceae	*Gomphandra quadrifida var. quadrifida*	-	-	
Sterculiaceae	*Sterculia hispidissima*	-	-	
Tectariaceae	*Heterogonium sagenioides*	-	-	
	Tectaria angulata	-	-	
	Tectaria grandidentata	-	-	
	Tectaria keckii	-	-	
	Tectaria oligophylla	-	-	
Ternstroemiaceae	*Eurya acuminata*	-	-	
Thelypteridaceae	*Amphineuron immersum*	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Thelypteridaceae	*Chingia*	-	-	
	Mesophlebion	-	-	
	Pneumatopteris truncata	-	-	
	Pronephrium repandum	-	-	
	Pronephrium triphyllum	-	-	
	Sphaerostephanos heterocarpus	-	-	
	Sphaerostephanos larutensis	-	-	
Thymelaeaceae	*Wikstroemia*	-	-	
Torricelliaceae	*Aralidium pinnatifidum*	-	-	LC
Urticaceae	*Elatostema acuminatum*	-	-	
	Elatostema latifolium	-	-	
	Oreocnide rubescens	-	-	
	Pilea fruticosa	-	E	
	Pipturus argenteus	-	-	
	Poikilospermum suaveolens	-	-	
	Procris pedunculata	-	-	
Violaceae	*Rinorea bengalensis*	-	-	
Vitaceae	*Cissus rostrata*	-	-	
	Tetrastigma dubium	-	-	
Woodsiaceae	*Diplazium asperum*	-	-	
	Diplazium bantamense	-	-	
	Diplazium cordifolium	-	-	
	Diplazium kunstleri	-	E	
	Diplazium silvaticum	-	-	
	Diplazium tomentosum	-	-	
Zingiberaceae	*Amomum*	-	-	
	Amomum ochreum	-	E	
	Boesenbergia	-	-	

Note:
E - Endemic
LC - Least Concern
NT - Near Threatened
VU - Vulnerable
EN - Endangered

Source: Forest Research Institute Malaysia (FRIM) (2017)

3. Ulu Gombak Forest Reserve

Family	Species	Vernacular Name	Endemism	IUCN Status
Achariaceae	*Hydnocarpus kunstleri*	-	-	
Actinidiaceae	*Saurauia pentapetala*	-	-	LC
Adiantaceae	*Haplopteris ensiformis*	-	-	
	Haplopteris scolopendrina	-	-	
Amaranthaceae	*Cyathula prostrata*	-	-	
Anacardiaceae	*Bouea macrophylla*	Kundang	-	
	Bouea oppositifolia	Ramia hutan	-	
	Buchanania sessifolia	-	-	
	Campnosperma auriculatum	Terentang	-	
	Dracontomelon dao	Sengkawang	-	
	Gluta aptera	Rengas	-	
	Gluta macrocarpa	Rengas	-	
	Mangifera foetida	-	-	
	Mangifera gracilipes	-	E	
	Mangifera odorata	-	-	
	Melanochyla angustifolia	-	-	
	Swintonia spicifera	Merpauh	E	
Anisophylleaceae	*Anisophyllea apetala*	Dedali	-	NT
	Anisophyllea corneri	-	-	LC
Annonaceae	*Alphonsea cylindrica*	Berberas	-	
Annonaceae	*Artabotrys*	-	-	
	Desmos chinensis	-	-	
	Fissistigma	-	-	
	Fissistigma fulgens	-	-	
	Friesodielsia filipes	-	E	
	Goniothalamus	Mempisang	-	
	Goniothalamus curtisii	Pepisang	E	
	Goniothalamus uvarioides	-	-	
	Maasia sumatrana	Mempisang	-	
	Meiogyne monosperma	Mempisang	-	
	Mezzettia parviflora	Mempisang	-	
	Mitrella kentii	-	-	
	Mitrephora maingayi	Mempisang	-	
	Mitrephora vulpina	-	-	
	Monocarpia	-	-	
	Monocarpia marginalis	Mempisang	-	
	Polyalthia	-	-	
	Polyalthia cinnamomea	Mempisang	-	
	Polyalthia clavigera	-	-	
	Polyalthia macropoda	Mempisang	E	
	Polyalthia motleyana	-	-	
	Polyalthia motleyana var. glabrescens	Mempisang	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Annonaceae	*Polyalthia motleyi*	Mempisang	-	
	Polyalthia rumphii	-	-	
	Polyalthia stenopetala	-	-	
	Popowia	-	-	
	Popowia pisocarpa	Mempisang	-	
	Popowia tomentosa var. crinita	-	-	
	Trivalvaria pumila	Mempisang	-	
	Uvaria	-	-	
	Uvaria cordata	-	-	
	Uvaria lobbiana	-	-	
	Xylopia ferruginea	Jangkang	-	
	Xylopia malayana	Mempisang	-	
	Xylopia sumatrana	Jangkang	-	
Aquifoliaceae	*Ilex epiphytica*	-	E	
Araceae	*Aglaonema nitidum*	-	-	
	Anadendrum marginatum	-	E	
	Anadendrum montanum	-	-	
	Homalomena	-	-	
	Homalomena angustifolia var. angustifolia	-	E	
	Homalomena deltoidea	-	E	
	Homalomena pendula	-	-	
	Pothos	-	-	
	Schismatoglottis scortechinii	-	E	
Araceae	*Schismatoglottis wallichii*	-	-	
Araliaceae	*Arthrophyllum diversifolium*	-	-	
	Macropanax maingayi	-	-	
	Schefflera oxyphylla	-	-	
	Trevesia cheirantha	-	-	
Aristolochiaceae	*Thottea tricornis*	-	-	LC
Asclepiadaceae	*Hoya imperialis*	-	-	
Aspleniaceae	*Asplenium nitidum*	-	-	
	Asplenium normale	-	-	
Begoniaceae	*Begonia rhoephila*	-	E	EN
	Begonia sinuata	-	-	
Bombacaceae	*Durio graveolens*	Durian burung	-	
	Durio malaccensis	-	-	
	Durio singaporensis	Durian	E	
Burseraceae	*Canarium littorale*	Kedondong	-	
Cannabaceae	*Gironniera subaequalis*	Hampas tebu	-	
	Trema angustifolia	-	-	
Celastraceae	*Bhesa paniculata*	-	-	
	Kokoona littoralis	Mata ulat	-	
	Microtropis	-	-	
Cibotiaceae	*Cibotium barometz*	-	-	LC
Commelinaceae	*Amischotolype gracilis*	-	-	
	Amischotolype irritans	-	-	
Compositae	*Vernonia arborea*	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Connaraceae	*Connarus*	-	-	
	Indet. Connaraceae	-	-	
Convallariaceae	*Peliosanthes teta*	-	-	
	Erycibe	-	-	
	Ipomoea cairica	-	-	
	Ipomoea triloba	-	-	
	Merremia umbellata	-	-	LC
Cornaceae	*Alangium ebenaceum*	-	-	
	Alangium ridleyi	-	E	
Crypteroniaceae	*Crypteronia paniculata var. paniculata*	-	-	LC
Cucurbitaceae	*Gymnopetalum chinense*	-	-	LC
	Momordica charantia f. abbreviata	-	-	
Cyatheaceae	*Cyathea*	Paku Pohon	-	
	Cyathea contaminans	Paku Pohon	-	
	Cyathea recommutata	-	-	
Cyperaceae	*Cyperus compressus*	-	-	
Davalliaceae	*Davallia angustata*	-	-	LC
Dilleniaceae	*Dillenia reticulata*	Sempah	-	
Dioscoreaceae	*Dioscorea laurifolia*	-	E	
	Dioscorea orbiculata var. tenuifolia	-	-	
Dipterocarpaceae	*Anisoptera costata*	-	-	VU
	Anisoptera curtisii	Mersawa	-	LC
	Anisoptera laevis	Mersawa	-	VU
Dipterocarpaceae	*Dipterocarpus gracilis*	-	-	NT
	Hopea beccariana	-	-	LC
	Hopea dryobalanoides	-	-	LC
	Hopea dyeri	-	-	NT
	Hopea griffithii	-	-	NT
	Hopea pierrei	Merawan	-	VU
	Hopea sulcata	-	E	NT
	Neobalanocarpus heimii	-	-	NT
	Parashorea densiflora	-	E	NT
	Shorea acuminata	Meranti rambai daun	-	LC
	Shorea bentongensis	-	E	EN
	Shorea bracteolata	Meranti paang	-	NT
	Shorea curtisii subsp. curtisii	-	-	NT
	Shorea curtisii x leprosula	-	-	
	Shorea dasyphylla	-	-	VU
	Shorea faguetiana	-	-	NT
	Shorea gibbosa	-	-	VU
	Shorea guiso	-	-	EN
	Shorea laevis	Balau kumus	-	NT
	Shorea leprosula	Meranti tembaga	-	LC
	Shorea longisperma	Meranti damar hitam	-	VU
	Shorea macroptera	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Dipterocarpaceae	*Shorea maxima*	-	E	NT
	Shorea ovata	-	-	NT
	Shorea parvifolia	-	-	
	Shorea pauciflora	-	-	LC
	Shorea platyclados	-	-	NT
	Shorea resinosa	Meranti belang	-	VU
	Vatica lowii	-	-	NT
	Vatica nitens	-	-	NT
Dracaenaceae	*Dracaena umbratica*	-	-	
Ebenaceae	*Diospyros ellipsoidea*	-	-	
	Diospyros ismailii	Arang	E	
	Diospyros kurzii	Arang	-	
	Diospyros latisepala	Arang	-	
	Diospyros pendula	Kayu arang	-	
	Diospyros pyrrhocarpa	Kayu arang	-	
	Diospyros singaporensis	Kayu arang	E	
	Diospyros sumatrana	-	-	
	Diospyros wallichii	Tuba buah	-	
Elaeocarpaceae	*Elaeocarpus*	-	-	
	Elaeocarpus angustifolius	-	-	
	Elaeocarpus ferrugineus subsp. glabrescens	Medang	-	
	Elaeocarpus glaber	-	-	
	Elaeocarpus mastersii	-	-	
Elaeocarpaceae	*Elaeocarpus pedunculatus*	-	-	
	Elaeocarpus petiolatus	-	-	
	Elaeocarpus robustus var. robustus	Mendong	-	
	Elaeocarpus stipularis var. stipularis	Medang api	-	
	Sloanea malayana	-	E	
Ericaceae	*Rhododendron longiflorum var. longiflorum*	-	-	
	Vaccinium bancanum var. tenuinervium	-	-	
Erythroxylaceae	*Erythroxylum kochummenii*	-	E	EN
Euphorbiaceae	*Acalypha caturus*	-	-	
	Blumeodendron subrotundifolium	-	-	
	Blumeodendron tokbrai	Gaham badak	-	
	Botryophora geniculata	-	-	
	Croton argyratus	-	-	
	Croton laevifolius	-	-	
	Epiprinus malayanus	-	-	
	Euphorbia synadenium	-	-	
	Hevea brasiliensis	Getah para	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Euphorbiaceae	*Indet. Euphorbiaceae*	-	-	
	Macaranga conifera	Ludai api	-	
	Macaranga heynei	Ludai	-	
	Macaranga hypoleuca	-	-	
	Macaranga lowii	Balek angin	-	
	Mallotus	-	-	
	Mallotus oblongifolius	-	-	
	Pimelodendron griffithianum	Perah ikan	-	
	Sapium baccatum	Ludai	-	
	Sapium discolor	Ludai	-	
	Trigonostemon malaccanus	-	-	
	Trigonostemon verticillatus var. salicifolius	-	-	
	Trigonostemon villosus	-	E	
Fagaceae	*Castanopsis inermis*	Berangan	-	
	Castanopsis malaccensis	Berangan	-	
	Castanopsis schefferiana	Berangan	-	
	Lithocarpus lucidus	Mempening	-	
	Lithocarpus pattaniensis	Mempening	-	
	Lithocarpus rassa	Mempening	-	
	Quercus oidocarpa	Mempening	-	
Gesneriaceae	*Codonoboea*	-	-	
Gesneriaceae	*Codonoboea breviflora*	-	-	
	Codonoboea hispida	-	-	
	Codonoboea malayana	-	-	
	Cyrtandra cupulata	-	-	
	Didymocarpus antirrhinoides	-	E	
	Didymocarpus cordatus	-	-	
	Henckelia breviflora	-	-	
	Ridleyandra porphyrantha	-	-	VU
Gleicheniaceae	*Dicranopteris linearis var. linearis*	Resam	-	
Gnetaceae	*Gnetum*	-	-	
	Gnetum gnemon	Meninjau	-	
Graminae	*Dendrocalamus pendulus*	-	E	
	Indet. Graminae	-	-	
	Ischaemum muticum	-	-	
	Scrotochloa urceolata	-	-	
Grammitidaceae	*Prosaptia alata*	-	-	NT
Guttiferae	*Calophyllum calaba var. bracteatum*	Bintangor	-	
	Calophyllum rubiginosum	Bintangor	-	
	Calophyllum teysmannii var. inophylloide	Bintangor batu	-	
	Garcinia	-	-	
	Garcinia cuspidata	Kandis	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Guttiferae	*Garcinia scortechinii*	Kandis	-	
	Kayea lepidota	Penaga layang	-	
	Kayea nuda	Penaga	E	
	Kayea racemosa	-	-	
	Mesua lepidota var. parviflora	Penaga	-	
Hemerocallidaceae	*Dianella ensifolia*	-	-	
Hymenophyllaceae	*Hymenophyllum*	-	-	
	Hymenophyllum serrulatum	-	-	
Hypericaceae	*Cratoxylum*	-	-	
	Cratoxylum cochinchinense	-	-	
	Cratoxylum formosum	Derum	-	
Labiatae	*Gomphostemma crinitum*	-	-	
	Rotheca serrata	-	-	
	Vitex	-	-	
	Vitex gamosepala	Leban	-	
Lauraceae	*Alseodaphne*	Medang	-	
	Beilschmiedia palembanica	-	-	
	Cryptocarya densiflora	Medang	-	
	Cryptocarya rugulosa	-	-	
	Cryptocarya tenuifolia	-	-	
	Cryptocarya teysmanniana	Medang	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Lauraceae	*Dehaasia incrassata*	Medang	-	
	Endiandra wrayi	Medang	E	
	Litsea castanea	Medang	-	
	Litsea costalis	Medang	-	
	Litsea cubeba	Medang serai	-	
	Litsea ferruginea	-	-	
	Litsea firma	Medang	-	
	Litsea garciae	Medang keladi	-	
	Litsea machilifolia	Medang	-	
	Litsea robusta	-	-	
	Persea declinata	-	-	
	Phoebe elliptica	Medang	-	
Lecythidaceae	*Barringtonia rimata*	-	-	LC
Leeaceae	*Leea*	-	-	
	Leea indica	-	-	
Leguminosae	*Adenanthera malayana*	-	-	
	Albizia pedicellata	-	-	
	Albizia splendens	Kungkur	-	
	Archidendron ellipticum	-	-	
	Archidendron globosum	-	-	
	Bauhinia integrifolia subsp. integrifolia	Tapak kuda	-	
	Bauhinia wrayi	-	-	
	Caesalpinia	-	-	
	Callerya atropurpurea	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Leguminosae	*Clitoria*	-	-	
	Cynometra	-	-	
	Cynometra malaccensis	-	-	
	Dalbergia pseudosissoo	-	-	
	Derris dalbergioides	-	-	
	Derris elegans	-	-	
	Derris malaccensis	-	-	
	Derris thyrsiflora	-	-	
	Desmodium heterophyllum	-	-	
	Dialium platysepalum	Keranji	-	
	Dialium wallichii	Keranji	-	
	Entada	-	-	
	Koompassia malaccensis	Kempas	-	LC
	Millettia atropurpurea	-	-	
	Millettia hemsleyana	Jadar	-	
	Millettia sericea	-	-	
	Mucuna biplicata	-	-	
	Ormosia venosa	Saga	-	
	Phanera bidentata	-	-	
	Saraca declinata	-	-	
	Saraca thaipingensis	Gapis	-	
Lindsaeaceae	*Tapeinidium pinnatum*	-	-	
Loranthaceae	*Dendrophthoe pentandra*	-	-	
Loranthaceae	*Helixanthera pulchra*	-	-	
	Macrosolen	-	-	
	Macrosolen formosus	-	-	
Lythraceae	*Lagerstroemia ovalifolia*	-	-	
Maesaceae	*Maesa ramentacea*	-	-	
Magnoliaceae	*Magnolia betongensis*	-	-	LC
Marantaceae	*Phrynium pubinerve*	-	-	
Marattiaceae	*Angiopteris evecta*	Paku Gajah	-	
Melastomataceae	*Dissochaeta monticola*	-	-	
	Medinilla radicans	-	-	
	Medinilla scortechinii	-	E	
	Medinilla venusta	-	-	
	Melastoma muticum	-	-	
	Oxyspora bullata	-	-	
	Sonerila	-	-	
	Sonerila heterostemon	-	-	
	Sonerila integrifolia	-	-	
	Sonerila obliqua	-	-	
	Sonerila picta	-	-	
	Sonerila prostrata	-	-	
Meliaceae	*Aglaia*	-	-	
	Aglaia crassinervia	-	-	LC
	Aglaia eximia	-	-	LC
	Aglaia foveolata	-	-	LC

Family	Species	Vernacular Name	Endemism	IUCN Status
Meliaceae	*Aglaia lawii*	-	-	
	Aglaia lawii subsp. oligocarpa	-	-	
	Aglaia leptantha	-	-	NT
	Aglaia odoratissima	-	-	LC
	Aglaia silvestris	-	-	LC
	Aglaia tenuicaulis	-	-	LC
	Aglaia teysmanniana	-	-	NT
	Aglaia tomentosa	-	-	
	Dysoxylum	-	-	
	Dysoxylum alliaceum	-	-	LC
	Lansium domesticum	-	-	LC
	Toona sureni	Surian	-	LC
Memecylaceae	*Memecylon floridum*	-	E	LC
	Memecylon minutiflorum	-	-	LC
	Memecylon pubescens	-	-	LC
Moraceae	*Artocarpus elasticus*	-	-	
	Artocarpus integer var. silvestris	-	-	
	Artocarpus lanceifolius	Keledang	-	
	Artocarpus lowii	-	-	
	Artocarpus nitidus subsp. griffithii	-	-	
	Artocarpus rigidus	-	-	
	Ficus annulata	Ara	-	
Moraceae	*Ficus aurata var. longipilosa*	Ara	-	
	Ficus deltoidea var. angustifolia	-	-	
	Ficus deltoidea var. kunstleri	-	-	
	Ficus fistulosa	-	-	
	Ficus fistulosa var. tengerensis	-	-	
	Ficus fulva	Ara	-	
	Ficus lepicarpa	Ara	-	
	Ficus parietalis	-	-	
	Ficus schwarzii	Ara	-	
	Ficus sinuata	-	-	
	Ficus sumatrana	Ara	-	
	Ficus uniglandulosa	-	-	
	Ficus variegata	-	-	
	Ficus xylophylla	Ara	-	
	Hullettia dumosa	-	-	
Musaceae	*Musa acuminata subsp. malaccensis*	-	-	
Myristicaceae	*Horsfieldia ridleyana*	-	-	NT
	Knema laurina var. laurina	Penarahan	-	LC
	Knema pseudolaurina	-	-	LC
Myrsinaceae	*Ardisia*	-	-	
	Ardisia andamanica	-	-	
	Ardisia colorata	Mata Pagar	-	
	Ardisia platyclada	-	E	
	Ardisia villosa	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Myrsinaceae	*Embelia garciniifolia*	-	-	
Myrtaceae	*Eugenia urophylla*	-	-	
	Syzygium	Kelat	-	
	Syzygium cerinum var. montanum	Kelat	-	
	Syzygium claviflorum var. montanum	-	-	
	Syzygium filiforme var. constrictum	Kelat	-	
	Syzygium filiforme var. filiforme	Kelat	-	
	Syzygium inophyllum var. inophyllum	-	-	
	Syzygium leptostemon	Kelat jambu	-	
	Syzygium pustulatum	-	-	
Olacaceae	*Ochanostachys amentacea*	-	-	LC
	Strombosia javanica	-	-	LC
Oleaceae	*Chionanthus callophyllus*	-	-	
Oleandraceae	*Oleandra neriiformis*	-	-	LC
Orchidaceae	*Bromheadia truncata*	-	-	
Orchidaceae	*Dendrobium*	-	-	
Orchidaceae	*Dendrobium acerosum*	-	-	
Orchidaceae	*Dendrobium subulatum*	-	-	
Orchidaceae	*Dendrochilum*	-	-	
Orchidaceae	*Hetaeria obliqua*	-	-	
Orchidaceae	*Liparis maingayi*	-	-	
	Plocoglottis plicata	-	-	
	Spathoglottis plicata	-	-	
Palmae	*Calamus paspalanthus*	Rotan sirikis	-	
	Ceratolobus subangulatus	Rotan tapait	-	
	Daemonorops geniculata	-	-	
	Iguanura geonomiformis	-	-	
	Licuala kunstleri	-	E	
	Licuala malajana	-	-	
	Licuala malajana var. malajana	-	-	
	Licuala pusilla	-	E	
	Myrialepis paradoxa	-	-	
	Nenga macrocarpa	-	E	
	Pinanga disticha	-	-	
	Pinanga glaucescens	-	E	
	Pinanga malaiana	-	-	
	Pinanga paradoxa	-	E	
	Pinanga scortechinii	Legong	E	
	Plectocomia geminiflora	-	-	
Pandaceae	*Galearia fulva*	-	-	LC
	Microdesmis caseariifolia	-	-	LC
Pandanaceae	*Benstonea ornata*	Pandan	-	
	Pandanus calvus	-	E	
Pentaphylacaceae	*Adinandra integerrima*	-	E	

Family	Species	Vernacular Name	Endemism	IUCN Status
Pentaphylacaceae	*Adinandra maculosa*	-	E	
Phyllanthaceae	*Antidesma coriaceum*	-	-	
	Antidesma cuspidatum	-	-	
	Antidesma montanum	-	-	
	Antidesma pendulum	-	E	
	Aporosa aurea	-	-	
	Aporosa confusa	-	-	
	Aporosa lunata	-	-	
	Aporosa maingayi	-	-	
	Aporosa microstachya	-	-	
	Aporosa nigricans	-	-	
	Aporosa nigropunctata	-	-	
	Aporosa prainiana	Sebasah	-	
	Aporosa selangorica	-	-	
	Aporosa stellifera	Sebasah	-	
	Aporosa symplocoides	-	-	
	Baccaurea macrocarpa	Tampoi	-	
	Baccaurea parviflora	-	-	
	Bischofia javanica	-	-	
	Breynia coronata	-	E	
	Bridelia tomentosa	-	-	
	Cleistanthus hirsutulus	-	-	
	Glochidion	-	-	
Phyllanthaceae	*Glochidion hypoleucum*	-	-	
	Glochidion wallichianum	Uban	-	
Picrodendraceae	*Austrobuxus nitidus*	-	-	
Piperaceae	*Peperomia pellucida*	-	-	
	Piper	-	-	
	Piper aduncum	-	-	
	Piper caninum	-	-	
	Piper mollissimum	-	-	
	Piper muricatum	-	-	
	Piper porphyrophyllum	-	-	
	Piper ramipilum	-	-	
	Piper ribesioides	-	-	
	Piper stylosum	-	-	
Polygalaceae	*Polygala*	-	-	
	Polygala venenosa	-	-	
	Salomonia cantoniensis	-	-	
	Xanthophyllum	-	-	
	Xanthophyllum affine	Minyak berok	-	
	Xanthophyllum eurhynchum	-	-	
	Xanthophyllum eurhynchum subsp. maingayi	Minyak berok	-	
	Xanthophyllum obscurum	Minyak berok	-	
	Xanthophyllum rufum	Minyak berok	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Polygalaceae	*Xanthophyllum venosum*	-	-	
Polypodiaceae	*Lecanopteris pumila*	-	-	LC
	Leptochilus macrophyllus	-	-	
	Microsorum punctatum	-	-	LC
	Pyrrosia angustata	-	-	LC
Proteaceae	*Helicia attenuata*	-	-	
	Helicia petiolaris	-	-	
	Heliciopsis ruficula	-	E	
Pteridaceae	*Syngramma cartilagidens*	-	-	
Rhamnaceae	*Ventilago oblongifolia*	-	-	
	Ziziphus	-	-	
Rhizophoraceae	*Pellacalyx saccardianus*	Membuloh	E	
Rosaceae	*Prunus arborea var. arborea*	Pepijat	-	
	Prunus polystachya	-	-	
Rubiaceae	*Aidia wallichiana*	-	-	
	Cephaelis griffithii	-	-	
	Chassalia chartacea	-	-	
	Chassalia pubescens	-	E	
	Diplospora	-	-	
	Diplospora malaccense	-	-	
	Gaertnera junghuhniana	-	-	
	Gardeniopsis longifolia	-	-	
Rubiaceae	*Greenea commersonii*	-	-	
	Indet. Rubiaceae	-	-	
	Ixora congesta	-	-	
	Ixora kingstonii	-	E	
	Ixora pendula	-	-	
	Ixora scortechinii	-	-	
	Lasianthus	-	-	
	Lasianthus constrictus	-	-	
	Lasianthus densifolius	-	-	
	Lasianthus oblongus	-	E	
	Lasianthus tenuifolius	-	-	
	Morinda umbellata	-	-	
	Mussaenda	-	-	
	Mussaenda mutabilis	-	-	
	Nauclea maingayi	-	-	
	Neolamarckia cadamba	-	-	
	Neonauclea pallida	-	-	
	Oxyceros fragrantissima	-	E	
	Pavetta	-	-	
	Pavetta graciliflora	-	-	
	Pavetta salicina	-	E	
	Pleiocarpidia	-	-	
	Prismatomeris	-	-	
	Psychotria	-	-	
	Psychotria calocarpa	-	-	
	Psychotria malayana	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Rubiaceae	*Psychotria montana*	-	-	
	Psydrax	-	-	
	Rennellia elongata	-	-	
	Rothmannia schoemanii	-	-	
	Tarenna mollis	-	-	
	Uncaria lanosa	-	-	
	Urophyllum	-	-	
	Urophyllum blumeanum	-	-	
	Urophyllum macrophyllum	-	-	
	Urophyllum streptopodium	-	-	
	Urophyllum trifurcum	-	E	
	Urophyllum umbellulatum	-	-	
Rutaceae	*Glycosmis chlorosperma*	-	-	
Salicaceae	*Homalium longifolium*	-	-	
	Osmelia maingayi	-	-	
Santalaceae	*Scleropyrum pentandrum*	-	-	
Sapindaceae	*Allophylus cobbe*	-	-	LC
	Pometia pinnata	-	-	LC
	Xerospermum	-	-	
	Xerospermum noronhianum	-	-	LC
Sapotaceae	*Palaquium*	-	-	
	Palaquium herveyi	Nyatoh	-	
	Palaquium hispidum	-	-	
	Palaquium maingayi	-	E	LC
	Payena luciata	-	-	
	Payena lucida	Nyatoh	-	
	Pouteria maingayi	-	-	
	Pouteria malaccensis	-	-	
	Sarcosperma uittienii	-	-	
Selaginellaceae	*Selaginella alutacia*	-	-	LC
	Selaginella frondosa	-	-	LC
	Selaginella intermedia var. intermedia	-	-	LC
	Selaginella stipulata	-	-	LC
	Selaginella strigosa	-	E	VU
Sonneratiaceae	*Duabanga grandiflora*	-	-	
Stemonuraceae	*Gomphandra*	-	-	
	Gomphandra quadrifida var. quadrifida	-	-	
Sterculiaceae	*Scaphium linearicarpum*	-	-	
	Sterculia hispidissima	Kelumpang	-	
	Sterculia macrophylla	-	-	
Symplocaceae	*Symplocos nivea*	-	E	EN
	Symplocos ophirensis subsp. perakensis	-	-	

Family	Species	Vernacular Name	Endemism	IUCN Status
Ternstroemiaceae	*Anneslea fragrans var. crassipes*	-	-	
Theaceae	*Gordonia maingayi*	-	E	
Thelypteridaceae	*Mesophlebion chylamydophorum*	-	-	
Tiliaceae	*Pentace*	-	-	
Torricelliaceae	*Aralidium pinnatifidum*	-	-	LC
Urticaceae	*Villebrunea rubescens*	-	-	
Vitaceae	*Ampelopsis cantoniensis*	-	-	
	Cayratia mollissima	Akar kenerat	-	
	Pterisanthes	-	-	
	Pterisanthes eriopoda	-	-	
	Tetrastigma pedunculare	Lakom	-	
Zingiberaceae	*Alpinia galanga*	Tepus	-	
	Alpinia rafflesiana	-	-	
	Amomum	-	-	
	Amomum hastilabium	-	-	
	Amomum xanthophlebium	-	E	
	Elettariopsis smithiae	-	-	
	Etlingera littoralis	Tepus	-	
	Globba aurantiaca	-	-	
	Globba cernua	-	-	
	Globba perakensis	-	-	
Zingiberaceae	*Hedychium longicornutum*	-	-	
	Scaphochlamys	-	-	
	Scaphochlamys concinna	-	E	EN
	Zingiber citrinum	-	-	
	Zingiber gracile var. aurantiacum	-	-	
	Zingiber gracile var. elatior	-	-	

Note:
E - Endemic
LC - Least Concern
NT - Near Threatened
VU - Vulnerable
EN - Endangered

Source: Forest Research Institute Malaysia (FRIM) (2017)

AP- D2

SG. PULOH MANGROVE SURVEY FINDINGS

Sungai Puloh Mangrove Survey Findings

for East Coast Rail Link Phase 2

Objective

The objective of the flora survey was to assess the general composition and diversity of the mangroves along Sg. Puloh where the proposed alignment will directly traverse through. Additionally, the total volume of the mangroves trees was also assessed to help provide an indication on the overall condition of the mangrove habitat.

Methodology

The survey was conducted in the form of a rapid inventory through stratified samplings, where only a representative number of samples were documented. As such, the survey does not attempt to provide a complete inventory of all species that may be present within the proposed alignment corridor, but rather a preliminary overview of the general composition and structure of the mangrove habitat.

The survey was carried out using two methodologies; 20m X 20m square plot method and linear transect method. The objective of the 20m X 20m plot method was to estimate the volume (m^3)/density (number of stems) of the survey area by measuring the diameter of trees present within the plot (quantitative). The estimated volume of the survey area will provide a preliminary indication on the quality of the mangrove habitat. The objective of the linear transect method was to document the species richness within the survey area (qualitative). This method is advantageous as it captures inherent variation in mangrove composition along the gradient from the river edge into inland areas.

A total of eight sampling plots were established in the Sg. Puloh mangroves, specifically in the areas where the proposed alignment will directly traverse through (**Table 1**). The plots were established by first identifying a reference point foreach plot. Measuring tapes were used to establish the plot from this point with the 20m X 20m dimensions in a clockwise direction. All plots were aligned towards the north direction. **Figure 1** shows the location of the selected plots in Sg. Puloh.

All trees within the plot measuring 10cm diameter at breast height (DBH) or more were enumerated and identified until the species level where possible. Subsequently, the line transect method was carried out by trekking eastwards and westwards from the reference point for approximately 30 – 50m. Trees observed along the transect were identified and documented until the species level where possible. **Chart 1** shows a general schematic of the sampling methodology used for the survey.

Table 1: Sg. Puloh Flora Survey Plot Coordinates

Sampling Location	Coordinates
Plot 1	N 3° 4'18.80"; E 101° 23'18.68"
Plot 2	N 3° 4'25.54"; E 101° 23'18.12"
Plot 3	N 3° 4'25.54"; E 101° 23'18.12"
Plot 4	N 3° 4'28.26"; E 101° 23'18.15"
Plot 5	N 3° 4'32.94"; E 101° 23'16.88"
Plot 6	N 3° 4'39.72"; E 101° 23'17.54"
Plot 7	N 3° 3'51.84"; E 101°23'18.96"
Plot 8	N 3° 4'3.76"; E 101°23'19.33"

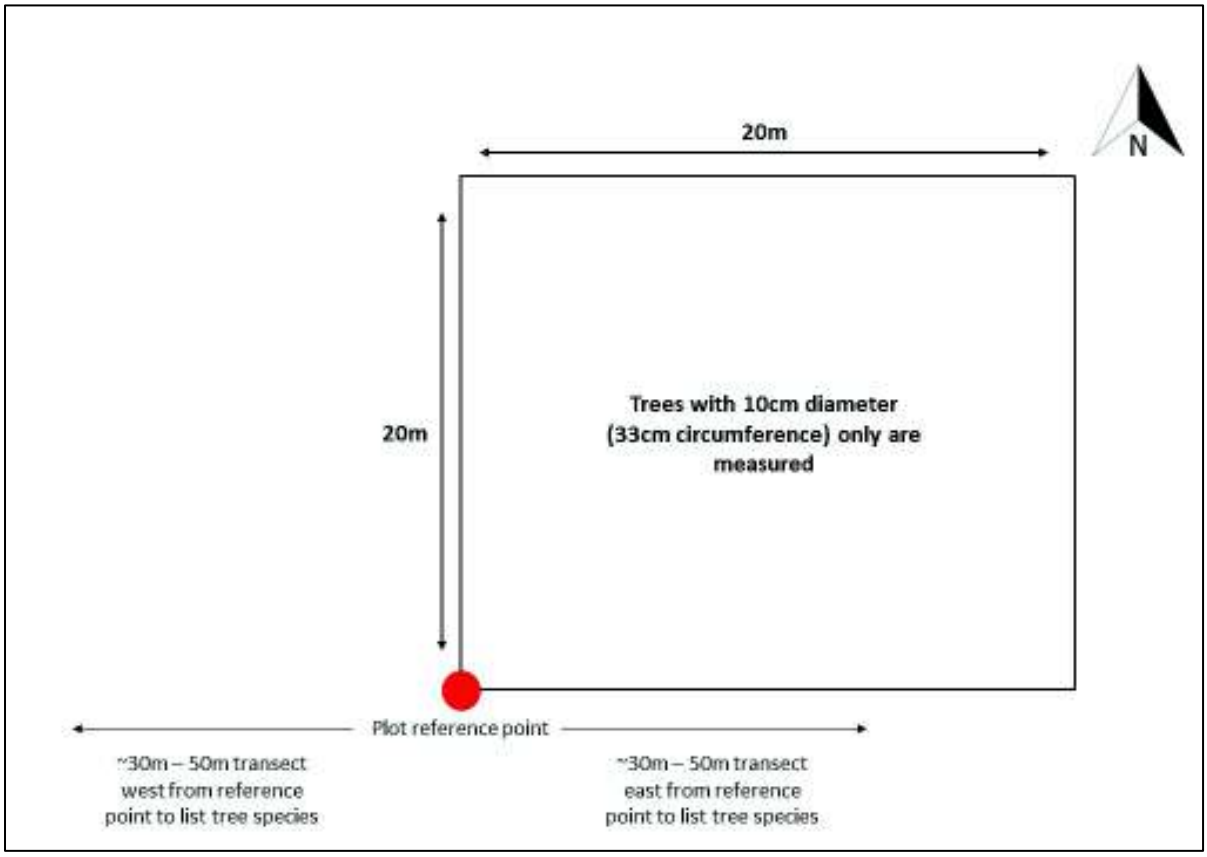


Chart 1: Schematic of rectangular and linear plot method used for mangrove flora survey

N

1:8,000 @ A4 size paper

0 0.1 0.2

km

Coordinate System:GCS WGS 1984
Units: Degree

Location of Survey Plots in Sungai Puloh Mangrove

Date	05-10-2017
Project No	EJ 616
Produced by	AFZ
Revision	A

FIGURE 1

Source: ERE Consulting Group (2017), Roads and localities courtesy of OpenStreetMap (2016), Forest Reserve by JPBD (2015) G:\Project\EJ 616 The East Coast Rail Link – Phase (2)\Maps\MXD\EIA\Fig6.12-7_LocSvyPlot_SgPuloh_South.mxd

Results: List of Mangrove Species along Sg. Puloh

Plot 1 Inventory

Family	Species	Local name	Stem diameter (cm)
Avicenniaceae	*Aviccenia officianalis*	Api api ludat	24.7
	Aviccenia officianalis	Api api ludat	35.0
	Aviccenia officianalis	Api api ludat	13.4
	Aviccenia officianalis	Api api ludat	31.8
	Aviccenia officianalis	Api api ludat	35.9
	Aviccenia officianalis	Api api ludat	25.8
	Aviccenia officianalis	Api api ludat	31.9
	Aviccenia officianalis	Api api ludat	20.4
	Aviccenia officianalis	Api api ludat	22.0
	Aviccenia officianalis	Api api ludat	22.4
	Aviccenia officianalis	Api api ludat	24.7
Rhizophoraceae	*Rhizophora apiculata*	Bakau minyak	39.2
	Rhizophora apiculata	Bakau minyak	14.5
	Rhizophora apiculata	Bakau minyak	23.4
	Rhizophora apiculata	Bakau minyak	14.0
	Rhizophora apiculata	Bakau minyak	25.6
	Rhizophora apiculata	Bakau minyak	14.9
	Rhizophora mucronata	Bakau kurap	30.3
Sonneratiaceae	*Sonneratia alba*	Perepat	15.6

Transect Observations around Plot 1

Family	Species	Local name
Rhizophoraceae	*Brugueira cylindrica*	Bakau putih
	Bruguiera gymnorhiza	Tumu merah
	Ceriops tagal	Tengar
	Rhizophora apiculata	Bakau minyak
	Rhizophora mucronata	Bakau kurap

Plot 2 Inventory

Family	Species	Local name	Stem Diameter (cm)
Avicenniaceae	*Aviccenia officianalis*	Api api ludat	13.8
	Aviccenia officianalis	Api api ludat	37.3
	Aviccenia officianalis	Api api ludat	16.2
	Aviccenia officianalis	Api api ludat	12.6
	Aviccenia officianalis	Api api ludat	13.5
	Aviccenia officianalis	Api api ludat	14.7
	Aviccenia officianalis	Api api ludat	13.3
	Aviccenia officianalis	Api api ludat	14.2
	Aviccenia officianalis	Api api ludat	12.4
	Aviccenia officianalis	Api api ludat	13.7
	Aviccenia officianalis	Api api ludat	11.4
Rhizophoraceae	*Rhizophora apiculata*	Bakau minyak	15.8
	Rhizophora apiculata	Bakau minyak	21.5
	Rhizophora apiculata	Bakau minyak	11.5
	Rhizophora apiculata	Bakau minyak	33.3
	Rhizophora apiculata	Bakau minyak	18.5
	Rhizophora apiculata	Bakau minyak	25.8
	Rhizophora apiculata	Bakau minyak	19.1
	Rhizophora apiculata	Bakau minyak	16.1
	Rhizophora apiculata	Bakau minyak	26.6
	Rhizophora apiculata	Bakau minyak	31.6
	Rhizophora apiculata	Bakau minyak	29.2
	Rhizophora apiculata	Bakau minyak	11.5
	Rhizophora apiculata	Bakau minyak	11.5
	Rhizophora apiculata	Bakau minyak	13.8
	Rhizophora apiculata	Bakau minyak	10.0
	Rhizophora apiculata	Bakau minyak	26.5
	Rhizophora apiculata	Bakau minyak	20.1

Plot 3 Inventory

Family	Species	Local name	Stem Diameter (cm)
Rhizophoraceae	*Brugueira cylindrica*	Bakau putih	13.1
	Rhizophora apiculata	Bakau minyak	14.0

Plot 4 Inventory

Family	Species	Local name	Stem Diameter (cm)
Rhizophoraceae	*Ceriops tagal*	Tengar	16.9
	Ceriops tagal	Tengar	14.8
	Ceriops tagal	Tengar	15.8
	Ceriops tagal	Tengar	12.0
	Rhizophora apiculata	Bakau minyak	20.4
	Rhizophora apiculata	Bakau minyak	12.2
	Rhizophora apiculata	Bakau minyak	10.2
	Rhizophora apiculata	Bakau minyak	18.8
	Rhizophora apiculata	Bakau minyak	11.3
	Rhizophora apiculata	Bakau minyak	11.6
	Rhizophora apiculata	Bakau minyak	11.4
Rhizophoraceae	*Rhizophora apiculata*	Bakau minyak	19.8
	Rhizophora apiculata	Bakau minyak	11.3
	Rhizophora apiculata	Bakau minyak	17.4
	Rhizophora apiculata	Bakau minyak	10.8
	Rhizophora apiculata	Bakau minyak	12.0

Transect Observations around Plot 4

Family	Species	Local name
Rhizophoraceae	*Ceriops tagal*	Tengar
	Rhizophora apiculata	Bakau minyak
	Rhizophora mucronata	Bakau kurap

Plot 5 Inventory

Family	Species	Local name	Stem Diameter (cm)
Avicenniaceae	*Avicennia alba*	Api api putih	66.5
	Aviccenia officianalis	Api api ludat	35.0
	Aviccenia officianalis	Api api ludat	94.2
Rhizophoraceae	*Brugueira sexangula*	Tumu mata buaya	10.7
	Rhizophora apiculata	Bakau minyak	22.3
	Rhizophora apiculata	Bakau minyak	36.9
	Rhizophora apiculata	Bakau minyak	26.4
	Rhizophora apiculata	Bakau minyak	20.1
Sonneratiaceae	*Sonneratia alba*	Perepat	23.9
	Sonneratia alba	Perepat	27.6
	Sonneratia alba	Perepat	24.7

Transect Observations around Plot 5

Family	Species	Local name
Meliaceae	*Xylocarpus moluccensis*	Nyireh batu
Rhizophoraceae	*Brugueira cylindrica*	Bakau putih
	Brugueira sexangula	Tumu mata buaya
	Rhizophora apiculata	Bakau minyak
Sonneratiaceae	*Sonneratia alba*	Perepat

Plot 6 Inventory

Family	Species	Local name	Stem Diameter (cm)
Meliaceae	*Xylocarpus granatum*	Nyireh bunga	16.4
	Xylocarpus granatum	Nyireh bunga	24.4
	Xylocarpus granatum	Nyireh bunga	15.2
	Xylocarpus granatum	Nyireh bunga	17.9
	Xylocarpus granatum	Nyireh bunga	11.9
	Xylocarpus granatum	Nyireh bunga	15.0
	Xylocarpus granatum	Nyireh bunga	29.3
Rhizophoraceae	*Rhizophora apiculata*	Bakau minyak	25.3
	Rhizophora apiculata	Bakau minyak	26.2
	Rhizophora apiculata	Bakau minyak	20.0
	Rhizophora apiculata	Bakau minyak	15.7
	Rhizophora apiculata	Bakau minyak	12.7
	Rhizophora apiculata	Bakau minyak	16.8
	Rhizophora apiculata	Bakau minyak	19.0
	Rhizophora apiculata	Bakau minyak	13.2
	Rhizophora apiculata	Bakau minyak	16.2
	Rhizophora apiculata	Bakau minyak	17.3
	Rhizophora apiculata	Bakau minyak	17.4
	Rhizophora apiculata	Bakau minyak	16.4
	Rhizophora apiculata	Bakau minyak	19.0
	Rhizophora apiculata	Bakau minyak	33.0
	Rhizophora apiculata	Bakau minyak	19.9
	Rhizophora apiculata	Bakau minyak	27.1
Rhizophoraceae	*Rhizophora apiculata*	Bakau minyak	20.2
	Rhizophora apiculata	Bakau minyak	35.0
	Rhizophora apiculata	Bakau minyak	16.0
	Rhizophora apiculata	Bakau minyak	30.2

Transect Observations around Plot 6

Family	Species	Local name
Cellastraceae	*Cassine viburnifolia*	Barak laut
Meliaceae	*Xylocarpus granatum*	Nyireh bunga
Pteridaceae	*Acrostichum speciosum*	Piai Laut
Rhizophoraceae	*Brugueira cylindrica*	Bakau putih
	Rhizophora apiculata	Bakau minyak

Plot 7 Inventory

Family	Species	Local name	Stem Diameter (cm)
Meliaceae	*Xylocarpus granatum*	Nyireh bunga	30.0
	Xylocarpus granatum	Nyireh bunga	18.1
Rhizophoraceae	*Brugueira cylindrica*	Bakau putih	25.9
	Brugueira cylindrica	Bakau putih	11.0
	Rhizophora apiculata	Bakau minyak	30.6
	Rhizophora apiculata	Bakau minyak	29.1
	Rhizophora apiculata	Bakau minyak	18.3
	Rhizophora apiculata	Bakau minyak	17.4
	Rhizophora apiculata	Bakau minyak	10.8
	Rhizophora apiculata	Bakau minyak	12.3
	Rhizophora apiculata	Bakau minyak	12.6
	Rhizophora apiculata	Bakau minyak	19.7
	Rhizophora apiculata	Bakau minyak	15.2
	Rhizophora apiculata	Bakau minyak	16.7
	Rhizophora apiculata	Bakau minyak	12.8
	Rhizophora apiculata	Bakau minyak	11.7

Transect Observations around Plot 7

Family	Species	Local name
Rhizophoraceae	*Brugueira sexangula*	Tumu mata buaya
	Ceriops tagal	Tengar
	Rhizophora apiculata	Bakau minyak

Plot 8 Inventory

Family	Species	Local name	Stem Diameter (cm)
Avicenniaceae	*Aviccenia officianalis*	Api api ludat	22.5
	Aviccenia officianalis	Api api ludat	35.2
Meliaceae	*Xylocarpus granatum*	Nyireh bunga	16.2
	Xylocarpus granatum	Nyireh bunga	18.0
	Xylocarpus granatum	Nyireh bunga	12.6
Rhizophoraceae	*Rhizophora apiculata*	Bakau minyak	13.1
	Rhizophora apiculata	Bakau minyak	11.2
	Rhizophora mucronata	Bakau kurap	11.4
	Rhizophora mucronata	Bakau kurap	12.3

Transect Observations around Plot 8

Family	Species	Local name
Rhizophoraceae	*Brugueira cylindrica*	Bakau putih
	Bruguiera gymnorhiza	Tumu merah
	Ceriops tagal	Tengar
	Rhizophora apiculata	Bakau minyak

Survey Photos

Photo 1: Identification of mangrove species

Photo 2: Measurement of tree diameter

Photo 3: Measurement of tree diameter

Photo 4: Plot (20x20 m) demarcation

Photo 5: Vegetation at plot 1

Photo 6: Vegetation at plot 1

Photo 7: Vegetation at Plot 2

Photo 8: Vegetation at Plot 3

Photo 9: Vegetation at Plot 4

Photo 10: Tributaries of Sg. Puloh

Photo 11: Vegetation at Plot 5

Photo 12: Vegetation at Plot 6

Photo 13: Vegetation at Plot 7

Photo 14: Vegetation at Plot 8

Photo 15: Vegetation clearance at Plot 8

Photo 16: The southern section of Sg. Puloh, where mangroves have been substantially cleared.

Voucher Specimens of common plants at Sg. Puloh

Rhizophora apiculata **(bakau minyak)**

Bruguuiera gymnorhiza **(tumu merah)**

Aviccenia officianalis **(api api ludat)**

Sonneratia alba **(perepat)**

Bruiguiera sexangula **(tumu putih)**

AP- D3

RANTAU PANJANG FR FLORA SURVEY FINDINGS

Rantau Panjang Forest Reserve Survey Findings

for East Coast Rail Link Phase 2

Objective

The objective of the flora survey was to assess the general composition and diversity of the Rantau Panjang Forest Reserve, specifically in the areas where the proposed alignment will directly traverse through. Additionally, the size and volume of trees were also assessed to help provide an indication on the overall condition of the forest habitat.

Methodology

The survey was conducted in the form of a rapid inventory through stratified sampling points, where only a representative number of samples were documented. As such, the survey does not attempt to provide a complete inventory of all species that may be present within the proposed alignment corridor, but rather a preliminary overview of the general composition and structure of the forest habitat.

The survey was carried out using two methodologies; 20m X 20m square plot method and linear transect method. The objective of the 20m X 20m plot method was estimate the volume (m^3)/density (number of stems) of the survey area by measuring the diameter of trees present within the plot. The estimated volume of the survey area will provide a preliminary indication on the quality of the forest habitat. The objective of the linear transect method was to document the species richness within the survey area. This method is advantageous as it captures inherent variation in flora composition along the different topographical gradients.

A total of eight sampling plots were established within Rantau Panjang FR, specifically in the areas where the proposed alignment will directly traverse through (**Table 1**). The plots were established by first identifying a reference point for each plot. Measuring tapes were the used to establish the plot from this point with the 20m X 20m dimensions in a clockwise direction. All plots were aligned towards the north direction. All trees within the plot measuring 10cm diameter at breast height (DBH) or more were enumerated and identified until the species level where possible. Subsequently, the line transect method was carried out by trekking eastwards and westwards from the reference point for approximately 30 – 50m. Trees observed along the transect were identified and documented until the species level where possible. **Chart 1** shows a general schematic of the sampling methodology used for the survey.

Table 1: Rantau Panjang Flora Survey Plot Coordinates

Sampling Location	Coordinates
Plot 1	N 3°19'42.87"; E 101°30'21.29"
Plot 2	N 3°19'48.95"; E 101°30'21.79"
Plot 3	N 3°19'27.71"; E 101°30'14.09"
Plot 4	N 3°19'32.22"; E 101°30'16.97"
Plot 5	N 3°19'18.15"; E 101°30'3.30"
Plot 6	N 3°19'10.83"; E 101°29'50.99"
Plot 7	N 3°19'6.29"; E 101°29'42.26"
Plot 8	N 3°19'46.78"; E 101°30'22.81"

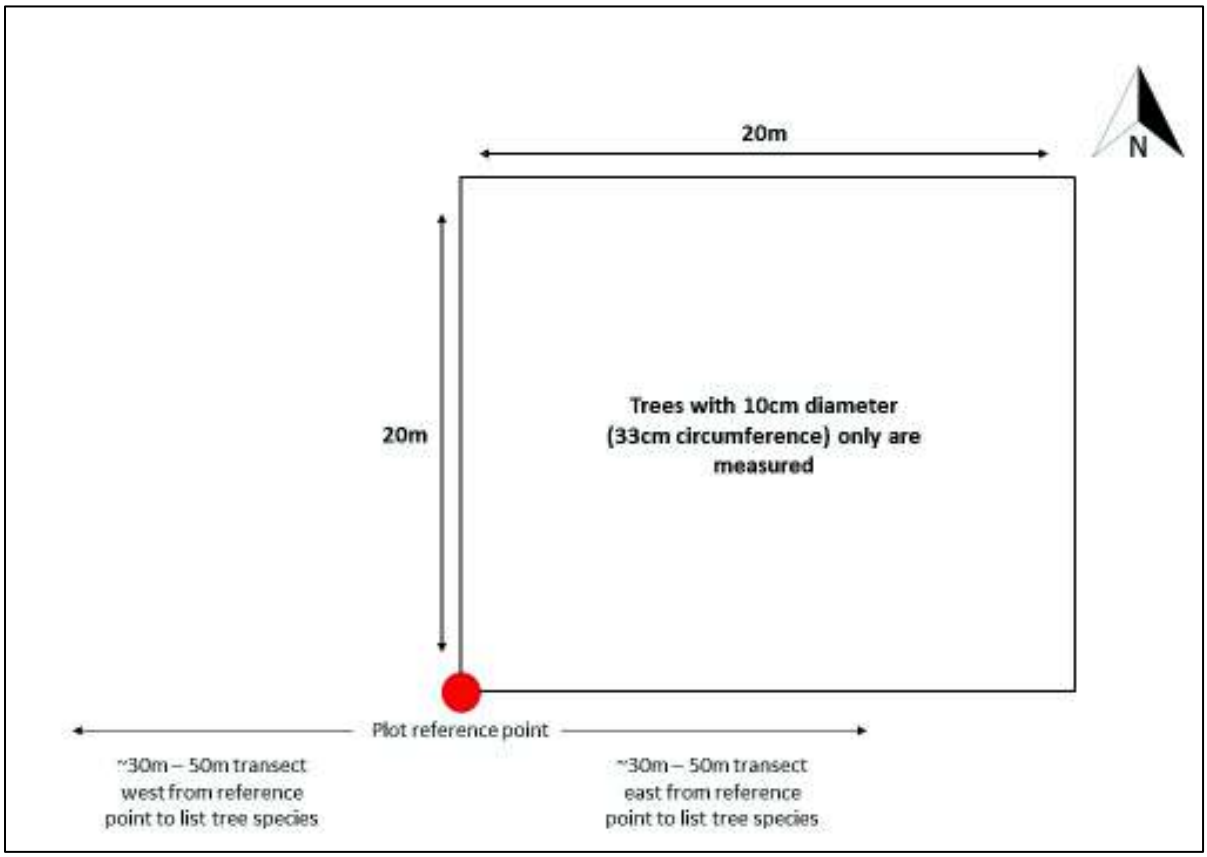
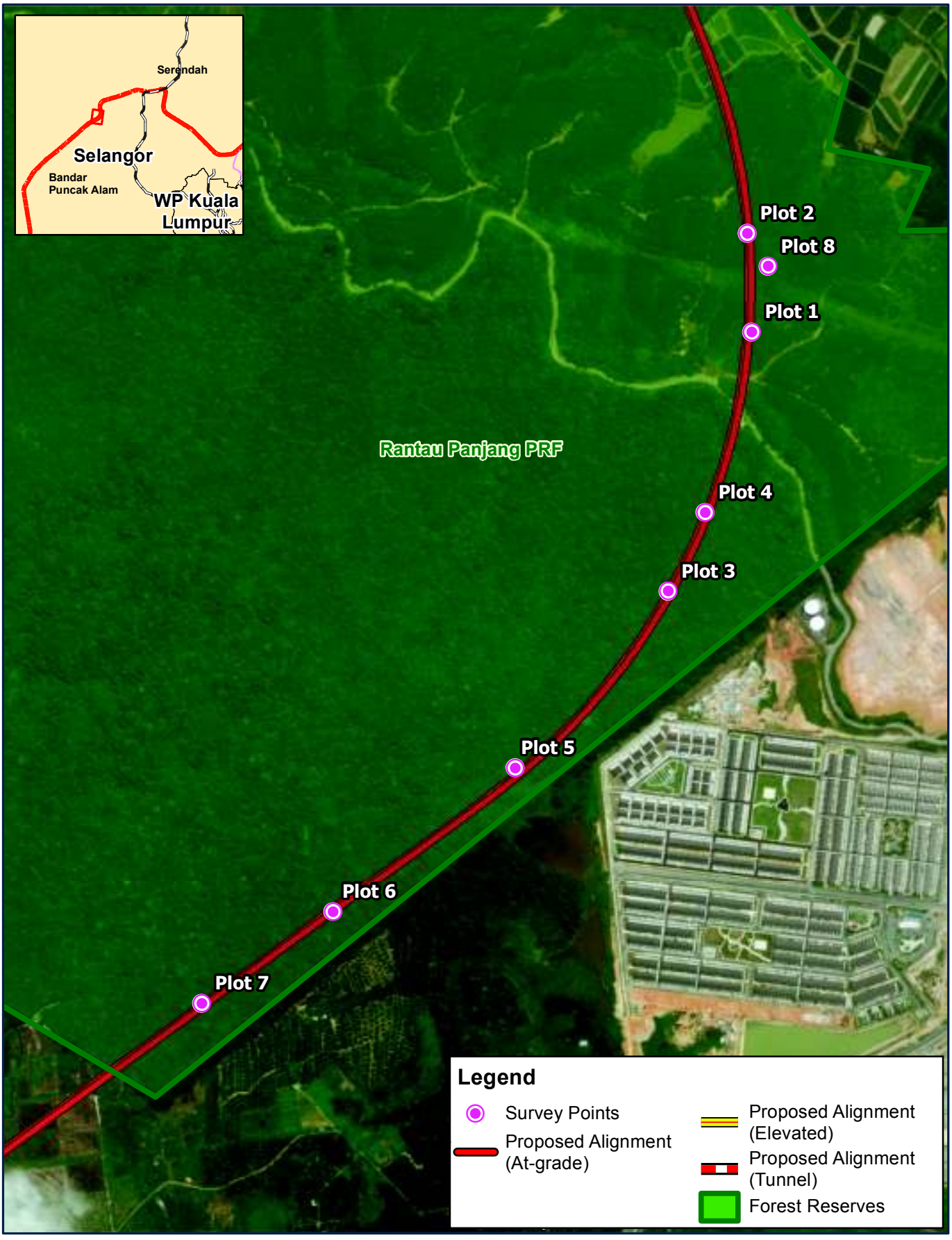


Chart 1: Schematic of rectangular and linear plot method used for flora survey in Rantau Panjang FR



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0 0.2 0.4

km

Coordinate System:GCS WGS 1984
Units: Degree

ere consulting group

Location of Survey Plots in Rantau Panjang Forest Reserve

Date	05-10-2017
Project No	EJ 616
Produced by	AFZ
Revision	A

FIGURE 1

Source: ERE Consulting Group (2017), Roads and localities courtesy of OpenStreetMap (2016), Forest Reserve by JPBD (2015) G:\Project\EJ 616 The East Coast Rail Link – Phase (2)\Maps\MXD\EIA\Fig6.12-6_LocSvyPlot_RantauPjgFR_South.mxd

Results: List of Tree Species in Rantau Panjang FR

Plot 1 Inventory

Family	Species	Local name	Stem diameter (cm)
Euphorbiaceae	*Hevea brasiliencis*	Getah	14.3
	Hevea brasiliencis	Getah	15.2
	Hevea brasiliencis	Getah	10.7
	Hevea brasiliencis	Getah	19.0
	Hevea brasiliencis	Getah	16.5
	Hevea brasiliencis	Getah	19.3
	Hevea brasiliencis	Getah	19.5
	Hevea brasiliencis	Getah	25.9
	Hevea brasiliencis	Getah	21.4
	Hevea brasiliencis	Getah	22.2
	Hevea brasiliencis	Getah	18.1
	Hevea brasiliencis	Getah	14.2
	Hevea brasiliencis	Getah	15.8

Transect Observations around Plot 1

Family	Species	Local name
Acanthaceae	*Asystasia gangetica* ssp. *Gangetica*	Pengorak
	Asystasia gangetica ssp. *Micrantha*	Pengorak
Aspleniaceae	*Asplenium nidus*	Paku Langsuir
Burseraceae	*Dacryodes* sp.	Kedondong
	Santiria laevigata	Kedondong Kerantai Licin
Compositae	*Elephantopus mollis*	-
	Mikania cordata	Selaput Tunggul
	Mikania micrantha	Selaput Tunggul
	Vernonia sp	-
Davalliaceae	*Davallia denticulata var. denticulata*	-
Dilleniaceae	*Tetracera indica*	Akar Mempelas
Elaeocarpaceae	*Elaeocarpus* sp.	Mendung
Euphorbiaceae	*Endospermum diadenum*	Sesenduk
	Hevea brasiliensis	Pokok Getah
	Macaranga gigantea	Mahang Gajah
	Macaranga heynei	Mahang
	Macaranga tanarius	Mahang
	Macaranga triloba	Mahang Merah
	Mallotus macrostachyus	Balek Angin
	Mallotus paniculatus	Balek Angin
	Sapium baccatum	Ludai
	Sapium discolor	Mamah Pelanduk
Flacourtiaceae	*Ryparosa* sp.	-

Family	Species	Local name
Gleicheniaceae	*Dicranopteris curranii*	-
	Dicranopteris linearis	Resam
Gramineae	*Imperata cylindrica var. major*	Lalang
Lauraceae	*Cassytha filiformis*	Chemar Batu
	Litsea sp.	Medang
Leeaceae	*Leea indica*	Memali
Leguminosae	*Callerya atropurpurea*	Tulang Daing
	Mimosa pudica	Semalu
Lycopodiaceae	*Lycopodiella cernua*	Paku Sesorok
Melastomataceae	*Clidemia hirta*	-
	Melastoma malabathricum	Senduduk
	Pternandra coerulescens	Mempoyan
Moraceae	*Artocarpus integer var. silvestris*	Bangkong
	Ficus sp.	Ara
Myrtaceae	*Rhodamnia cinerea*	Mempoyan
	Syzygium sp.	Kelat
Nephrolepidaceae	*Nephrolepis auriculata*	-
Olacaceae	*Ochanostachys amentacea*	Petaling
Onagraceae	*Ludwigia hyssopifolia*	-
Oxalidaceae	*Oxalis barrelieri*	Belimbing Tanah
Palmae	*Eugeissona tristis*	Bertam
Pandaceae	*Galearia fulva*	-
Phyllanthaceae	*Antidesma coriaceum*	Brunei
	Aporosa arborea	Sebasah
	Breynia racemosa	Hujan Panas
	Bridelia tomentosa	Kenidai

Family	Species	Local name
Phyllanthaceae	*Glochidion superbum*	Ubah
	Phyllanthus amarus	Dukung Anak
Poaceae	*Paspalum conjugatum*	Rumput Lembu
	Paspalum distichum	Rumput Kerbau
Polygalaceae	*Polygala paniculata*	Pokok Sarsi
Rhizophoraceae	*Pellacalyx saccardianus*	Membuluh
Rubiaceae	*Chassalia chartacea*	Jarum-jarum
	Hedyotis capitellata	-
	Ixora javanica	Pecah Periuk
	Mitracarpus hirtus	-
	Porterandia anisophylla	Tinjau belukar
	Spermacoce articularis	-
	Tarenna sp.	-
	Uncaria cordata var. cordata	-
Sapindaceae	*Lepisanthes cf. tetraphylla*	-
	Nephelium lappaceum	Rambutan
Selaginellaceae	*Selaginella intermedia var. intermedia*	Jambul Merak
Sterculiaceae	*Melochia corchorifolia*	-
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Urticaceae	*Poikilospermum suaveolens*	-
Verbenaceae	*Lantana camara*	Bunga Tahi Ayam

Plot 2 Inventory

Family	Species	Local name	Stem diameter (cm)
Euphorbiaceae	*Hevea brasiliencis*	Getah	15.8
	Hevea brasiliencis	Getah	21.5
	Hevea brasiliencis	Getah	11.5
	Hevea brasiliencis	Getah	33.3
	Hevea brasiliencis	Getah	18.5
	Hevea brasiliencis	Getah	25.8
	Hevea brasiliencis	Getah	19.1
	Hevea brasiliencis	Getah	16.1
	Hevea brasiliencis	Getah	26.6
	Hevea brasiliencis	Getah	31.6
	Hevea brasiliencis	Getah	29.2
	Hevea brasiliencis	Getah	13.8
	Hevea brasiliencis	Getah	37.3
	Hevea brasiliencis	Getah	16.2
	Hevea brasiliencis	Getah	12.6
	Hevea brasiliencis	Getah	13.5

Transect Observations around Plot 2

Family	Species	Local name
Acanthaceae	*Asystasia gangetica* ssp. *Gangetica*	Pengorak
	Asystasia gangetica ssp. *Micrantha*	Pengorak
Burseraceae	*Dacryodes* sp.	Kedondong
Compositae	*Elephantopus mollis*	-
	Mikania cordata	Selaput Tunggul
	Mikania micrantha	Selaput Tunggul
Davalliaceae	*Davallia denticulata var. denticulata*	-
Dilleniaceae	*Tetracera indica*	Akar Mempelas
Euphorbiaceae	*Endospermum diadenum*	Sesenduk
	Hevea brasiliensis	Pokok Getah
	Macaranga gigantea	Mahang Gajah
	Macaranga heynei	Mahang
	Macaranga tanarius	Mahang
	Macaranga triloba	Mahang Merah
	Mallotus macrostachyus	Balek Angin
	Mallotus paniculatus	Balek Angin
Gramineae	*Imperata cylindrica var. major*	Lalang
Lauraceae	*Cassytha filiformis*	Chemar Batu
Leeaceae	*Leea indica*	Memali
Melastomataceae	*Clidemia hirta*	-
	Melastoma malabathricum	Senduduk
Nephrolepidaceae	*Nephrolepis auriculata*	-
Onagraceae	*Ludwigia hyssopifolia*	-
Oxalidaceae	*Oxalis barrelieri*	Belimbing Tanah
Passifloraceae	*Passiflora foetida*	Letop - letop

Family	Species	Local name
Phyllanthaceae	*Breynia racemosa*	Hujan Panas
	Phyllanthus amarus	Dukung Anak
Poaceae	*Paspalum distichum*	Rumput Kerbau
Polygalaceae	*Polygala paniculata*	Pokok Sarsi
Rubiaceae	*Mitracarpus hirtus*	-
Rutaceae	*Melicope lunu-ankenda*	Tenggek Burung
Sterculiaceae	*Melochia corchorifolia*	-
Ulmaceae	*Trema angustifolia*	Menarong
Vitaceae	*Cayratia mollissima*	-

Plot 3 Inventory

Family	Species	Local name	Stem diameter (cm)
Apocynaceae	*Dyera costulata*	Jelutong	16.1
Euphorbiaceae	*Endospermum diadenum*	Sesenduk	31.6
	Endospermum diadenum	Sesenduk	29.2
Ixonanthaceae	*Ixonanthes icosandra*	Pagar Anak	18.5
Moraceae	*Artocarpus anisophyllus*	Keledang Babi	13.9
Myrtaceae	*Syzygium* sp.	Kelat	33.3
Pinaceae	*Pinus cf. caribaea*	Pine	34.9
	Pinus cf. caribaea	Pine	15.8
	Pinus cf. caribaea	Pine	21.5
	Pinus cf. caribaea	Pine	11.5
Pinaceae	*Pinus cf. caribaea*	Pine	25.8
	Pinus cf. caribaea	Pine	26.6
Ulmaceae	*Gironniera nervosa*	Hampas Tebu	13.8
Unknown	*unknown*	unknown	19.1

Transect Observations around Plot 3

Family	Species	Local name
Anisophylleaceae	*Anisophyllea* sp.	Delek
Annonaceae	*Desmos dasymaschalus var. dasymaschalus*	Akar Mempisang
	Xylopia cf. ferruginea	Jangkang Bukit
Apocynaceae	*Dyera costulata*	Jelutong
Araceae	*Epipremnum giganteum*	Akar Gajah
Burseraceae	*Canarium littorale f. rufum*	Kedondong Gergaji
	Dacryodes rostrata	Kedondong Kerut
	Santiria sp.	Kedondong Kerantai
Compositae	*Vernonia* sp.	-
Dilleniaceae	*Acrotrema costatum*	Punai Tanah
	Dillenia grandifolia	Simpoh Daun Merah
Dracaenaceae	*Dracaena elliptica*	-
	Dracaena umbratica	-
Ebenaceae	*Diospyros argentea*	Bedil Lalat
	Diospyros wallichii	Tuba Buah

Family	Species	Local name
Elaeocarpaceae	*Elaeocarpus* sp.	Mendung
Euphorbiaceae	*Endospermum diadenum*	Sesenduk
	Macaranga gigantea	Mahang Gajah
	Macaranga hypoleuca	Mahang Putih
Flacourtiaceae	*Flacourtia rukam*	Rukam
Gleicheniaceae	*Dicranopteris curranii*	-
Guttiferae	*Calophyllum* sp.	Bintangor
	Garcinia sp.	Kandis
Ixonanthaceae	*Ixonanthes icosandra*	Pagar Anak
Labiatae	*Vitex pinnata*	Leban
Lauraceae	*Actinodaphne macrophylla*	Medang Payung
	Cinnamomum sp.	Medang
	Litsea sp.	Medang
Lecythidaceae	*Barringtonia pendula*	Putat
Leguminosae	*Callerya atropurpurea*	Tulang Daing
	Dialium wallichii	Keranji Kuning Kecil
Maesaceae	*Maesa ramentacea*	Gambir Hutan
Melastomataceae	*Clidemia hirta*	-
	Oxyspora bullata	-
	Pternandra coerulescens	Mempoyan
Meliaceae	*Aglaia* sp.	Bekak
Memecylaceae	*Memecylon* sp.	Nipis Kulit
Moraceae	*Artocarpus anisophyllus*	Keledang Babi
	Artocarpus sp.	Temponek
Myristicaceae	*Horsfieldia* sp.	Penarahan
Myrtaceae	*Syzygium* sp.	Kelat
Olacaceae	*Ochanostachys amentacea*	Petaling
Palmae	*Daemonorops sabut*	Rotan Cincin
	Eugeissona tristis	Bertam
Pandaceae	*Galearia fulva*	-
Passifloraceae	*Paropsia vareciformis*	Dendulang
Phyllanthaceae	*Antidesma coriaceum*	Brunei
	Aporosa arborea	Sebasah
	Baccaurea parviflora	Setambun Tahi
Piperaceae	*Piper porphyrophyllum*	Sireh Rimau
Pteridaceae	*Taenitis blechnoides*	-
Rhizophoraceae	*Carallia brachiata*	Meransi
	Gynotroches axillaris	Mata Keli
	Pellacalyx saccardianus	Membuluh
Rubiaceae	*Aidia densiflora*	Menterbang
	Chassalia chartacea	Jarum-jarum
	Hedyotis capitellata	-
	Hedyotis philippinensis	-
	Ixora pendula	Pecah Periuk
	Porterandia anisophylla	Tinjau Belukar
	Psychotria malayana	-
	Rothmania kuchingensis	-

Family	Species	Local name
	Timonius wallichianus	Tulang-tulang Jantan
Rubiaceae	*Uncaria cordata var. cordata*	-
	Urophyllum arboreum	Melukut
Rutaceae	*Melicope glabra*	Pepauh
Sapindaceae	*Nephelium* sp.	Rambutan
Smilacaceae	*Smilax megacarpa*	-
	Smilax setosa	-
	Smilax sp.	-
Stemonuraceae	*Gomphandra quadrifida var. quadrifida*	-
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Vitaceae	*Ampelocissus cinnamomea*	Akar Lipang

Plot 4 Inventory

Family	Species	Local name	Stem diameter (cm)
Euphorbiaceae	*Endospermum diadenum*	Sesenduk	30.0
	Endospermum diadenum	Sesenduk	38.0
Moraceae	*Artocarpus anisophyllus*	Keledang Babi	12.9
	Artocarpus anisophyllus	Keledang Babi	10.3
Pinaceae	*Pinus cf. caribaea*	Pine	18.5
	Pinus cf. caribaea	Pine	29.5
	Pinus cf. caribaea	Pine	26.9
Rhizophoraceae	*Pellacalyx saccardianus*	Membuluh	13.3
	Pellacalyx saccardianus	Membuluh	11.6
	Pellacalyx saccardianus	Membuluh	13.2
Rubiaceae	*Porterandia anisophylla*	Tinjau Belukar	10.8
	Porterandia anisophylla	Tinjau Belukar	11.4
Ulmaceae	*Gironniera nervosa*	Hampas Tebu	15.1

Transect Observations around Plot 4

Family	Species	Local name
Burseraceae	*Santiria* sp.	Kedondong Kerantai
Dracaenaceae	*Dracaena umbratica*	-
Ebenaceae	*Diospyros* sp.	Kayu Arang
Elaeocarpaceae	*Elaeocarpus petiolatus*	Mendung

Family	Species	Local name
Euphorbiaceae	*Drypetes cf. pendula*	Lidah-lidah
	Endospermum diadenum	Sesenduk
	Macaranga gigantea	Mahang Gajah
	Macaranga lowii	Mahang
	Macaranga triloba	Mahang Merah
Guttiferae	*Cratoxylum formosum*	Derum
	Garcinia nervosa var. nervosa	Kandis
Labiatae	*Vitex pinnata*	Leban
Lauraceae	*Actinodaphne macrophylla*	Medang Payung
Leguminosae	*Callerya atropurpurea*	Tulang Daing
Melastomataceae	*Clidemia hirta*	-
	Oxyspora bullata	-
	Pternandra coerulescens	Mempoyan
Memecylaceae	*Memecylon sp.*	Nipis Kulit
Moraceae	*Ficus chartacea*	Ara
Myristicaceae	*Knema laurina ssp. Laurina*	Penarahan
	Knema sp.	Penarahan
Myrtaceae	*Rhodamnia cinerea*	Mempoyan
	Syzygium sp.	Kelat
Palmae	*Eugeissona tristis*	Bertam
	Oncosperma horridum	Bayas
Phyllanthaceae	*Antidesma coriaceum*	Brunei
	Antidesma sp.	Brunei
	Baccaurea parviflora	Setambun Tahi
Pinaceae	*Pinus cf. caribaea*	Pine
Polygalaceae	*Xanthophyllum affine*	Minyak Beruk
Rhizophoraceae	*Gynotroches axillaris*	Mata Keli

Family	Species	Local name
Rhizophoraceae	*Pellacalyx saccardianus*	Membuluh
Rubiaceae	*Aidia densiflora*	Menterbang
	Mussaenda glabra	-
	Pavetta wallichiana	-
	Porterandia anisophylla	Tinjau Belukar
	Rothmania kuchingensis	-
	Timonius wallichianus	Tulang-tulang Jantan
	Uncaria cordata var. cordata	-
Rutaceae	*Melicope glabra*	Pepauh
Sapindaceae	*Nephelium maingayi*	Redan
	Nephelium sp.	Rambutan
Smilacaceae	*Smilax megacarpa*	-
Tectariaceae	*Pleocnemia irregularis*	-
Tiliaceae	*Microcos tomentosa*	Chenderai
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Urticaceae	*Poikilospermum suaveolens*	-

Plot 5 Inventory

Family	Species	Local name	Stem diameter (cm)
Guttiferae	*Garcinia* sp.	Kandis	15.9
	Garcinia sp.	Kandis	12.5
Myrtaceae	*Syzygium* sp.	Kelat	10.7
	Syzygium sp.	Kelat	11.0
	Syzygium sp.	Kelat	11.4
Podocarpaceae	*Podocarpus* sp.	-	25.3
Phyllanthaceae	*Baccaurea parviflora*	Setambun Tahi	10.8
	Baccaurea parviflora	Setambun Tahi	11.4
	Baccaurea parviflora	Setambun Tahi	19.1
Guttiferae	*Garcinia* sp.	Kandis	15.9
	Garcinia sp.	Kandis	12.5
Myrtaceae	*Syzygium* sp.	Kelat	10.7
	Syzygium sp.	Kelat	11.0

Transect Observations around Plot 5

Family	Species	Local name
Araceae	*Aglaonema nitidum*	-
	Alocasia sp.	Keladi Muka Kuda
	Homalomena griffithii var. griffithii	Keladi Murai
Cyatheaceae	*Cyathea latebrosa*	Pakis Gajah
Dilleniaceae	*Dillenia reticulata*	Simpoh Gajah
Dracaenaceae	*Dracaena elliptica*	-
Dracaenaceae	*Dracaena umbratica*	-
Ebenaceae	*Diospyros* sp.	Kayu Arang
Euphorbiaceae	*Macaranga gigantea*	Mahang Gajah
	Macaranga heynei	Mahang
	Macaranga hypoleuca	Mahang Putih
	Macaranga triloba	Mahang Merah
Flagellariaceae	*Flagellaria indica*	Rotan Palsu
Gentianaceae	*Fagraea racemosa*	Kopi Hutan
Gleicheniaceae	*Dicranopteris curranii*	-
Gnetaceae	*Gnetum gnemon*	Meninjau
Guttiferae	*Cratoxylum arborescens*	Geronggang
	Garcinia sp.	Kandis
Leguminosae	*Dialium patens*	Keranji Paya
Lygodiaceae	*Lygodium circinnatum*	-
Lygodiaceae	*Lygodium microphyllum*	Ribu-ribu
Melastomataceae	*Clidemia hirta*	-
	Dissochaeta gracilis	-
	Melastoma malabathricum	Senduduk
	Pternandra coerulescens	Mempoyan
	Pternandra echinata	Sial Menahun
Moraceae	*Artocarpus* sp.	Temponek
Myristicaceae	*Gymnacranthera cf. forbesii var. forbesii*	Penarahan
Myrsinaceae	*Ardisia* sp.	Mata Pelanduk
Myrtaceae	*Syzygium* sp.	Kelat
Nepenthaceae	*Nepenthes gracilis*	Periuk kera
Palmae	*Daemonorops angustifolia*	Rotan Getah
Palmae	*Oncosperma tigillarium*	Nibong
Pandaceae	*Pandanus cf. corneri*	Mengkuang Paya
Pandanaceae	*Pandanus atrocarpus*	Mengkuang

Family	Species	Local name
Phyllanthaceae	*Baccaurea parviflora*	Setambun Tahi
Pteridaceae	*Taenitis blechnoides*	-
Rhizophoraceae	*Gynotroches axillaris*	Mata Keli
	Pellacalyx saccardianus	Membuluh
Rubiaceae	*Mussaenda glabra*	-
	Porterandia anisophylla	Tinjau Belukar
	Psychotria obovata	-
Smilacaceae	*Smilax setosa*	-
	Smilax sp.	-
Stemonuraceae	*Gomphandra quadrifida var. quadrifida*	-
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Urticaceae	*Poikilospermum suaveolens*	-
Zingiberaceae	*Globba patens var. patens*	Meroyan Beruk

Plot 6 Inventory

Family	Species	Local name	Stem diameter (cm)
Bombacaceae	*Durio griffithii*	Durian Tupai	16.3
Burseraceae	*Dacryodes* sp.	Kedondong	23.7
	Dacryodes sp.	Kedondong	35.8
	Dacryodes sp.	Kedondong	17.3
	Dacryodes sp.	Kedondong	12.9
Guttiferae	*Garcinia* sp.	Asam pupui	16.4
	Garcinia sp.	Asam pupui	13.3
	Garcinia sp.	Asam pupui	16.7
	Garcinia sp.	Asam pupui	16.8
	Garcinia sp.	Asam pupui	12.7
Ixonanthaceae	*Ixonanthes icosandra*	Pagar Anak	17.8
	Ixonanthes icosandra	Pagar Anak	20.0
	Ixonanthes icosandra	Pagar Anak	18.9
	Ixonanthes icosandra	Pagar Anak	19.7
Lauraceae	*Cryptocarya* sp.	Medang	19.8
Moraceae	*Artocarpus* sp.	Temponek	21.6
Myrtaceae	*Syzygium* sp.	Kelat	37.1
	Syzygium sp.	Kelat	37.9
Phyllanthaceae	*Antidesma coriaceum*	Brunei	23.9
Rhizophoraceae	*Gynotroches axillaris*	Mata Keli	12.2
	Gynotroches axillaris	Mata keli	19.4
Rubiaceae	*Nauclea cf. subdita*	Mengkal	15.8
	Porterandia anisophylla	Tinjau Belukar	18.5
Sapindaceae	*Nephelium maingayi*	Redan	37.5
	Nephelium maingayi	Redan	39.9

Family	Species	Local name	Stem diameter (cm)
Symplocaceae	*Symplocos sp.*	-	14.5
	Gironniera nervosa	Hempas Tebu	22.3
Unknown	*unknown*	unknown	38.1

Transect Observations around Plot 6

Family	Species	Local name
Annonaceae	*Xylopia cf. ferruginea*	Jangkang Bukit
Bombacaceae	*Durio griffithii*	Durian Tupai
Burseraceae	*Canarium littorale f. rufum*	Kedondong Gergaji
	Dacryodes rostrata	Kedondong Kerut
Burseraceae	*Santiria apiculata*	Kedondong Kerantai
	Santiria laevigata	Kedondong Kerantai Licin
	Santiria sp.	Kedondong Kerantai
Dipterocarpaceae	*Dryobalanops aromatica**	Kapur
Dracaenaceae	*Dracaena elliptica*	-
Ebenaceae	*Diospyros argentea*	Bedil Lalat
Euphorbiaceae	*Endospermum diadenum*	Sesenduk
Flacourtiaceae	*Ryparosa* sp.	-
Guttiferae	*Garcinia nervosa var. nervosa**	Kandis
	Mesua sp.	-
Ixonanthaceae	*Ixonanthes icosandra*	Pagar Anak
Labiatae	*Clerodendrum deflexum*	-
Lauraceae	*Actinodaphne macrophylla*	Medang Payung
	Cryptocarya sp.	Medang
	Litsea sp.	Medang
Leguminosae	*Callerya atropurpurea*	Tulang Daing
Melastomataceae	*Clidemia hirta*	-
	Pternandra coerulescens	Mempoyan
	Pternandra echinata	Sial Menahun
Moraceae	*Artocarpus scortechinii*	Terap Hitam
	Artocarpus sp.	Temponek
Myristicaceae	*Knema laurina* ssp. *Laurina*	Penarahan
	Knema sp.	Penarahan
Myrtaceae	*Rhodamnia cinerea*	Mempoyan
	Syzygium sp.	Kelat
Olacaceae	*Ochanostachys amentacea*	Petaling
	Strombosia javanica	Dedali
Oxalidaceae	*Sarcotheca griffithii*	Pupoi
Palmae	*Eugeissona tristis*	Bertam
Pandanaceae	*Pandanus atrocarpus*	Mengkuang
Phyllanthaceae	*Antidesma coriaceum*	Brunei
	Baccaurea parviflora	Setambun Tahi
Pteridaceae	*Taenitis blechnoides*	-
Rubiaceae	*Nauclea cf. subdita*	Mengkal
	Pavetta wallichiana	-
	Porterandia anisophylla	Tinjau belukar
	Psychotria sp.	-
	Rothmania kuchingensis	-
	Timonius wallichianus	Tulang-tulang Jantan
Sapindaceae	*Nephelium maingayi*	Redan

Family	Species	Local name
Symplocaceae	*Symplocos* sp.	-
Tiliaceae	*Pentace* sp.	Melunak
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Unknown	*unknown*	unknown

Plot 7 Inventory

Family	Species	Local name	Stem diameter (cm)
Dipterocarpaceae	*Dryobalanops aromatica*	Kapur	32.0
Euphorbiaceae	*Endospermum diadenum*	Sesenduk	10.2
Guttiferae	*Garcinia* sp.	Kandis	19.7
Lauraceae	*Litsea* sp.	Medang	41.3
Moraceae	*Artocarpus scortechinii*	Terap Hitam	13.1
Phyllanthaceae	*Antidesma coriaceum*	Brunei	10.2
	Antidesma coriaceum	Brunei	12.1
Rhizophoraceae	*Gynotroches axillaris*	Mata keli	12.3
	Gynotroches axillaris	Mata keli	18.5
	Gynotroches axillaris	Mata keli	12.9
	Gynotroches axillaris	Mata keli	28.8
	Pellacalyx saccardianus	Membuluh	22.3
	Pellacalyx saccardianus	Membuluh	11.4
	Pellacalyx saccardianus	Membuluh	21.1
Ulmaceae	*Gironniera nervosa*	Hampas tebu	19.3
	Gironniera nervosa	Hampas tebu	12.8
Unknown	*unknown*	unknown	17.0
Unknown	*unknown*	unknown	22.3
Unknown	*unknown*	unknown	12.6

Transect Observations around Plot 7

Family	Species	Local name
Annonaceae	*Desmos dasymaschalus var. dasymaschalus*	Akar Mempisang
	Xylopia cf. ferruginea	Jangkang Bukit
Araceae	*Scindapsus* sp.	-
	Epipremnum giganteum	Akar Gajah
Burseraceae	*Dacryodes* sp.	Kedondong
	Canarium littorale f. rufum	Kedondong Gergaji
	Santiria apiculata	Kedondong Kerantai
Dilleniaceae	*Tetracera indica*	Akar Mempelas
	Dillenia sp.	Simpoh
Dipterocarpaceae	*Dryobalanops aromatica*	Kapur
	Shorea pauciflora	Nemesu
Dracaenaceae	*Dracaena elliptica*	-
	Dracaena umbratica	-
Euphorbiaceae	*Macaranga triloba*	Mahang Merah
	Endospermum diadenum	Sesenduk
	Pimelodendron griffithianum	Perah Ikan
Flagellariaceae	*Flagellaria indica*	Rotan palsu
Gentianaceae	*Fagraea racemosa*	Kopi Hutan
Gnetaceae	*Gnetum gnemon*	Meninjau

Family	Species	Local name
Guttiferae	*Calophyllum* sp.	Bintangor
	Garcinia nervosa var. nervosa	Kandis
	Garcinia sp.	Kandis
	Mesua sp.	-
Labiatae	*Clerodendrum deflexum*	-
Lauraceae	*Actinodaphne macrophylla*	Medang Payung
	Litsea sp.	Medang
Leguminosae	*Dialium platysepalum*	Keranji Kuning Besar
	Koompassia malaccensis	Kempas
Melastomataceae	*Clidemia hirta*	-
	Oxyspora bullata	-
Meliaceae	*Aglaia tomentosa* ssp. *tomentosa*	Bekak
Moraceae	*Artocarpus scortechinii*	Terap Hitam
	Ficus chartacea	Ara
Myrsinaceae	*Ardisia colorata var. colorata*	Mata Pelanduk
	Ardisia sp.	Mata Pelanduk
Myristicaceae	*Horsfieldia* sp.	Penarahan
	Knema laurina ssp. *Laurina*	Penarahan
	Knema sp.	Penarahan
Myrtaceae	*Syzygium* sp.	Kelat
Olacaceae	*Ochanostachys amentacea*	Petaling
	Strombosia javanica	Dedali
Palmae	*Daemonorops angustifolia*	Rotan Getah
	Daemonorops sabut	Rotan Cincin

Family	Species	Local name
Palmae	*Eugeissona tristis*	Bertam
	Oncosperma horridum	Bayas
Pandaceae	*Galearia fulva*	-
Phyllanthaceae	*Baccaurea parviflora*	Setambun Tahi
Rhizophoraceae	*Carallia brachiata*	Meransi
Rhizophoraceae	*Gynotroches axillaris*	Mata Keli
	Pellacalyx saccardianus	Membuluh
Rubiaceae	*Aidia densiflora*	Menterbang
	Ixora pendula	Pecah Periuk
	Mussaenda glabra	-
	Porterandia anisophylla	Tinjau belukar
	Rothmania kuchingensis	-
	Tarenna sp.	-
	Timonius wallichianus	Tulang-tulang Jantan
	Uncaria sp.	-
	Urophyllum arboreum	Melukut
Sapindaceae	*Nephelium* sp.	Rambutan
Sapotaceae	*Palaquium* sp.	Nyatoh
Sapindaceae	*Pometia cf.ridleyi*	Kasai Daun Kecil
Stemonuraceae	*Gomphandra quadrifida var. quadrifida*	-
Sterculiaceae	*Sterculia rubiginosa var. rubiginosa*	Kelumpang
Tectariaceae	*Pleocnemia irregularis*	-

Family	Species	Local name
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Vitaceae	*Cayratia mollissima*	-
	*Ampelocissus cinnamomea**	Akar Lipang
Unknown	*unknown*	unknown

Plot 8 Inventory

Family	Species	Local name	Stem diameter (cm)
Euphorbiaceae	*Endospermum diadenum*	Sesenduk	14.5
	Endospermum diadenum	Sesenduk	12.5
	Macaranga gigantea	Mahang Gajah	13.0
	Macaranga gigantea	Mahang Gajah	10.7
	Macaranga gigantea	Mahang Gajah	14.3
	Macaranga gigantea	Kubin	18.7
	Macaranga gigantea	Kubin	17.1
Moraceae	*Artocarpus integer var. silvestris*	Bangkung	11.0
Styracaceae	*Styrax benzoin*	Kemenyan	22.9
Ulmaceae	*Gironniera nervosa*	Hampas Tebu	10.5

Transect Observations around Plot 8

Family	Species	Local Name
Annonaceae	*Desmos dasymaschalus var. dasymaschalus*	Akar Mempisang
Araceae	*Homalomena griffithii var. griffithii*	Keladi Murai
Aspleniaceae	*Asplenium nidus*	Paku Langsuir
Cyatheaceae	*Cyathea latebrosa*	Pakis Gajah
Davalliaceae	*Davallia denticulata var. denticulata*	-
Dilleniaceae	*Dillenia reticulata*	Simpoh Gajah
Dracaenaceae	*Dracaena elliptica*	-
Elaeocarpaceae	*Elaeocarpus petiolatus*	Mendung
Euphorbiaceae	*Endospermum diadenum*	Sesenduk
	Hevea brasiliensis	Pokok Getah
	Macaranga gigantea	Mahang Gajah
	Macaranga triloba	Mahang Merah
	Sapium baccatum	Ludai
	Sapium discolor	Mamah Pelanduk
Flacourtiaceae	*Ryparosa sp.*	-
Gesneriaceae	*Cyrtandra cupulata var. cupulata*	-
Gleicheniaceae	*Dicranopteris linearis*	Resam
Guttiferae	*Cratoxylum formosum*	Derum
Hypoxidaceae	*Molineria latifolia var. latifolia*	Lemba
Ixonanthaceae	*Ixonanthes icosandra*	Pagar Anak
Labiatae	*Clerodendrum deflexum*	-
Lauraceae	*Actinodaphne macrophylla*	Medang Payung
	Litsea sp.	Medang
Leeaceae	*Leea indica*	Memali
Leguminosae	*Dialium platysepalum*	Keranji Kuning Besar

Family	Species	Local name
Melastomataceae	*Clidemia hirta*	-
	Dissochaeta gracilis	-
	Oxyspora bullata	-
	Pternandra coerulescens	Mempoyan
Moraceae	*Artocarpus integer var. silvestris*	Bangkong
	Artocarpus scortechinii	Terap Hitam
	Artocarpus sp.	Temponek
	Ficus chartacea	Ara
	Streblus elongatus	Tempinis
Myrsinaceae	*Ardisia* sp.	Mata Pelanduk
Myrtaceae	*Syzygium* sp.	Kelat
Olacaceae	*Ochanostachys amentacea*	Petaling
	Strombosia javanica	Dedali
Palmae	*Daemonorops angustifolia*	Rotan Getah
	Eugeissona tristis	Bertam
Pandanaceae	*Pandanus atrocarpus*	Mengkuang
Phyllanthaceae	*Bridelia tomentosa*	Kenidai
Polygalaceae	*Xanthophyllum affine*	Minyak Beruk
Rhizophoraceae	*Carallia brachiata*	Meransi
	Gynotroches axillaris	Mata Keli
	Pellacalyx saccardianus	Membuluh
Rubiaceae	*Greenea corymbosa var. corymbosa*	Sekam Bulan
	Ixora javanica	Pecah Periuk
	Melicope lunu-ankenda	Tenggek Burung

Family	Species	Local Name
Rubiaceae	*Mussaenda glabra*	-
	Porterandia anisophylla	Tinjau belukar
	Rothmania kuchingensis	-
	Tarenna sp.	-
	Uncaria cordata var. cordata	-
Selaginellaceae	*Selaginella intermedia var. intermedia*	Jambul Merak
	Selaginella wallichii	Paku Merak
Smilacaceae	*Smilax setosa*	
Stemonuraceae	*Gomphandra quadrifida var. quadrifida*	-
Styracaceae	*Styrax benzoin*	Kemenyan
Tectariaceae	*Pleocnemia irregularis*	-
Ulmaceae	*Gironniera nervosa*	Hampas Tebu
Urticaceae	*Poikilospermum suaveolens*	-
Vitaceae	*Cayratia mollissima*	-
Zingiberaceae	*Etlingera littoralis*	Tepus
	Globba patens var. patens	Meroyan Beruk

Survey Photos

Photo 1: Vegetation at Plot 1

Photo 2: Vegetation at Plot 2

Photo 3: Vegetation at Plot 3

Photo 4: Vegetation at Plot 4

Photo 5: Vegetation at Plot 5

Photo 6: Vegetation at Plot 6

Photo 7: Vegetation at Plot 7

Photo 8: Low branching of most trees in Plot 7

Photo 9: Vegetation at Plot 8

Photo 10: Plot (20x20m) demarcation

Photo 11: Measurement of tree diameter.

Photo 12: Identification of tree species

Photo 13: Leaf voucher collection

Photo 14: Leaf voucher collection using catapult

Voucher Specimens

Durio griffithii **(durian tupai)**

Garcinia sp **(kandis)**

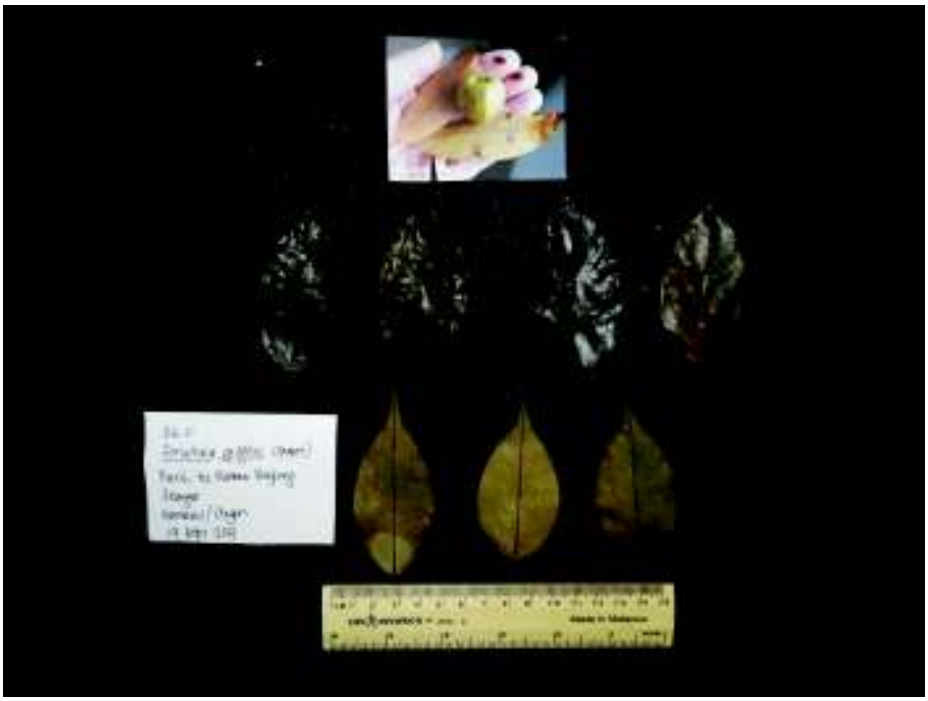
Gironniera nervosa **(hampas tebu)**

Ixonanthes icosandra **(pagar anak)**

Macaranga gigantea **(Mahang gajah)**

Pinus caribaea **(pine)**

Santiria apiculata **(kedondong)**



Sarcotheca griffithii **(pupoi)**

***Syzygium* sp (kelat)**

AP- D4 | WILDLIFE SURVEY REPORT

KAJIAN INVENTORI HIDUPAN LIAR DI KAWASAN HUTAN SIMPAN DI NEGERI SELANGOR UNTUK PEMBINAAN EAST COAST RAIL LINE (ECRL)




JABATAN PERHILITAN NEGERI SELANGOR

KAJIAN INVENTORI HIDUPAN LIAR DI KAWASAN HUTAN DI NEGERI SELANGOR UNTUK PEMBINAAN *EAST COAST RAIL LINE (ECRL)*

1. Tujuan:

Satu kajian inventori hidupan liar telah dijalankan di HSK Rantau Panjang, HSK Hulu Gombak, HSK Templer dan HSK Serendah pada 15 Ogos hingga 18 Ogos 2017 dan 11 hingga 16 September 2017 oleh kakitangan Jabatan PERHILITAN negeri Selangor. Seramai 17 orang kakitangan Jabatan PERHILITAN Selangor terlibat dalam kajian ini. Kajian ini dilaksanakan adalah bertujuan untuk mengetahui kehadiran dan taburan hidupan liar di kawasan pembinaan *East Coast Rail Line (ECRL)* yang merentangi hutan-hutan seperti di atas.

2. Latar belakang

Environmental Impact Assesment (EIA) ialah sebagai salah satu instrument bagi mencapai pembangunan yang menitik beratkan persekitaran secara lestari tanpa mendatangkan kesan buruk kepada alam sekitar. Konflik manusia – hidupan liar adalah satu implikasi yang perlu dihadapi dan ditangani setelah pembangunan, perbandaran atau pertanian mengambilalih kawasan habitat bagi hidupan liar.

Kepentingan pembangunan dan kemajuan sosio-ekonomi, membuatkan kita perlu menghadapi impak-impak sampingan daripada aktiviti-aktiviti pembangunan yang dijalankan. Namun begitu konflik manusia-hidupan liar ini jika diuruskan dengan cara yang sistematik maka tahap keseriusan impaknya adalah terkawal. Semua bentuk insrastruktur linear, seperti jalan raya, lebuh raya, landasan kerata api dan sebagainya membentuk halangan atau serpihan yang mengasingkan habitat, dan penyekat pergerakan haiwan dan seterusnya fungsi semulajadi yang besar terhadap proses ekologi.

Satu cadangan EIA diperlukan bagi pembinaan landasan kerata api atau *East Coast Rail Line (ECRL)* yang akan melalui kawasan HSK Rantau Panjang, HSK Hulu Gombak, HSK Templer dan HSK Serendah Beberapa kajian inventori hidupan liar perlu dilakukan bagi mengenalpasti populasi hidupan liar dikawasan tersebut, kesan terhadap hidupan liar daripada pembinaan semasa dan selepas

3. Objektif Kajian

Tujuan Inventori kepelbagaian biologi pada cadangan inventori hidupan liar ini dilaksana berdasarkan objektif-objektif seperti berikut;

i. Mengemaskini dan mengumpul maklumat terkini berkaitan fauna untuk merangka strategi atau langkah-langkah berkesan dalam pengurusan hidupan liar untuk faedah masa kini dan akan datang.

ii. Mengesan, memantau dan membenteras ancaman kemusnahan kepelbagaian biologi di tapak cadangan projek ECRL disebabkan oleh aktiviti pembukaan kawasan hutan dan kemusnahan habitat.
iii. Memantau kehadiran dan populasi spesies yang mengalami ancaman kepupusan yang serius

4. Justifikasi Kajian

Kajian ini dijalankan adalah untuk:

i. Menjalankan inventori bagi mengetahui pola dan taburan hidupan liar yang terdapat di sekitar tapak cadangan projek.
ii. Menyediakan maklumat untuk cadangan pengurusan bagi tujuan konservasi habitat dan kepelbagaian biologi di tapak cadangan projek
iii. Mendapatkan maklumat terkini mengenai kepelbagaian biologi di tapak cadangan projek dimasukkan di dalam pengkalan data jabatan.

5. Kakitangan Terlibat

1. Alfiesyahril Anewar Bin Ahmad
2. Ahmad Sawaludin Bin Mohamed Gani
3. Mohamad Haira Nor bin Ngarji
4. Mohd Azrin Bin Basrin
5. Mohd Ainsha bin Ahmad
6. Enos bin Jeoffry
7. Pereessan A/L Manickam
8. Lawrence Anak Manila
9. Zul Zamri Bin A. Rahim
10. Mohd Johari Bin Hassan
11. Muhammad Razif Bin Mohd Ghani
12. Fadzirul Aremear Bin Sukeran
13. Khir Shahrir Amri Bin Khir Johari
14. Mazuan Bin Mohamed
15. Besurelok Anak Golat
16. Nor Azharuddin Bin Mohd Zin
17. Justine AK Paing

6. Methodologi

Kajian ini dijalankan dengan mengunakan ‘Kaedah tracking’ dan “camera trap”. Laluan dipilih secara rawak bagi mewakili keseluruhan kawasan yang dikaji. Kumpulan tracking terbahagi kepada 3 dan kumpulan terdiri daripada empat (4) orang ahli kumpulan yang bergerak secara berjalan kaki dan membuat cerapan di sepanjang garis pada arah serta laluan yang ditetapkan. Bidang kajian yang dijalankan dengan kaedah garis alignment dan “camera trap” ialah:

a) mamalia besar
b) mamalia kecil
c) avifauna
d) pencerobohan
e) kawasan-kawasan menarik

Setelah cerapan dibuat, bacaan GPS akan diambil untuk mengetahui kedudukan dan koordinat cerapan. Maklumat yang dicerap akan direkodkan di dalam borang inventori yang telah disediakan. Seterusnya maklumat ini akan diproses dan dianalisa dengan menggunakan program komputer Microsoft Excel. Manakala taburan hidupan liar pula akan diplotkan .

Dua kaedah cerapan yang digunakan di dalam kajian ini ialah:

a) Pemerhatian secara langsung

Kaedah ini adalah secara menghitung terus spesies haiwan liar yang dilihat melintas di hadapan pemerhati samada dengan mata kasar atau menggunakan binokular.

b) Pemerhatian secara tidak langsung

Pemerhatian secara tidak langsung adalah kaedah cerapan melalui kesan yang ditinggalkan oleh hidupan liar. Antara kesan-kesan yang kehadiran yang direkodkan adalah seperti berikut :

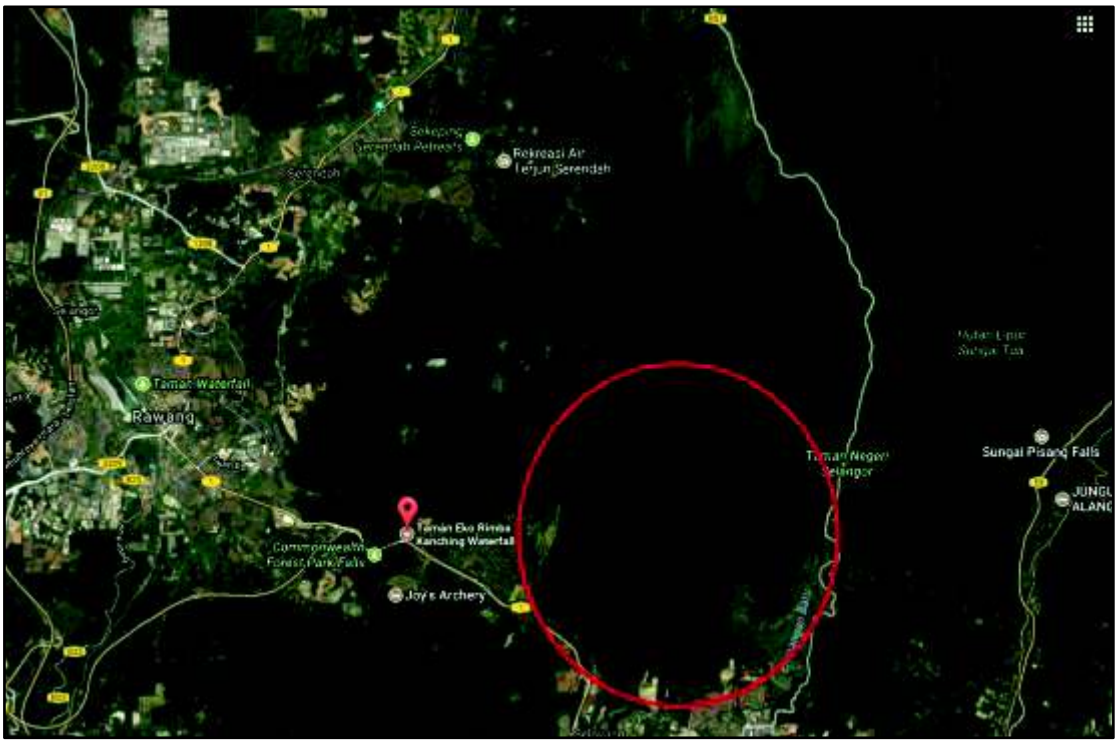
i. Dengar (bunyi)
ii. Tapak kaki (jejak)
iii. Sisa Makanan
iv. Bangkai/ Tulang
v. Sarang/ jerumun
vi. Kubang
vii. Kesan cakaran
viii. Kesan perkhumuhan
ix. Bulu/ Tanduk/ Duri landak

7. Lokasi Kajian Inventori Hidupan Liar

Rajah 1 hingga rajah 4 menunjukkan cadangan kawasan laluan ECRL di sebahagian kawasan Negeri Selangor. Laluan cadangan tersebut melalui kawasan HSK Rantau Panjang, HSK Hulu Gombak, HSK Templer dan HSK Serendah yang merupakan rangkaian ekologi hidupan liar. Oleh itu, satu kajian inventori hidupan liar perlu dilakukan di kawasan cadangan laluan dan sekitar bagi mengetahui taburan dan populasi hidupan liar di kawasan tersebut.

Rajah 1 : Kawasan Lokasi Kajian Hutan Simpan Rantau Panjang, Batu Arang.

Rajah 2 : Kawasan Lokasi Kajian HSK Hulu Gombak



Rajah 3 : Kawasan Lokasi Kajian HSK Templer,Selayang

Rajah 4 : Kawasan Lokasi Kajian HSK Serendah, Rawang

8.0 Hasil Kajian

8.1 Pemasangan Camera Trap

BIL	TARIKH	NO KAMERA	X	Y	LOKASI	KAKITANGAN
1	13.09.2017	ECRL 3	418147	367852	Hutan Simpan Kekal Hulu Gombak	Haira, Johari, Preessen, Lawrence
2	13.09.2017	ECRL 4	417927	367502	Hutan Simpan Kekal Hulu Gombak	Haira, Johari, Preessen, Lawrence
3	13.09.2017	ECRL 5	419271	368062	Hutan Simpan Kekal Hulu Gombak	Haira, Johari, Preessen, Lawrence
4	14.09.2017	ECRL 6	405602	366337	Hutan Simpan Kekal Templer	Haira, Johari, Preessen, Lawrence
5	14.09.2017	15	403251	366323	Hutan Simpan Kekal Templer	Haira, Johari, Preessen, Lawrence
6	16.08.2017	6	389315	368197	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
7	16.08.2017	8	389315	368197	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
8	16.08.2017	5	388768	367603	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
9	16.08.2017	10	388768	367603	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
10	17.08.2017	A075	389937	367944	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
11	17.08.2017	3	389937	367944	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
12	18.08.2017	ECRL 1	394720	371772	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
13	18.08.2017	ECRL 2	394720	371772	Hutan Simpan Kekal Rantau Panjang	Ainsha, Enos, Fadzirul, Johari
14	13.09.2017	ECRL 2	416908	366832	Hutan Simpan Kekal Hulu Gombak	Ainsha, Enos, Fadzirul, razif
15	13.09.2017	ECRL 9	417556	366934	Hutan Simpan Kekal Hulu Gombak	Ainsha, Enos, Fadzirul, razif
16	13.09.2017	ECRL 8	415913	366230	Hutan Simpan Kekal Hulu Gombak	Ainsha, Enos, Fadzirul, razif
17	15.09.2017	ECRL 1	406798	365211	Hutan Simpan Kekal Serendah	Ainsha, Enos, Fadzirul, razif
18	15.09.2017	5	406106	364767	Hutan Simpan Kekal Serendah	Ainsha, Enos, Fadzirul, razif
19	14.09.2017	3	407155	362789	Hutan Simpan Kekal Serendah	Ainsha, Enos, Fadzirul, razif
20	16.08.2017	No.15	389037	368909	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
21	16.08.2017	A098	389049	368894	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan

BIL	TARIKH	NO KAMERA	X	Y	LOKASI	KAKITANGAN
22	16.08.2017	No.4	388669	368632	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
23	16.08.2017	A067	388669	368640	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
24	17.08.2017	1382100239096	387844	368133	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
25	17.08.2017	1382100239437	387844	368126	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
26	18.08.2017	1382100239097	393511	372185	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
27	18.08.2017	1382100239540	393511	372185	Hutan Simpan Kekal Rantau Panjang	En. Alfie, En.Syawal, En. Haira, En. Mazuan
28	13.09.2017	ECRL 7	419959	368829	Hutan Simpan Kekal Hulu Gombak	En. Alfie, En.Syawal, En. Haira, En. Mazuan
29	13.09.2017	A067	420351	368815	Hutan Simpan Kekal Hulu Gombak	En. Alfie, En.Syawal, En. Haira, En. Mazuan
30	13.09.2017	A098	419958	368875	Hutan Simpan Kekal Hulu Gombak	En. Alfie, En.Syawal, En. Haira, En. Mazuan
31	14.09.2017	A106	402607	369958	Hutan Simpan Kekal Serendah	En. Alfie, En.Syawal, En. Haira, En. Mazuan
32	14.09.2017	No.13	402723	369246	Hutan Simpan Kekal Serendah	En. Alfie, En.Syawal, En. Haira, En. Mazuan

Hasil Pemerhatian Hidupan Liar Yang Berjaya Direkodkan Melalui Perangkap Kamera adalah seperti berikut :

Bil	Hutan	Spesies	Bilangan (ekor)
1	Hutan Simpan Kekal Rantau Panjang	Babi	123
		Beruk	25
		Kera	152
		Tapir	5
		Kijang	1
		Musang	1
		Napuh	1
		Ayam	1
		Pelanduk	1
		Landak	1
		Punai Tanah	2
	JUMLAH		
2	Hutan Simpan Kekal Hulu Gombak	Rusa Sambar	1
		Beruk	16
		Kijang	2
		Kambing Gurun	2
		Landak Raya	1
		Kera	2
		Babi Hutan	3
		Tapir	1
	JUMLAH		
3	Hutan Simpan Kekal Templer	Beruk	3
	JUMLAH		
4	Hutan Simpan Kekal Serendah	Harimau Dahan	1
		Babi hutan	4
		Beruk	10
		Kijang	2
		Kera	1
		Ayam Hutan	1
		Landak	2
	JUMLAH		

8.2 Ringkasan Hasil Inventori HSK Rantau Panjang

(Lampiran borang-borang inventori yang telah dikemaskini)

Bil.	Spesies	Cara pemerhatian (anggaran bilangan)		
	Nama biasa	Nama sainstifik	Langsung (ekor)	Tidak langsung (ekor)
1	Tapir	*Tapirus indicus*		3
2	Babi Hutan	*Sus scrofa*		21
3	Greater Racquet Tailed Drongo		2	
5	Murai Batu	*Copsychus malabaricus*	2	
6	Ular Kapak Hijau		1	
	Jumlah cerapan		**28**	

8.3 Ringkasan Hasil Inventori HSK Hulu Gombak

(Lampiran borang-borang inventori yang telah dikemaskini)

Bil.	Spesies		Cara pemerhatian (anggaran bilangan)	
	Nama biasa	Nama saintifik	Langsung (ekor)	Tidak langsung (ekor)
1	Babi Hutan	*Sus scrofa*		8
2	Kijang	*Muntiacus muntjack*		2
3	Blue winged leafbird		3	
4	Ungka tangan Putih		1	
5	Siamang			1
6	Tapir	Tapirus indicus		5
7	Rusa			1
8	Kijang			1
9	Murai batu		1	
	Jumlah cerapan		**23**	

8.4 Ringkasan Hasil Inventori HSK Serendah & HSK Templer

(Lampiran borang-borang inventori yang telah dikemaskini)

Bil.	Spesies		Cara pemerhatian (anggaran bilangan)	
	Nama biasa	Nama saintifik	Langsung (ekor)	Tidak langsung (ekor)
1	Babi Hutan	*Sus scrofa*		8
2	Emerald Dove		1	
3	Richard's Pipit		2	
4	White Belliesd Sea Eagle		2	
5	Raffles malkoha		1	
6	Greater-Racquet tailed drongo		1	
7	Kijang		1	
	Jumlah cerapan		**16**	

9.0 PERBINCANGAN

- Hasil taburan hidupan liar yang dicerap adalah didapati kesemua hutan mempunyai spesies babi hutan manakala tapir pula didapati di 2 hutan yang dikaji .
- Sebanyak 16 unit perangkap kamera telah dipasang di HSK Rantau Panjang dan setelah cerapan selesai diambil, kesemua 16 kamera tersebut dipasang di HSK Hulu Gombak,HSK Serendah dan HSK Templer.
- Terdapat kesan-kesan pencerobohan terutamanya untuk aktiviti memburu serta guna tanah di kawasan HSK Rantau Panjang serta HSK Serendah.
- Antara lokasi menarik di kawasan cerapan adalah seperti air terjun,sungai dan kawasan permatang yang mempunyai pemandangan yang mempunyai nilai estetika yang tersendiri.

10.0 CADANGAN

- Mewujudkan satu pos kawalan hidupan liar di kawasan-kawasan yang mempunyai populasi hidupan liar yang tinggi seperti HSK Hulu Gombak supaya akttiviti yang melanggar undang-undang dapat dikawal dan dibendung.
- Membuat program Tangkap Pindah Tapir di kawasan HSK Rantau Panjang kerana kawasan tersebut telah di kelilingi oleh jalan raya dan kawasan perumahan
- Kajian hidupan liar menggunakan perangkap kamera perlu dilanjutkan mengikut musim tertentu bagi mendapatkan data yang lebih menyeluruh. Contohnya, pada musim buah kebanyakan binatang aktif keluar mencari makanan. Manakala pada musim mengawan pula adalah berbeza mengikut spesies dan kemungkinan hidupan liar yang bergerak secara solo lebih mudah dicerap seperti Tapir, Harimau Kumbang, Kucing Hutan, Beruang dan sebagainya.
- Aktiviti penguatkuasaan perlu dijalankan secara berterusan dan diperluaskan semasa dan selepas pembinaan jajaran ECRL kerana pembukaan jalan ke kawasan pembinaan akan terdedah dengan aktiviti perlanggaran Akta Pemuliharaan Hidupan Liar 2010.

LAMPIRAN

GAMBAR AKTIVITI INVENTORI HIDUPAN LIAR

Kesan makan Hidupan Liar

Kubang hidupan liar

Kesan tapak Kijang

Kesan tapak Kijang

Pemasangan camera trap

Kumpulan yang menjalankan survei

Penemuan najis Tapir

Memusnahkan khemah penceroboh

Gambar-Gambar Perangkap Kamera :-

(HSK Hulu Gombak)


Bestok • 20C 68F 09/20/2017 15:25 0000


Bestok • 19C 66F 09/22/2017 21:36 0000


Bestok • 17C 62F 09/24/2017 08:59 0000


Bestok • 19C 66F 10/01/2017 12:10 0000


Bestok • 17C 62F 10/03/2017 08:30 0000

(HSK Rantau Panjang)

(HSK Serendah & HSK Templer)


Bestok 20C 68F 09/26/2017 11:04 0000


Bestok 17C 62F 09/27/2017 01:46 0000


Bestok 15C 59F 09/24/2017 04:34 0000


Bestok 17C 62F 09/26/2017 01:20 0000


Bestok 21C 69F 09/30/2017 13:00 0000


Bestok 17C 62F 09/23/2017 08:13 0000

AP- D5 | HUMAN- WILDLIFE CONFLICTS DATA

REKOD ADUAN GANGGUAN HIDUPAN LIAR DISEKITAR (2KM BUFFER) JAJARAN ECRL FASA 2 DI NEGERI KELANTAN BAGI TAHUN 2012-2016

Spesies	Kelantan			Jumlah aduan Kelantan
	Tumpat	Kota Bharu	Pasir Mas	
Beruk	5	3	2	10
Babi Hutan	2	1	3	6
Kera	4	1	0	5
Biawak	2	0	0	2
Ular Sawa	0	1	0	1
Memerang	1	0	0	1
Musang Pandan	0	0	0	0
Lotong Cengkong	0	0	0	0
Lain-lain Ular	0	0	0	0
Tapir	0	0	0	0
Lain-lain Spesies	0	0	0	0
Lotong Cenekah	0	0	0	0
Harimau Belang	0	0	0	0
Ular Tedung	0	0	0	0
Jumlah Aduan	**14**	**6**	**5**	**25**

REKOD ADUAN GANGGUAN HIDUPAN LIAR DISEKITAR (2KM BUFFER) JAJARAN ECRL FASA 2 DI NEGERI SELANGOR BAGI TAHUN 2012-2016

Spesies	Selangor				Jumlah aduan Selangor
	Klang	Gombak	Kuala Selangor	Hulu Selangor	
Kera	218	67	20	14	319
Babi Hutan	4	15	1	5	25
Musang Pandan	4	8	1	2	15
Beruk	0	5	1	0	6
Lotong Cengkong	0	4	0	0	4
Lain-lain Ular	0	3	1	0	4
Tapir	0	2	0	0	2
Biawak	1	1	0	0	2
Lain-lain Spesies	0	1	0	0	1
Lotong Cenekah	1	0	0	0	1
Harimau Belang	0	1	0	0	1
Ular Sawa	1	0	0	0	1
Ular Tedung	0	0	1	0	1
Memerang	0	0	0	0	0
Jumlah Aduan	**229**	**107**	**25**	**21**	**382**

Sumber: Jabatan Perhilitan Semananjung Malaysia, 2017

AP - E

CONSULTATION WITH GOVERNMENT AGENCIES

CONSULTATION WITH GOVERNMENT AGENCIES & NGOs

1. Department of Wildlife and National Parks (PERHILITAN) Selangor

Date : 18th July 2017
Time : 09.30am – 11.30am
Venue : Perhilitan Selangor Office

Attendance:

No.	Name	Agencies	Designation
1	En. Rahim Bin Othman	Department of Wildlife and National Parks (PERHILITAN) Selangor	Director
2	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd	Consultant

Matters discussed:

- The meeting was arranged to brief the director on the ECRL Phase 2 project and discuss on wildlife survey scope, cost and timeline.
- According to En. Rahim, the most critical site in Selangor is Rantau Panjang FR. Although there's no tiger or elephants, there are still a population of tapirs in the FR. DWNP Selangor have received number of Tapir conflict cases report in the residential areas (e.g. Jalan Tasik Puteri) south of the FR. There's also high number of road kill incidents at the existing road in the FR. En. Rahim suggested below recommendations for Rantau Panjang FR:
  - If the alignment can't be realigned to avoid the FR, the alignment should be elevated (as viaduct). If not, wildlife crossings structure must be provided.
  - The alignment shift to the south, right outside the border of the reserve. Then, the railway will act as 'barrier' to prevent human-wildlife conflict in adjacent areas.
- Other forest reserves in the State Park is not too critical as long as the alignment is tunnelling through to minimise fragmentation and habitat loss. There are not much endangered large mammals in the State Park, except maybe Tapir will be present (but very few).

- DWNP Selangor said although poaching still present, the more common issues in Selangor is the foreign workers from Vietnam, Cambodia, Philippine trespassing into forest reserve. They will head into the forest during lunch time to catch wildlife (usually macaques) for meal. This issue is more common when there are construction activities nearby/next to a forest reserve.
- DWNP Selangor have agreed to do the wildlife survey and highlight that the priority areas for survey are:
    1) Rantau Panjang FR
    2) Templer FR
    3) Serendah FR
    4) Ulu Gombak FR (for both Phase 2 and Phase 1)
- AFD informed that the survey must start quickly (by early August) and DWNP shall provide the inventory results by mid-September. ERE can also lend cameras to DWNP. ERE would have about 13 cameras while DWNP have around 20 cameras. Encik Rahim said more cameras would provide better inventory. Since ECRL survey have a short time, the results may not be effective entirely since camera trap require minimum 2 months to get a decent result.
- However, DWNP Selangor highlighted that time and manpower is another issue the department is facing. Selangor State Government could provide funding for DWNP to conduct study at few CFS corridor in Selangor. It might clash with ECRL survey. Some locations are trickier and require more time such as mountainous site in the State Park.
- AFD informed the alignment is still not finalised and there could be major change especially in the state park area. ERE can provide the latest alignment by Friday 21/7. However, the alignment could change again after that.
- The major concern here is to prevent the issue in Phase 1 where survey has been conducted at specific area in a FR. But frequent shifting of the alignment to different area will reduce the effectiveness and relevance of the survey results in original location. En. Rahim suggested to conduct the survey in a bigger radius so even if the alignment shifted, it won't affect the survey as much provided the deviation of the alignment is not major. However, this would require more time, manpower and equipment.
- DWNP Selangor will conduct survey at Rantau Panjang first (since it's a higher priority and easier to conduct survey) followed by the State Park.
- DWNP Selangor have actually sent a proposal in May for a wildlife survey in Ulu Gombak. DWNP Selangor will revise the proposal to include the scope for ECRL Phase 2. AFD informed that budget for survey is around RM 75,000 and DWNP

Selangor has to make sure the total cost and survey scope is within that budget. En. Rahim have no issues with the cost.

- Once ERE agreed with the proposal, then DWNP Selangor can start the survey after payment received.

2. Department of Wildlife and National Parks (PERHILITAN) Peninsular Malaysia

Date : 13 July 2017
Time : 2.30pm – 4.30pm
Venue : Bilik Mesyuarat Belatok Pinang,Ibu Pejabat, Jabatan PERHILITAN

Attendance:

No.	Name	Agency	Designation
1	YBrs. Encik Fakhrul Hatta bin Musa	PERHILITAN MALAYISA	Timbalan Ketua Pengarah 1 *Pejabat Timbalan Ketua Pengarah 1*
2	Dr. Pazil bin Abdul Patah		*Pengarah Bahagian Konservasi Biodiversiti*
3	En. Adnan Bin Hj Ismail		*Penolong Pengarah Bahagian Konservasi Biodiversiti*
4	En. Ahmad Azhar bin Mohammed	PERHILITAN Pahang	*Pengarah PERHILITAN Negeri Pahang*
5	En. Mohd Zaide bin Mohamed Zin		*Penolong Pengarah Kanan PERHILITAN Negeri Pahang*
6	En. Abd. Rahim bin Othman	PERHILITAN Selangor	*Pengarah PERHILITAN Negeri Selangor*
7	En. Mohd Hasdi bin Husin	PERHILITAN Kelantan	*Pengarah PERHILITAN Negeri Kelantan*
8	Yew Yow Boo	MRL	Project Director
9	Nurul Auji Mohd Jimmy Wong	MRL	Project Executive
10	Mex Gombek	CCCC	Environmental Manager
11	G. Balamurugan	ERE	Director
12	Ahmad Afandi	ERE	Consultant
13	Syarinal Putra Bujang	HSSI	Engineer

Matters discussed:

- The DWNP of Peninsular Malaysia as well as states DWNP of Selangor and Kelantan were briefed on the project.
- The department have no objection of the project but expected that full wildlife surveys to be conducted in all major habitats that will be affected, especially Rantau Panjang FR where the alignment will fragment the reseve.
- The department expected that proper and sufficient implementation of mitigation measures throughout construction and operation stage.
- DWNP Selangor have also agreed to help with the wildlife survey. The department shall be engaged again in separate discussion.

3. Environment NGOs (PEKA, MNS, TrEES, WWF, EcoKnights, MENGO)

Date : 3 August 2017
Time : 10.00am – 1.00pm
Venue : Malaysia Rail Link Sdn Bhd

Attendance:

CCCC/MRL/ERE				
No.	**Name**	**Organisation**	**Email**	**Phone**
1	Chi Zang	CCCC	czhang@chec.bj.cm	012-6557959
2	Mexlien Gombek	CCCC	mexgombek@hotmail.com	019-3593651
3	K.Shannmuganantha	HSSI	kshan@hss.com.my	012-9323549
4	Syarinal Putra	HSSI	syarinal@hss.com.my	013-4651584
5	Rosmah Mahmud	MRL	rosmah@mrl.com.my	013-3936963
6	Yew Yow Boo	MRL	ybyew@mrl.com.my	012-3718877
7	NorHasrul	MRL	norhasrul@mrl.com.my	019-5167115
8	G Balamurugan	ERE	gbm@ere.com.my	012-3831135
9	Kevin Quah	ERE	kqw@ere.com.my	
10	Randolph	ERE	rsj@ere.com.my	016-3980389
11	Ahmad Afandi	ERE	afd@ere.com.my	019-7552419
12	Daniel Chin	ERE	czh@ere.com.my	016-4638907

NGO				
No.	**Name**	**NGO**	**Email**	**Phone**
1	Nuradila Binti Norddin	WWF-Malaysia	nnordin@wwf.org.my	019-3662786
2	Saradambal Srinivasan	WWF-Malaysia	ssrinivasan@wwf.org.my	03-74503373
3	Daria Maethew	WWF-Malaysia	dmathew@wwf.org.my	019-2869600
4	Christa Hasmim	TrEES	treateveryenvironmentspecial@gmail.com	03-78769958
5	Leela Panikkar	TrEES	treateveryenvironmentspecial@gmail.com	03-78769958
6	Yasmin Rashid	EcoKnights	yasmin.rasyid@ecoknights.org.my	012-3665689
7	Balu Perumal	MNS	hod.conservation@mns.org.my	018-3632058
8	Sonny Wong	MNS	conservation2@mns.org.my	012-2727408
9	Lai Chong Haur	MNS	-	
10	Steven Wong Siew Por	MNS	atkr45@gmail.com	016-3276072
11	Stephanie Bacon	MNS	mns.honses@gmail.com	012-2175590
12	I.S.Shanmugaraj	MNS	director@mns.org.my	016-2893912

Matters discussed:

- The environment NGOs were briefed on the ECRL Phase 2 and to provide update on status of Phase 1 as a follow up to previous meeting.
- The NGOs raise concern on Rantau Panjang FR, where even though it's a plantation forest, there are still many endangered mammals within the reserve.
- TrEES raise concern the impacts to rainforest is not just entailed to loss of habitat and fragmentation but also will contribute to other environmental issues such as flooding, water quality and erosion.
- The NGOs strongly suggested that the alignment should be revised while MNS suggested the railway should go along the boundary of forest reserve to reduce fragmentation.

4. Forest Research Institute Malaysia (FRIM)

Date : 2 August 2017
Time : 10.00am – 12.30pm
Venue : FRIM

Attendance:

No.	Name	Agencies	Designation
1	Dr. Lilian Chua	FRIM	Research Officer
2	Pn. Hamidah Mamat	FRIM	Research Officer
3	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd	Consultant
4	Daniel Chin Zhi Hao	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- FRIM was briefed on ECRL Phase 2 as well as update on Phase 1.
- Dr. Lillian is able to provide most of the information pertaining to floral communities for the forest reserves that the proposed alignment directly cuts through such as Selangor State Park (Templer FR and Serendah FR) since lot of work has been done previously. The data should be sufficient considering there will be no forest loss in the State Park due to provision of tunnel. Tunnel entrances is also outside of the forest reserve.
- The more critical area is Rantau Panjang FR where the alignment is going through at-grade. FRIM need to check if they have any information and inventory in the forest reserve and revert back.
- If FRIM does not have data in Rantau Panjang FR, they can also help to conduct flora survey where the alignment is cutting through. Dr Lillian said the survey will take about a week to be completed. However, FRIM is also currently involved with other works and may not have enough manpower to fulfil ad-hoc request. ERE has requested FRIM to provide their proposal for the survey.
- FRIM has expressed that the alignment should be shifted to avoid and be away from the Selangor Batu Dam considering the close proximity.
- Even though the alignment is tunnelling for most of the forest reserves, there could still be impact on wildlife such as noise and vibration especially during construction.
- FRIM shall be included in future engagements such as briefing to stakeholders or discussion on Selangor State Park with NGOs etc.

5. Forestry Department of Peninsular Malaysia

Date : 28 August 2017
Time : 2.30 pm – 4.30 pm
Venue : Bilik Perbicangan Direktorat (BLOK CHENGAL), Ibu Pejabat Perhutanan Semenanjung Malaysia

Attendance:

No.	Name	Agency
1.	Dato' Hj. Nor Akhirrudin B. Mahmud	Director-General of Forestry Peninsular Malaysia
2.	Nur Illyani binti Ibrahim	*Bahagian Pengurusan Biodiversiti dan Perhutanan, Kementerian Sumber Asli dan Alam Sekitar*
3.	Tn. Hj. Yusoff B. Muda	*Ketua Seksyen (Pengurusan Hutan Darat)*
4.	Dr Lillian Chua Swee Lian	*Pengarah Bahagian Biodiversity Hutan, FRIM*
5.	Suhaida Binti Mustafa	*Pegawai Penyelidik, Program Kesihatan Dan Pemuliharaan (Kph) Bahagian Biodiversiti Hutan*
6.	Prof. Madya Dr. Mohd Nazre Bin Sale	Dekan Fakulti Perhutanan Universiti Putra Malaysia
7.	Rosilam bin Hj Said	*Pen. Pengarah (Perancangan & Pengurusan Hutan)*, Jabatan Perhutanan Negeri Kelantan
8.	Norzalya Mohd Shazali	Wakil Pengarah Jabatan Perhutanan Negeri Kelantan
9.	En. Muhamad Hafni bin Ahmad Saraji	*Pen. Pengarah (Perancangan & Pengurusan Hutan),* Jabatan Perhutanan Negeri Terengganu
10.	Zainuddin Jamaludin	Timb. Pengarah Jabatan Perhutanan Negeri Selangor
11.	Ismail Md Ali	Wakil Malaysia Rail Link Sdn Bhd
12.	NorHasrul bin Abu Hassan	Wakil Malaysia Rail Link Sdn Bhd
13.	Nuradila binti Norddin	WWF-Malaysia (Wakil)
14.	Asma binti Mahiddin	Penolong Pengarah (Pelupusan), Pejabat Tanah dan Galian Pahang
15.	Wan Mohd Anuar bin Endut	Timbalan Pengarah Pejabat Tanah dan Galian Terengganu
16.	Dato' Hj. Nazran b Muhammad	Pengarah Pejabat Tanah dan Galian Kelantan
17.	Siti Nor Azura binti Md Saad	Pergawai Kawalan Jabatan Alam Sekitar
18.	Sham Izuddi Mat Hussin	Pergawai Kawalan Jabatan Alam Sekitar
19.	Nor Farahain	Jurukur Perunding Service Sdn Bhd
20.	Mohd Exham bin Mohd Asri	Jurukur Perunding Service Sdn Bhd
21.	Nurul Auji Mohd Jimmy Wong	MRL
22.	Mexlien Gombek	CCCC
23.	Ahmad Afandi	ERE
24.	Dr G Balamurugan	ERE
25.	Daniel Chin Zhi Hao	ERE
26.	Shakir Tang Chee Chiang	Mahyuddin & Siew Sdn Bhd
27.	Pan Nyuk Fan	Mahyuddin & Siew Sdn Bhd

Matters Discussed:

- The meeting was arranged by Forestry to obtain the status of ECRL project and determining the flora inventory method for Phase 1.
- The meeting was chaired by the DG of Forestry. Besides the 4 state forestry departments, they also invited Ministry of NRE, DOE, UPM and WWF to the meeting.
- The department including Selangor Forestry representatives was also briefed on ECRL Phase 2.
- The department was pleased that the project has added sustainable features such as tunnels to the railway to significantly reduce forest loss and fragmentation.
- Besides the method for flora survey, forestry concern was related to matters below for both Phase 1 and 2:
    - Replacement of forest reserves loss (hectares) at state level
    - Best mitigation measures for RET flora species such as rescue or replanting
    - NRE stand on PRF affected by the project – on how this would impact the international and national level commitment.
    - Cost of habitat restoration after construction is completed
    - Forest fragmentation by the fence and ROW of the railway.
- The department shall be brief again once the alignment is firmed as the project progress, as well in separate discussion with Selangor Forestry Department.

6. Pengurusan Air Selangor (HQ)

Date : 31 July 2017
Time : 2.40pm – 4.00pm
Venue : Meeting Room, Pengurusan Air Selangor, Kuala Lumpur

Attendance:

No.	Name	Agencies	Designation
1	Ir. Abas Abdullah	Pengurusan Air Selangor	Chief ExecutiveOfficer
2	Mohd Hafiz Md Yunos	SPLASH	Officer
3	Noor Hazarina Mohamed Hussain	Pengurusan Air Selangor	Officer
4	Siti Nadiah Razali	Pengurusan Air Selangor	Officer
5	Shahrom Hashim	Pengurusan Air Selangor	Officer
6	Zairi Zainuddin	Pengurusan Air Selangor	Officer
7	Kelvin Siew	Pengurusan Air Selangor	Officer
8	Raja Nur Ashikin	ERE Consulting Group S/B	Director
9	Sharmila	ERE Consulting Group S/B	Consultant

Matters discussed:

- ERE presented about the Project (Phase 1 and Phase 2) to Pengurusan Air Selangor and SPLASH.
- Ir Abas mentioned that SSP1, SSP2 and SSP3 distribute water to 60% of the entire Selangor district.
- Based on the discussion, there are a lot of pipeline crossing from Serendah to Klang stretch. The distribution network mostly consists of underground pipeline while there are also some above ground pipes, averaging from 600 mm to 2000mm in diameter.
- Ir. Abas suggested the proposed alignment shall be elevated in order to avoid the crossing with distribution of pipeline. Otherwise, the pipeline has to be diverted which is highly not recommended.
- Pengurusan Air Selangor can only share information / map about the pipeline distribution if ERE can share the details of the alignment (chainage, sections elevated, at grade, etc) to them. However, SPLASH has shared a sketch on the water pipelines for Sg. Selangor WTPs' and reservoirs.
- Ir. Abas recommended for another session of discussion with the presence of the engineers (HSS) with some detailed design of the alignment and also to include North Hummock WTP, Tasik Subang and Bandar Baru Sg. Buaya WTP in the Google kmz file.
- Pengurusan Air Selangor is also concern about the vibration impact to the pipelines.

7. Jabatan Pengairan dan Saliran, Lembaga Urus Air Selangor (LUAS), Ketua Pegawai Keselamatan Kerajaan Malaysia (KPKK)

Date : 22 August 2017
Time : 09.30am – 11.00am
Venue : Level 1, JPS Wilayah

Attendance:

No.	Name	Agencies
1	Ir. Hj. Nishad Mohamad bin Hj C.J Mohd Shafiq	JPSKL
2	Muhamad Nasif b. Daud	JPSKL
3	Hj. Mazlan Abdul Wahab	CGSO Selangor
4	Mohd Azmen b Hussin	JPS Selangor
5	Mohd Shahar Bin Shariffudin	PLSK
6	Ooi Soon Lee	JPSKL
7	Nur Hanis Akmal Bt Ahmad Fauzi	JPS Gombak
8	Azril Hafiz Bin Ab Rahim	JPSKL
9	Mohamad Shafiq B Mohd Sayusi	LUAS
10	Norfaezah Bt Shamsuddin	LUAS
11	Mohd Hafiz B Abd Aziz	LUAS
12	Sarina Mohd Ali	JPSKL
13	Hayati Binti Bakri	JPSKL
14	Chua Li Ying	ERE Consulting Group Sdn Bhd
15	Kevin Quah	ERE Consulting Group Sdn Bhd
16	Zhai Pengcheng	CCCCRG
17	Dong Xian	CCCCRG
18	Gong Chun Pa	CCCC
19	Chi Zhang	CCCC
20	Raja Nur Ashikin	ERE Consulting Group Sdn Bhd
21	Ashraf Ahmad Nazari	HSSI
22	Zamri Mohd	HSSI
23	Mohamed Kamal Suhaimi	MRL
24	Azli	JPSKL
25	Engku Ahmad Khalid	

Matters Discussed:

- All attendees (JPSKL, JPS Selangor, JPS Gombak, JPS PLSK, LUAS & CGSO) raised serious concerns with regards to the ECRL P2 alignment.

- **JPS PLSK Comments:**
  a. Batu Dam is gazetted since 2010 as a zone of protection under the LUAS Enactment 1999 (Section 48, https://goo.gl/AHF8L1). All development must be more than 500m away from the gazetted area. LUAS verbally mentioned gazetted area is from impoundment area (normal pool level, NPL).
  b. Advised to avoid the dam area in lieu of prior State EXCO decision for another project.
- **CGSO/KPKK Selangor Comments:**
  a. Requested ECRL team to look into *Kawasan Larangan & Tempat Larangan 1959* (Protected Areas & Protected Places 1959), Akta 298
  b. Requested ECRL team to look into Key Points under Emergency (Essential Powers) Act, 1964 as Batu Dam is categorized as *Tahap Keselamatan Satu*.
- **LUAS Comments**
  a. No objections to river crossings but supported comments by JPS PLSK (Item 2a, 2b).
  b. Requested ECRL Team to pre-consult Menteri Besar Incorporated (MBI) on planned developments in Klang area and see how ECRLP2 fits into the masterplan.
- **JPS Wilayah Comments:**
  a. Requested ECRL Team to relook into realignment of ECRLP2.
  b. Brought up concerns of dam security during construction and risk of derailment.

8. Majlis Perbandaran Klang (MPK – Solid Waste Management)

Date : 25 August 2017
Time : 09.30 am – 10.30 am
Venue : Jabatan Perkhidmatan Persekitaran, Majlis Perbandaran Klang

Attendance:

No.	Name	Agencies	Designation
1	Mr. Woo Lee Tay	MPK	Asst. Environmental Health Officer
2	Mohd Fazlin	ERE Consulting Group Sdn Bhd	Consultant
3	Anisa	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- ERE briefed on ECRL Phase 2 to Mr Woo.
- Waste management is managed by KDEB for areas within MPK jurisdiction.
- Domestic collection is collected 3 times a week.
- KDEB is the main contractor for pilot Project conducted within MPK area for domestic waste collection.
- KDEB is under MBI (Menteri Besar Incorporated).
- Contract with KDEB is 7 years from 2016.
- In terms of domestic waste and industrial waste, waste contractor for industries need to register with MPK.
- Construction waste is under pembangunan for renovation /demolition of houses or buildings because Jabatan pembangunan will give permit to conduct renovation / demolition.
- Person in charge of KDEB is Mr. Ramli (General Manager) whom can be contacted at 019-2797907.
- Tipping fee is RM 36/tonne is paid by MPK to the Worlwide Landfill (Jeram).
- 1 day: 500 tonne waste generated (domestic, garden,inert waste)
- Oragnic waste comprised 50% from total composition of waste. Composting and recycling are way to go forward for areas under MPK.
- Selangor and Penang do not take part in Act 672.
- Mr Woo gave waste generation data in monthly basis for year 2016 and 2017.

9. Majlis Perbandaran Klang (MPK- Planning)

Date : 25 August 2017
Time : 11.00 am – 12.30pm
Venue : Jabatan Perancang, Majlis Perbandaran Klang

Attendance:

No.	Name	Agencies	Designation
1	Pn. Ivana Mas Ayu Binti Mohd Ali	MPK	Asst. Town Planner
2	Mohd Fazlin	ERE Consulting Group Sdn Bhd	Consultant
3	Anisa	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- ERE briefed on ECRL Phase 2 alignment to Puan Ivana from Jabatan Perancang.
- Puan Ivana highlighted the proposed alignment will be passing through future industry and future residential. However, no planning permission yet for these 2 plots (see attachment).
- She was highly concerned on the villagers' reactions at Kg Delek due to the lands which will be acquired for this project.
- Landuse zoning for Blok Perancangan Klang Utara 8 (BPKU 8) has been amended as per Rancangan Tempatan Majlis Perbandaran Klang (Pengubahan 3) 2020 (see attachment), however the amended plot is not along the corridor of alignment.

10. Department of Fisheries, Kelantan

Date : 29 August 2017
Time : 10.00 am – 11.30 am
Venue : Pejabat Perikanan Negeri Kelantan

Attendance:

No.	Name	Agencies
1	En. Mohd Rafi bin Hasan	Department of Fisheries Kelantan
2	En. Che Zaid bin Musa	Department of Fisheries Kelantan
3	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd
4	Chua Li Ying	ERE Consulting Group Sdn Bhd

Matters Discussed:

- The officers verified the fisheries locations marked in the TOR map (near river mouth of Sg. Mentua and Sg. Pengkalan Nangka). All of the fisheries activities in the Project Area are cage culture in the river.
- Fish bred are mostly *siakap, keli* and *tilapia.*
- The officers will provide ERE with the number of fish breeders in the proximity of the alignment.
- They mentioned that there are also some fish rearing activities in the irrigation canals, but KADA will have the information, not the Fisheries Office. Fish bred in canals are usually *patin* and *baung*.
- There are no riverine fishermen (*nelayan sungai*) in the area of P2 alignment.
- The Fisheries Office do not have records of recreational fishing ponds, those only have trade licences from the Local Authority.
- Water pollution concerns - sediments and oil spill from railway construction and operations.
- Water pollution occurrences are rare, although fish has been killed by herbicides/pesticides applied in the paddy fields.
- The officers are concerned about the vibration created by the train to the fish in the water bodies the tracks are crossing.

11. Majaari Services Sdn Bhd, Kota Bharu

Date : 29 August 2017
Time : 2.30pm – 3.30pm
Venue : Majaari Services Sdn. Bhd, Kota Bahru

Attendance:

No.	Name	Agencies
1	Pn.Nurhazlin	Maajari Services Sdn Bhd
2	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd
3	Chua Li Ying	ERE Consulting Group Sdn Bhd

Matters Discussed:

- Pn. Nurhazlin shared that HSSI met with her staff on Monday (28 Aug) because P1 alignment crosses an Oxidation Pond (OP) near Desa Darulnaim at Pasir Tumboh (6.059734°N; 102.280571°E). They told HSSI that the alignment can remain and the OP reclaimed as long as the STP next to the OP is upgraded to compensate the loss of the OP.
- Sludge disposal areas in Kota Bahru are at Pengkalan Chepa and Pasir Mas. Sludge from STP will be sent to the nearest one.
- In Kelantan, public STP constructed will be handed over to Maajari Services for operation and maintenance, in compliance with DOE's Standard B Sewage Effluent Limits.
- The preferred type of STP is the Extended Aeration (EA) due to ease of maintenance. There is no Sequencing Batch Reactor (SBR) type of STP in Kelantan as of now.
- In Kelantan, the STP designed for the largest PE is in Gua Musang at 19,800 PE. There are still many individual septic tanks in Kelantan.
- Pn. Nurhazlin will check with her database to let ERE know if the P2 alignment crosses any of their sewerage infrastructures.

12. Lembaga Kemajuan Pertanian KEMUBU

Date : 30 August 2017
Time : 8.30 am– 9.30 am
Venue : KADA office, Kota Bharu

Attendance:

No.	Name	Agencies
1	En. Baharuddin b Ali	KADA
2	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd
3	Chua Li Ying	ERE Consulting Group Sdn Bhd

Matters Discussed:

- KADA informed that there are two parts to the granary area. The northen part is under JPS Tumpat while the rest belongs to KADA.
- KADA is concerned with the at-grade alignment. An elevated track is preferable as the ground obstruction is less. However, they are also concerned that after construction is done, the "access road / platform" which was constructed for the elevated track will be left at the site and not removed.
- Flooding – if the alignment is at-grade, KADA is concerned that the culverts may not be enough to ensure water flow thus worsening floods.
- Water pollution – more concerned with construction period and sediment runoff from this.

13. Jabatan Pengairan dan Saliran (JPS) Tumpat

Date : 30 August 2017
Time : 10.00 am – 11.00 am
Venue : JPS Tumpat Office

Attendance:

No.	Name	Agencies	Designation
1	En. Nor Muhammad Alamin Bin Ismail	JPS Tumpat	Asst. Engineer-Jajahan Tumpat
2	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd	Consultant
3	Chua Li Ying	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- JPS voiced concern of at-grade alignment – blockage of flow path during storm flow as well as the accessibility of farmers.
- Irrigation canals are generally 10m wide, with 10m pathways on both sides. The irrigation canals are also access roads for the farmers to get from one field to another.
- Therefore, if the alignment is at-grade, the culverts must be wide and high enough for the farmers and their machinery to pass.
- There is an on-going *Rancangan Tebatan Banjir* programme at Sg. Mentua (tributary of Sg. Golok) where the bunds along the river are being raised to prevent overflow from the river.
- JPS will comment about collector drains along the alignment therefore these drains must be designed to adequately accommodate runoff from the drainage areas.
- Poor drainage will cause water retention by the tracks which will lead to degradation of water quality in these *lopak air*.

14. Majlis Daerah Hulu Selangor (MDHS - Waste Management)

Date : 6 September 2017
Time : 10.00 am – 11.00 am
Venue : Jabatan Pengurusan Sisa Pepejal & Pembersihan Awam, Majlis Daerah Hulu Selangor & Jabatan Bangunan

Attendance:

No.	Name	Agencies
1	En. Alauddin bin Mustafa	MDHS
2	En. Mohd Hazwan bin Othman	MDHS
3	Mohd Fazlin	ERE Consulting Group Sdn Bhd
4	Anisa	ERE Consulting Group Sdn Bhd

Matters Discussed:

- Frequency of domestic waste collection is done 3 times a week:
- Residential : Monday, Wednesday and Friday
- Commercial : Tuesday, Thursday and Saturday
- Domestic waste is being disposed at Bukit Tagar Sanitary Landfill from 1.03.2017 because Sg Sabai Landfill has stopped receiving domestic waste. The instruction to stop receiving domestic waste at Sg Sabai Landfill was made by LUAS due to leachate discharge to the nearby streams, Sg. Sabai. Only bulky waste such as garden waste, furnitures and construction waste will be disposed to Sg Sabai Landfill.
- Waste generation data for construction waste is not available because no weighing bridge at the landfill. As for domestic waste, the highest waste generated is 250 tonnes/month.
- Contractors must be registered with Jabatan Pengurusan Sisa Pepejal & Pembersihan Awam to dispose construction waste at Sg Sabai Landfill.
- Construction waste is under Jabatan Bangunan and the list of contractors that have permit to dispose construction waste is as attached.
- Sg Sabai Landfill is managed fully by MDHS. However, there is a plan in the future to hand over the management to Worldwide Landfill. This is subject to the decision by YDP.
- No information on the waste composition and future projection of waste generation due to lack of data documentation.

- Domestic waste management is carried out by MDHS (30%) and appointed contractors (70%) while for public cleansing has been fully subbed to the appointed contractors.

15. Majlis Perbandaran Selayang (MPS)

Date : 13 September 2017
Time : 10.00 am – 11.30 am
Venue: Jabatan Pengurusan Sisa Pepejal dan Kesihatan, Majlis Perbandaran Selayang

Attendance:

No.	Name	Agencies
1	En. Zariman Bin Ibrahim	Jabatan Pengurusan Sisa Pepejal dan Kesihatan, MPS
2	Nur Amalina Bt Yusin	Jabatan Pengurusan Sisa Pepejal dan Kesihatan, MPS
3	Syairah Zahidi Baki	Jabatan Pengurusan Sisa Pepejal dan Kesihatan, MPS
4	Mohd Mustain Bin Mohad Zainal	Jabatan Perancang
5	Mohd Fazlin Bin Nazli	ERE Consulting Group Sdn Bhd
6	Anisa Mohd Azhar	ERE Consulting Group Sdn Bhd

Matters Discussed:

- En Zariman chaired the meeting and the meeting started off with the project description briefed by KQW (ERE).
- Information on solid waste management in terms of management, landfills information, and waste generation data for overall area in areas under MPS jurisdiction were given.
- According to En. Zariman, Sg. Kertas landfill will end its operation in ½ year time and the new area has not been determined yet.
- Starting from 1/3/17, waste management (collection, disposal) for areas under MPS is managed by KDEB.
- As of now no procedure or any regulation for generation of construction waste.
- Selangor Solid Waste Management Encatment is still being amended.
- For ECRL Phase 1, v15b alignment passes through some parcels of land with approved KM nearby ITT Gombak.
- There is an earmarked development next to Saujana Technopark. MPS also mentioned a Selangor Fruits Valley (SVF) around Rantau Panjang Permanent Forest Reserve and SVF was recently revived middle of this year by Perbadanan Kemajuan Pertanian Selangor (PKPS).

16. Majlis Daerah Tumpat (MDT- Solid Waste Management)

Date : 6 September 2017
Time : 5.00 pm – 5.20 pm
Venue : Telephone conversation

Attendance:

No.	Name	Agencies	Designation
1	En. Shahrulzaman	MDT	Head of Department – Public Health, Cleanliness, Licensing
2	Anisa	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- Generation of domestic waste is 125 tonnes/ day in areas under Majlis Daerah Tumpat. No data on waste generation for bulky waste as no weighing bridge installed at the disposal area.
- Waste collection for domestic and bulky waste is carried out on a daily basis by MDT.
- Receiving landfill for waste generated in Tumpat is Tapak Pelupusan Sampah Kg Kok Bedollah. The landfill received domestic waste and bulky waste such as garden waste, furnitures, and construction waste.
- A developer needs to write a letter to YDP of Majlis Daerah Tumpat to apply permit to dispose construction waste at the approved disposal area which is Tapak Pelupusan Sampah Kg Kok Bedollah.
- The lifespan of the landfill is 60 years, and it has been operated since year 1985.
- Area of the landfill is 50 acres and the used area of the landfill is 20 acres. However, the information on the used capacity is based on year 2015.
- Mr Shahrulzaman will response with the information requested by letter.

17. Jabatan Pengairan dan Saliran (JPS) Selangor

Date : 7 September 2017
Time : 11.30 am – 12.45 pm
Venue : Bilik Cempaka, JPS Selangor

Attendance:

No.	Name	Agencies	Designation
1	En. Azmin Bin Husin	JPS Selangor	Deputy Director (Development I)
2	Ir. Hj Badaruddin Bin Tahiruddin	JPS Selangor	Deputy Director (Development II)
3	Pn. Hezrin Haslinda Bt Hashim	JPS Selangor	Senior Assistant Director - Flood Management Division
4	En. Ahmad Azizi Bin Ariffin	JPS Selangor	Deputy Senior Director – River and Beach Special Projects and BPSP
5	Pn. Siti Salwa Binti Ramli	JPS Selangor	Asst. Director - River and Beach Special Projects and BPSP
6	Pn. Sri Yanty Binti Samsuri	JPS Selangor	*Bahagian Saliran Mesra Alam*
7	Ahmad Afandi Nor Azmi	ERE Consulting Group Sdn Bhd	Consultant
8	Chua Li Ying	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- JPS voiced concerns about flash floods especially during construction period. There are numerous flash flood hotspots where the alignment will be crossing.
- Sg. Klang and Sg. Selangor have 50 m river reserve, gazetted under LUAS Enactment.
- JPS has Rancangan Tebatan Banjir in Sg. Buloh, Sg. Kundang, Sg. Garing, Sg. Gong, Sg. Bakau.Most of these are river re-alignment works and increasing heights of bunds.
- JPS will comment on the land status/ maintenance ownership at areas where the alignment crosses the rivers.
- For Klang, flooding concerns have to take into account of tidal effect where high tide will cause the river to overflow.

- For culverts, JPS typically recommends design for 100 years ARI, 1.5 m free board. Detention ponds with adequate capacity are required for stations and part of alignment to mitigate flooding.

18. Jabatan Mineral dan Geosains (JMG) HQ

Date : 19 September 2017
Time : 10.00am – 11.30am
Venue : JMG HQ, Bangunan Tabung Haji, KL

Attendance:

No.	Name	Agencies	Designation
1	Tuan Haji Shahar Effendi Bin Abdullah Azizi	JMG HQ	Head of Director
2	Norsham Binti Samsudin	JMG HQ	Assistant Director
3	Safura Bt. Alias	JMG HQ	Assistant Director
4	Che Ibrahim Bin Mat Saman	JMG HQ	Assistant Director
5	Abd Razak Zainal Abidin	JMG HQ	Assistant Director
6	Mexlien Gombek	CCC ECRL S/B	
7	Sia Say Gee, Dr.	JMG HQ	Ketua Penolong Pengarah
8	Hasnida Bt Zabidi	JMG Sel /WP	Senior Geoscience Officer
9	Tuan Rusli Bin Tuan Mohamad	JMG Sel /WP	Deputy Director
10	Mohd Badzran Bin Mat Taib	JMG HQ	Director
11	Muhammad Faiz	HSSI	Engineer
12	Tan Xingkang	ERE Consulting Group Sdn Bhd	Consultant
13	G. Balamurugan	ERE Consulting Group Sdn Bhd	Director
14	Mohamed Kamal	MRL	
15	Saim Suratman	ERE Consulting Group Sdn Bhd	Consultant
16	Norhasrul	MRL	Environmental Manager

Matters Discussed:

- JMG concerned about blasting activities at tunnels
- Concerns on marine clay and compacted peat from kapar to klang - ground treatment & engineering solutions needed
- Construction of tunnels and structures near Batu Dam may be problematic - 500 m away still considered near
- Landslide issues to be addressed
- Geology info in the EIA must be comprehensive - with the help of SI data
- JMG can share the Kajian Penyediaan Peta Bahaya Cerun- which will be given to PBT and JPBD on 20/09/2017

- Geology and geotechnical constraints must be highlighted
- Fault lines nearby to be identified more in depth than the geological map
- Jabatan Perhutanan and JAS may have some maps on peat areas
- JMG has encountered many settlement and peat fire issues during construction - may be too late to mitigate efficiently
- Overall the KP is supportive. JMG Selangor emphasise to provide enough detailed info as early as in the EIA stage to identify issues.

19. Menteri Besar Incorporated (MBI) Office

Date : 20 September 2017
Time : 3.00pm – 4.00pm
Venue : MBI Office, Bangunan Darul Ehsan

Attendance:

No.	Name	Agencies
1	En. Syaiful Azman	MBI
2	En. Fuad	MBI
3	Hilmi Mohamad	CCCC
4	Lee Heng Cheong	MRL
5	Saiful Adli Yahya	CCCC
6	Noor Azlan Salleh	MRL
7	Yusni	MRL
8	Wan Mohamad Firdau Bin Wan Omar	MRL
9	Kevin Quah	ERE Consulting Group Sdn Bhd
10	Sharmila	ERE Consulting Group Sdn Bhd

Matters Discussed:

- ERE presented the Selangor alignment to MBI.
- MBI pointed out that P2 alignment will cut across the closed Teluk Kapas landfill. The 140 acres landfill with an estimation of 2 million metric tonnes waste was closed in 2007 and was not decommissioned properly. The area is now highly contaminated with methane gas.
- MBI has already met with Peghulu Kg. SIreh, Kg, Delek and they are not agreeable to relocation (new location/ new house/ high rise), compensation but may consider restructuring of the kampung at the same location.
- MBI shared sime information on the Sungai Maritime Gateway (SMB). The summaried points are as below.
    - Klang River Rehabilitation Project started in year 2016 with river cleaning.
    - SMG development covers an area of 2000 acres and along 22 km of Sg. Klang
    - Master plan focuses on themes that's divided into 6 zones (Zone 1 – Klang Islands; Zone 2- Selangor Gateway; Zone 3- Eco City; Zone 4 – North Riverfront; Zone 5 – Green Living and Zone 6 – Heritage Quarter)
- MBI is keen to work closely with MRL for ECRL Phase 2.

20. Jabatan Kemajuan Orang Asli Malaysia Hulu Selangor

Date : 21 September 2017
Time : 3.00pm – 5.00pm
Venue : JAKOA Hulu Selangor

Attendance:

No.	Name	Agencies
1	En. Hafiz	JAKOA Hulu Selangor
2	Tan Xingkang	ERE Consulting Group Sdn Bhd
3	Noorainie Awang Anak	ERE Consulting Group Sdn Bhd

Matters Discussed:

- En. Hafiz cannot confirm the excat locations of the forage areas for orang asli in Serendah. Indicative locations was shown during the discussion.
- Need to confirm with Pejabat Daerah Hulu Selangor if the fruit orchard near Tan Chong and the Kampung Orang Asli Serendah will be affected.
- En. Hafiz proposed to have meeting with Pejabat Tanah Gombak and Pejabat Tanah Hulu Selangor in order to get the exact location of the fruit orchards that belongs to the orang asli. Suggest to send the invitation letter to Pejabat Tanah, Forestry Department and JAKOA.

21. Department of Fisheries Selangor

Date: 25 September 2017
Time: 09.30 a.m – 10.30 am
Venue: Tingkat 16, Wisma MBSA

Attendance:

No.	Name	Department/Agencies
1	Chua Li Ying	ERE Consulting Group Sdn Bhd
2	Nur Diyana Abdul Rahim	ERE Consulting Group Sdn Bhd
3	En. Mohd Fariz bin Abdul Kadir	Department of Fisheries Selangor
4	Pn. Nur Farris binti Md. Esa	Department of Fisheries Selangor
5	Cik Noor Zalina binti Mat Shariff	Department of Fisheries Selangor

Matters Discussed:

- Land acquisition of aquaculture ponds where the alignment passes.
- Fishermen (*nelayan darat*) access to fishing spots along rivers may be blocked (especially at Sg. Puloh and Klang river).
- Water quality is a general issue; it is prevalent even now especially with the rapid development in Selangor.
- DOF Selangor received the TOR but they are not allowed to give comments (instruction from HQ). The fisheries department will have a committee made up of various fisheries sections' officers and subject experts to assess the report.
- There are fishing activities in Batu Arang which are under TKPM (Jabatan Pertanian).
- Location of aquaculture sites detected at CH. 20500, 34500,35000,35500
- Types of freshwater fish cultivated: *tilapia, keli, patin*
- Types of saltwaterfish cultivated: *siakap*, shrimp
- The Biosecurity section under DOF Selangor deals with wastewater treatment. They use Biological Treatment and filtration. Treatment for saline water is slightly different whereby discharge must be of same salinity level as the receiving river's water (JAS Conditions).
- Selangor has no enactment to cover inland fisheries (*perikanan darat*). So DOF Selangor still covers both imland and marine fisheries.
- MyGAP's purpose is to ease the market penetration and distribution (*pasaran keluar mudah*) especially for the export of fish products. This is sponsored by the government but not all fishermen are registered under this program.

- DOF Selangor will provide the full list of registered fish breeders that may be affected by the alignment.

22. Jabatan Warisan Negara (JWN)

Date: 10 October 2017
Time: 9.30 am– 11.15 am
Venue: Jabatan Warisan Negara, Bilik Mesyuarat Mezzanine, Blok B

Attendance:

No.	Name	Agencies
1	Tn. Haji Mesran Mohd Yusop (Timbalan Pengarah)	Jabatan Warisan Negara
2	En. Saifuz	MRL
3	En. Mazlin	MRL
4	Mr. Shan	HSS
5	Mr. Mex	CCCC
6	Ms. Junn	CGB
7	Ms. Suzie	CGB
8	Mr. Kevin	ERE Consulting Group Sdn Bhd

Matters Discussed:

- Presentation of Phase 2 Heritage Impact Assessment was chaired by Tn. Hj. Mesran Mohd Yusop.
- CGB presented findings of HIA:
  - All identified heritage areas are on PBT Inventory List and not on JWN listing.
  - Majority of identified areas are more than 200m away from the alignment, except for pre-war buildings in Serendah
- JWN has no objections to the HIA ingeneral and has verbally approved the HIA for the current alignment verison.

23. Worldwide Landfills Sdn Bhd

Date: 24 October 2017
Time: 10.00 am– 11.30 am
Venue: Discussion Room, Level 3, Worldwide Landfills Sdn Bhd

Attendance:

No.	Name	Agencies	Designation
1	En. Noor Azam bin Mastor	Worldwide Landfills Sdn Bhd	Senior Manager (Business Development)
2	En. Hashim bin Wahab	Worldwide Landfills Sdn Bhd	Business Development Executive
3	Mohd Fazlin	ERE Consulting Group Sdn Bhd	Consultant
4	Anisa	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- ERE briefed about the Project to En. Noor Azam and En. Hashim.
- En. Azam mentioned that no waste characteristics information for C&D waste because minimal disposal of C&D waste. This is because contractor prefers to dispose to private land or illegal dumping.
- Sg. Kertas landfill is still in operation and can sustain up to 5 years if the receiving waste capacity is still the same which is at 300 tonnes per day.
- Information for Jeram Sanitary landfill, Kuang landfill and Sg. Kertas landfill was provided.
- En. Hashim mentioned that contractors responsible to dispose solid waste (domestic/ construction waste) to the landfill do not require to acquire license from local authorities.
- The contractors for waste disposal appointed by the Project Proponent need to get acceptance letter from Worldwide Landfills S/B in order for them to dispose waste at landfills by Worldwide. Upon disposal to the landfill, appointed contractors shall pass the disposal receipt and docket to the Project proponent to maintain the chain of custody.

24. Department of Fisheries

Date: 26 October 2017
Time: 10.00 am– 11.30 am
Venue: Level 2, Bahagian Perancangan dan Pembangunan, Jabatan Perikanan Malaysia

Attendance:

No.	Name	Agencies	Designation
1	Pn. Hasmayana	Department of Fisheries	Head of Planning Section
2	Other officers	Department of Fisheries	-
3	Raja Nur Ashikin	ERE Consulting Group S/B	Director
4	Tan Xingkang	ERE Consulting Group Sdn Bhd	Consultant

Matters Discussed:

- Impact on access for fishermen along rivers during construction of viaducts etc.
- To propose appropriate mitigation measures to reduce water pollution.
- Potential vibration impacts on fish in rivers and ponds.
- Queries on compensation for fishermen if yield from rivers are affected.
- Sedimentation concerns and effectiveness of LD-P2M2 were raised.
- Height of viaducts crossings rivers should be high enough to provide boat access during high tide.
- Impacts towards cage cultures near the mouth of Sg. Klang should also be quantified – more technical assessment. The distance from construction site and receptor (aquaculture) should also be factored in.
- Impact towards smaller streams in Rawang, Batu Arang and Serendah should be addressed especially those used by fish pond operators to abstract water.
- As aquculture registration is still voluntary, data obtained from state offices ,ay not be accurate. DOF requested to identify more fish ponds in the field via site survey / googel earth.
- Info: LUAS regulates water abstraction. DOF also has a new Fisheries Rule 2017 (Kaedah -Kaedah Perikanan 2017) that regulates aquaculture registration / license etc. but this rule is still not gazetted in Selangor and Negeri Sembilan. Local authorities also have info on registered aquaculture activities.
- Construction activities near ex mining areas may affect downstream receptors when ex mining ground and soil is disturbed.

- To assess impacts on pristine streams in Sg. Choh and Templer Park – many valueable fish species present.
- ECRL Phase 1 info: to assess impact on Pusat Perikanan Bentong if any.
- Concerns on access between villages for communities severed by the railway.
- Impacts on irrigation canals, paddy fields flood prone areas to be addressed.
- DOF will issue official comments for the meeting.

25. Jabatan Pengairan dan Saliran (JPS) Selangor

Date: 30 October 2017
Time: 3.00 pm– 4.30 pm
Venue: Bilik Cempaka, JPS Selangor Bangunan SSAAS

Attendance:

No.	Name	Agencies
1	JPS (Selayang, Hulu Selangor, Kuala Selangor and Klang)	
2	Kevin Quah	ERE Consulting Group S/B
3	Kamal	MRL
4	Yusni	MRL
5	Wendy	Meinhardt
6	John Lim	G&P

Matters Discussed:

- First official briefing initiated by MRL / CCC to JPS Selangor. JPS Selangor was generally disinterested as MRL was unable to provide preliminary / detailed engineering. General comments included complaice towards EIA COA, typical construction issues and JPS Selangor will only provide input upon submission of preliminary / detailed engineering.
- Other observations raised by members of meeting:
  - Batu Dam issue: JPS was indifferent of the alignment running next to Batu Dam crest or across Taman Jasa Utama
  - Sg. Puloh : experiences todal effect up to 5.7 m range. MRL to ensure existing flood mitigation bunds along Sg. Puloh at Taman Sementa to be preserved.
  - Sg. Tk Gadong Besar: JPS is currently deepening it by 5m.
  - Future drainage upgrade works: JPS raised concerns that undersized cross culverts will be very costly to be ugraded in the future. MRL to follow JPS guidelines on the matter.
  - MRL to liaise with JPS Malaysia for information requested (Flood mitigation reports, Flood map, watercourse topographic survey, penwartaan lebar sungai, rain gauge data, etc)

26. Jabatan Mineral dan Geosains (JMG) Selangor

Date: 16 November 2017
Time: 10.00 am – 12.00 pm
Venue: Bilik Mesyuarat Kuarza, JMG Selangor/WP

Attendance:

No.	Name	Agencies
1	En. Rusli	Timbalan Pengarah – JMG Selangor
2	En. Abdul Hadi	Mineral Resources – JMG Selangor
3	Pn. Hasnida	Groundwater – JMG Selangor
4	Pn. Maizatul	Groundwater – JMG Selangor
5	Kevin Quah	ERE Consulting Group S/B
6	Sharmila Devi Valaitham	ERE Consulting Group S/B

Matters Discussed:

- Briefing to JMG Selangor/WP on both P1 & P2.
- Concerns raised:
  a. Serendah area sits upon deep-seated limestone formation (similarly aged, but not connected to, KL limestone). Recent Yayasan UEM housing development experience major sinking (1m).
  b. Bandar Puncak Alam – Jln Kastam alignment sits on thick, soft marine clay with typical bedrock only found between 60m-100m. Due to very low friction properties of marine clay, the surrounding areas will suffer from differential settlement upon introduction of loads such as ECRL. JMG strongly suggests ground improvement works be taken along this stretch.

- Sharing from JMG:
  a. There is an ex-coal extraction/mining area nearby Bandar Puncak Alam via the *Room & Pillar mining* method.
  b. There are numerous sand mining activities and tube wells along BPA – Jln Kastam. Information can be obtained from LUAS.
  c. There are two main active fault lines between Batu Dam & Genting tunnel; Bkt Tinggi fault & Ulu Kelang fault.

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AP - F

PERCEPTION SURVEY AND STAKEHOLDER ENGAGEMENT

AP – F1

SURVEY QUESTIONNAIRE AND SHOWCARD

This perception questionnaire is to obtain feedback from communities within 500m -2000m corridor of the proposed East Coast Rail Line (ECRL). Your response is important to us. (Please ensure the **Show Card on the Alignment** is available for viewing).

FOR USE BY ENUMERATOR

Questionnaire No. | | | | |

Survey Area Code: | | | | |

Respondent Type: [R]

Near Code: <500m
Far Code >500m | | | | |

SECTION 1: GENERAL INFORMATION

Q1 1 Name:_____

2. Household head: [1] Yes [2] No

3 If you are not the household head, please state your relationship to the household head?

_____

4 Address:_____

5 Village/Taman:_____

_____ 6. Poscode: _____

7 District: 8. State:

_____ _____

9 Premise Type*: (Please (√) in relevant box)*

- [1] Village house
- [2] Bungalow huose (s/s or d/s)
- [3] Semi-detached house
- [4] Terrae or Link house (s/s or d/s)
- [5] Condominium atau Apartment
- [6] Low cost house/Flat
- [7] Shophouse
- [8] Others (Specify)

_____

10 Premise Tenure:

- [1] Owner-occupied
- [2] Tenant
- [3] Provided by employer
- [4] Others (Specify)

_____

11. Length of stay (in years): _____

12. Contact (if relevant) (i) Telephone _____ (ii) E-mail _____

SECTION 2: PERCEPTION OF PRESENT NEIGHBOURHOOD:

Q2 Do you currently encounter any issues in your neighbourhood?

		Has issue?		Level of Acceptance		
		Yes	No	High	Moderate	Low
1	Noise pollution	1	2	3	2	1
2.	Air pollution and dust	1	2	3	2	1
3	Vibrations	1	2	3	2	1
4	Floods	1	2	3	2	1
5	Traffic congestion	1	2	3	2	1
6	Road conditions	1	2	3	2	1
7	Access to public amenities	1	2	3	2	1
8	Access to schools (primary & Secondary)	1	2	3	2	1
9	Others (Specify)					
i.	_____	1	2	3	2	1
ii.	_____	1	2	3	2	1
iii.	_____	1	2	3	2	1

Q3. Overall, are you satisfied staying here in your current neighbourhood?

[1] Yes [2] No

Q4. What would be the important thing you find most likeable in your current neighbourhood? (Please rank 1-7; Giving 1 to the most important factor and 7 to the least important factor)

- [ ] Strategic location
- [ ] Excellent access to public amenities
- [ ] Well-planned neighbourhood
- [ ] Safe neighbourhood
- [ ] Good neighbours and strong community support
- [ ] Good local roads and no traffic congestion
- [ ] Good air quality

SECTION 3: AWARENESS OF ECRL PROJECT

Q5 Have you heard of ECRL project?

[1] Yes (Go to ***Q5,Q6,Q7***) [2] No (Go to ***Q7***)

Q6 Sources of Information on ECRL

		Yes	No
1	Read or heard about ECRL Project in the mainstream media such as Newspapers, TV or radio?	1	2
2	Heard from friends, family members and otehr people?	1	2
3	Heard from government representatives/district offices?	1	2
4	Received information on ECRL project in exhibitions, meetings and Workshops?	1	2
5	Visited any website to read about the ECRL Project?	1	2

Q7 If Yes, how much do you think you know about ECRL Project?

[1] Almost nothing [2] A bit [3] Enough for me

Q8 Preferred **Methods** to inform you about the proposed ECRL?
(Please (√) in relevant boxes)

[1] Mainstream newspapers, TV, Radio

[2] Jawatankuasa Kemajuan dan Keselamatan Kampung (JKKK)/ Residents' Associations

[3] Local Authorities and Public noticeboards

[4] Social media *(Facebook / Twitter/Instagram*)

[5] Short Message Service (SMS): _____

[6] E-mail (state address) _____

[7] Others (Specify)

[i] _____

[ii] _____

SECTION 4: BENEFITS AND CONCERNS OVER ECRL PROJECT.

Q9 In your opinion, what are the most important **BENEFITS** of the proposed ECRL? Please tick only 5 most important benefits.

- [1] Quick, easy and safe to use for many people
- [2] Saves travel time and increases productivity
- [3] Reduces risks of road accidents and accident-related deaths
- [4] Saves travel costs (in terms of tolls and petrol)
- [5] Reduces air pollution
- [6] Serves as growth catalysts in areas near and around stations
- [7] Creates more opportunities for employment and business
- [8] Enhances market values of properties and lands near and around stations
- [9] Reduces traffic congeston on highways during festive seasons and school holidays
- [10] Helps to stimulate growth of the East Coast States
- [11] Provide job opportunities for locals in the East Coast States
- [12] Provide opportunities for locals in East Coast States to travel within ECR and outside

Q10 What are your **CONCERNS** about the proposed ECRL during **PRE-CONSTRUCTION** and **CONSTRUCTION**? Please indicate how important are they to you? **ANSWER ALL QUESTIONS**

		Level of Importance				
SOCIAL		**Very High**	**High**	**Moderate**	**Low**	**Very Low**
1	Land acquisition	5	4	3	2	1
2	Worry over relocation & resettlement	5	4	3	2	1
3	Disruptions to local neighbourhood due to Severances caused by rail alignment	5	4	3	2	1
4	Loss of income due to loss of livelihood or employment.	5	4	3	2	1
5	Damage to properties	5	4	3	2	1
6	Utility disruptions	5	4	3	2	1
7	Worry over community safety and security	5	4	3	2	1

8	Loss of aesthetics and visual in neighbourhood	5	4	3	2	1
9	Risk to community health from diseases Such as Denggi/Malaria and others	5	4	3	2	1
10	Loss of cultural/religious sites or buildings	5	4	3	2	1
ENVIRONMENT						
1	Air pollution and dust	5	4	3	2	1
2	Floods including flash flood	5	4	3	2	1
3	Close proximity to construction sites	5	4	3	2	1
4	Noise from concrete works and piling	5	4	3	2	1
5	Vibrations from construction activities	5	4	3	2	1
6	Traffic congestion	5	4	3	2	1
7	Disturbances to ecology of area wildlife	5	4	3	2	1

Q11 What are your C**ONCERNS** about ECRL Project during **OPERATIONS? Please indicate how important** they are to you? **ANSWER ALL QUESTIONS**

		Level of Importance				
SOCIAL		**Very High**	**High**	**Moderate**	**Low**	**Very Low**
1	Issues over community safety and security	5	4	3	2	1
2	Loss of aesthetics in neighbourhood	5	4	3	2	1
3	Loss of income and livelihood as result of land acquisition and relocation	5	4	3	2	1
4	No access to railway station	5	4	3	2	1
5	Loss in property values due to close Proximity to railway tracks or station	5	4	3	2	1
		5	4	3	2	1
ENVIRONMENT						
6	Noise pollution and vibrations	5	4	3	2	1
7	Increased risks of floods and flash floods	5	4	3	2	1
8	Air pollution and dust	5	4	3	2	1
9	Risks of traffic congestion near stations	5	4	3	2	1

SECTION 5: LEVEL OF SUPPORT FOR ECRL

Q12 Based on the SHOWCARD and with the known benefits and concerns, would you support the proposed ECRL?

Level of Support				
Very High	**High**	**Moderate**	**Low**	**Very Low**
5	4	3	2	1

Q13 Do you think your or your family members would be affected by the construction of the proposed ECRL?

1 Yes 2 No 3 Maybe

4 Don't know as I don't have sufficient information

Q14 What is your **LEVEL of ACCEPTANCE** to proximity of the ECRL alignment to your house?

		Level of Acceptance				
		Very High	**High**	**Moderate**	**Low**	**Very Low**
1	Within distance of 50m	5	4	3	2	1
2	Between 51m - 100m	5	4	3	2	1
3	Between 101m – 500m	5	4	3	2	1
4	>500m	5	4	3	2	1

SECTION 6: PERCEPTIONS ON MITIGATION ACTIONS ON CONCERNS over ECRL PROJECT

Q15 Indicate the level of importance of the proposed mitigation actions in reducing your concerns?.

		Level of Importance				
		Very High	**High**	**Moderate**	**Low**	**Very Low**
1	Compensation for loss of property	5	4	3	2	1
2	Relocation plan	5	4	3	2	1
3	Noise barriers	5	4	3	2	1
4	Measures to reduce vibrations	5	4	3	2	1
5	Public engagement plan	5	4	3	2	1
6	Safety and security measures	5	4	3	2	1
7	Flood mitigation plan	5	4	3	2	1
8	Environmental management plan	5	4	3	2	1

9	Traffic management plan	5	4	3	2	1
10	Public health management plan	5	4	3	2	1
11	Mitigation plan to improve visual and aesthetics in the neighbourhood	5	4	3	2	1

SECTION 7: RESPONDENT PROFILE

Q16	1	Gender*:*	1	Male	2	Female
	2	Age:	1	< 19 years	4	51 -65 years
			2	19 – 25 years	5	>65 years
			3	26 –50 years		
	3	Ethnicity:	1	Malay	4	Indian
			2	Other Bumiptura	5	Others
			3	Chinese	6	Non-Malaysian citizen
	4	Status Pekerjaan:	1	Employee	5	Student
			2	Self employed	6	Housewife
			3	Pensioner	7	Not Working/Looking for job
	5	Educational Achievement	1	SPM/STPM/A level/Certificate	4	Professional qualification
			2	Diploma/Degree	5	Did not complete schooling
			3	Master/PhD	6	No formal education/ No schooling
	6	Estimated Monthly Household income	1	<RM1,000	5	RM5,001 – RM7,000
			2	RM1,001 – RM2,000	6	RM7,001 – RM10,000
			3	RM2,001 – RM3,000	7	> RM10,000
			4	RM3,001 – RM5,000		

7 Ownership and Use of Agricultural Land (if you own/operate agricultural lands):

	Crops/Livestock	Area (acre)	Tenure (Please use codes below)	State of Use	Estimated Annual Revenue (RM)
1	Oil palm	_____			_____
2	Paddy	_____			_____
2	Rubber	_____			_____
3	Vegetables	_____			_____
4	Fruits	_____			_____
5	Other crops	_____			_____
6	Livestock	_____			_____
7	(i)Total	_____		(ii)Total	_____

Code: *Tenure* *1 Owner* *2 Tenant* *3 Rent out*
State of Use *1 Actively used* *2 Not in use/idle*

SECTION 8: HOUSEHOLD INFORMATION

Please use codes given

(1) No	(2) Names of household members	(3) Relationship to head of household	(4) Gender	(5) Age	(6) Highest level of education achieved	(7) Main occupation	(8) Estimated Monthly Income from main job
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
	Total Number:						

(3) Relationship to HH
1. Husband/Wife
2. Child
3. Parents
4 Grandchild
5. Brothers/Sisters
6.Cousins
7. No family relations

(4) Gender
1. Male
3. Female

(5) Age (Years)
1. < 6
2. 7 -12
3. 13 - 17
4. 18 – 23
5. 24 – 30
6. 31 – 50
7. 51 – 65
8. > 65

(6) Highest Level of Education Achieved
1. None/Not yet schooling
2. In primary school
3. In Lower Secondary School (Form 1-3)
4. In Upper secondary School (Form 4-5)
5. STPM/Certificate
6. Diploma/University
7. No formal schooling

(7) Occupation
1. Management/Administration
2. .Professional
3. Semi Professional/Technician
4. Clerks
5. Sales/Marketing/Shop worker
6. Craftsman
7. Factory worker
8. Elementary worker
9. Agricultural worker

(8) Monthly Income
1. < RM1,000
2. RM1,001 – RM2,000
3. RM2,001 – RM3,000
4. RM3,001 – RM5,000
5. RM5,001 – RM10,000
6. > RM10,000

Thank you for your Kind Cooperation

SECTION FOR ENUMERATOR

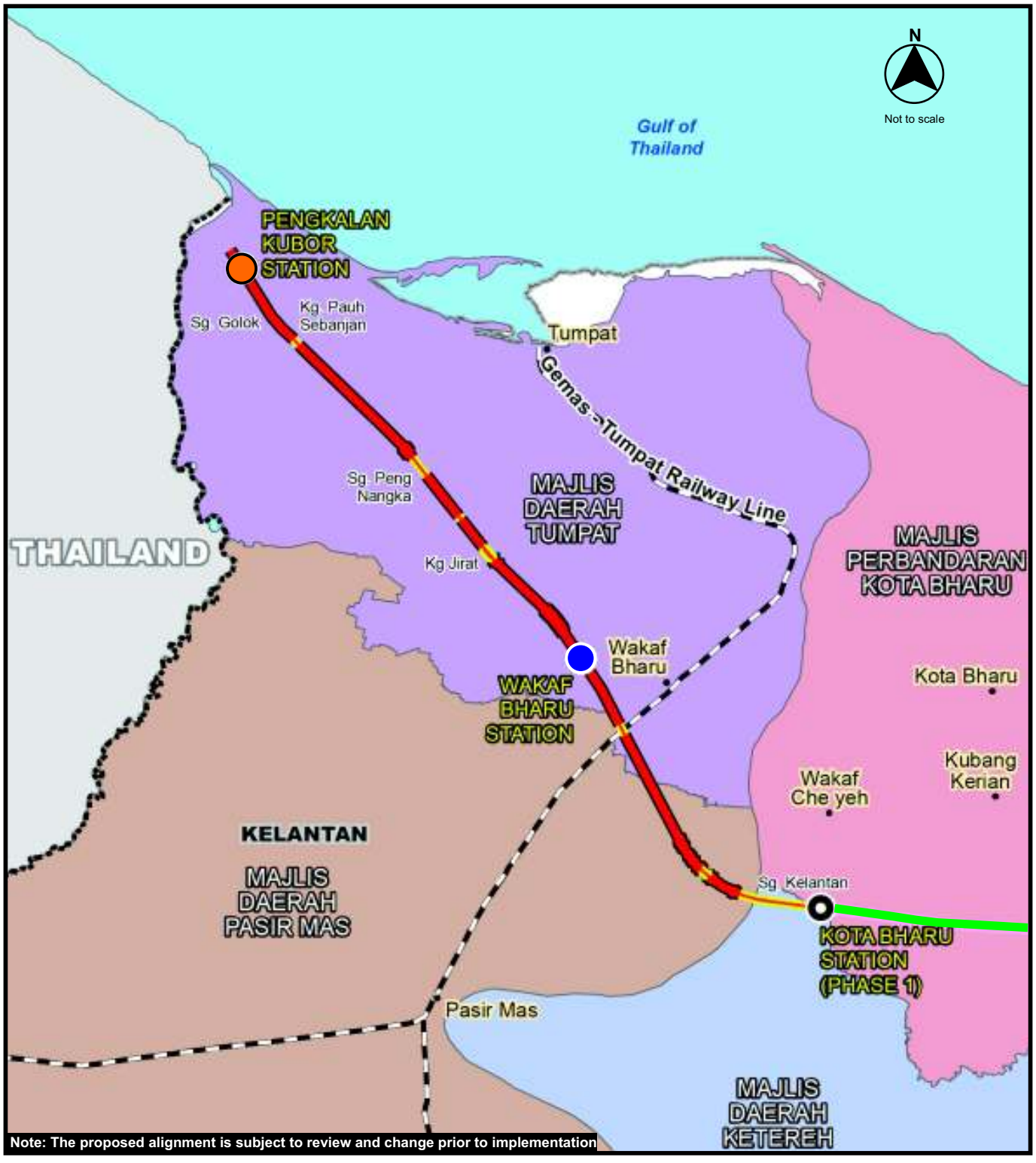
Name: _____

NRIC: _____ Mobile: _____

Number of attempts at interview: 1 2 3

This interview: Date: _____ Time: _____

EAST COAST RAIL LINK PROJECT (PHASE 2) - KELANTAN

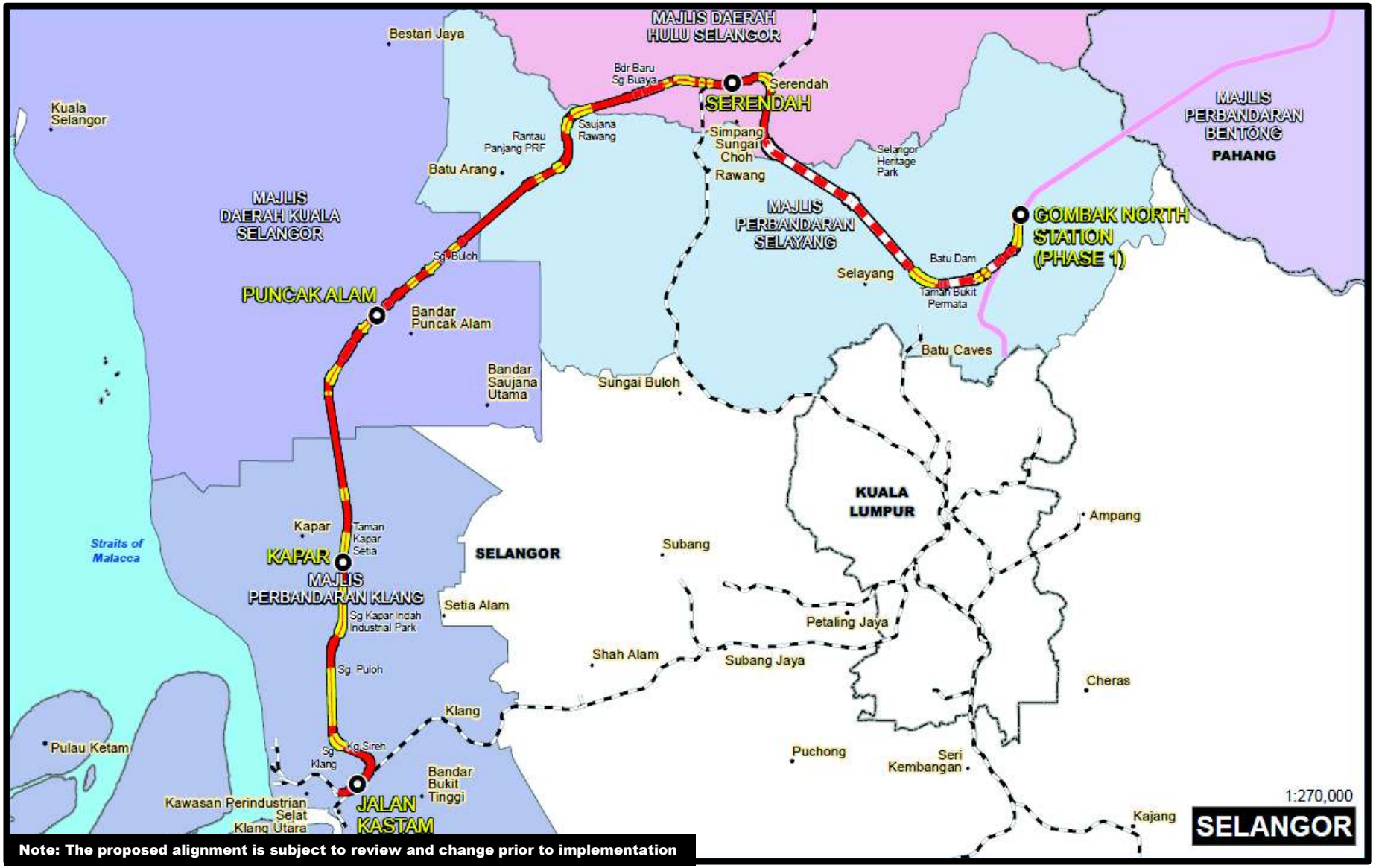


LEGEND

- PROPOSED STATIONS (PASSENGER)
- PROPOSED STATIONS (PASSANGER / FREIGHT)
- PROPOSED ALIGNMENT (AT-GRADE)
- PROPOSED ALIGNMENT (ELEVATED)
- ALIGNMENT (PHASE 1)
- TOWNS
- STATE BOUNDARY
- EXISTING GEMAS - TUMPAT RAILWAY

Project Proponent	Malaysia Rail Link Sdn. Bhd.
Alignment Length (KM)	24.5
Stations	2
Operating Speed	160 km/hr (Passenger) 80 km/hr (Freight)
Construction Period	2018 - 2024

EAST COAST RAIL LINK PROJECT (PHASE 2) - SELANGOR



Note: The proposed alignment is subject to review and change prior to implementation

LEGEND

- PROPOSED STATIONS (PASSANGER / FREIGHT)
- PROPOSED ALIGNMENT (AT-GRADE)
- PROPOSED ALIGNMENT (ELEVATED)
- PROPOSED ALIGNMENT (TUNNEL)
- ALIGNMENT (PHASE 1)
- TOWNS
- STATE BOUNDARY
- EXISTING GEMAS - TUMPAT RAILWAY

Project Proponent	Malaysia Rail Link Sdn Bhd
Alignment Length (km)	83.5
Stations	4
Operating Speed	160 km/hr (Passenger) 80 km/hr (Freight)
Construction Period	2018 - 2024

AP – F2 | PERCEPTION SURVEY ANALYSIS

SOCIAL IMPACT OF IMPACT ZONE (SELANGOR AND KELANTAN)

The perception survey is based on a sample size of 1,550. It used a questionnaire designed to capture the perceptions of respondents on the ECRL at a given point in time.[1] The sample distribution was drawn based on the estimated population in the mukims along the 2km corridor of the alignment. For the purpose of the survey and stakeholder engagements, the corridor was divided into four major zones comprising three zones in Selangor and one in Kelantan. To further facilitate the survey, the zones in Selangor was further broken up into three segments, namely segment 2a stretching from Gombak North to Serendah, segment 2b from Serendah to Punchak Alam, and segment 2c which stretches from Puncak Alam to Klang.

Based on a level of confidence of 95% and allowing for a margin of error of 5%, the sample size drawn for each survey zone averaged 387 and it adjusted accordingly after site visits to take into consideration spatial factors. The overall survey sample is 1,550 households and its distribution by segment and district is given in **Table 1.**

Table 1 : Distribution of Survey Sample Size

State	Within Corridor by Segment	Households
Selangor	Segment 2a Gombak North -Serendah	387
	Segment 2b –Serendah-Puncak Alam	387
	Segment 2c –Puncak Alam - Klang	386
Kelantan		390
	Within Corridor By District	
Selangor	Gombak	198
	Hulu Selangor	470
	Kuala Selangor	119
	Klang	373
		1,160
Kelantan	Tumpat	311
	Kota Bharu	20
	Pasir Mas	59
		390
	Total Corridor	**1,550**

1. Profile of Respondents and Impact Zone

a) 62% are household heads; 34% are spouses of household heads or their children, and the remaining are relatives to household heads such as parents, brothers or sisters.

b) Ethnicity, Gender and Age, Employment Status and Educational Qualifications: Almost all respondents are Bumiputera (73.2%). About 50.1% of respondents surveyed are males. About 29% are employees and 11% are self-employed. Thirty-two percent completed secondary school education i.e. SPM holders or A level and certificate holders and about 8%

[1] *Public perception can change over time based on people's personal experiences with the project and other similar ongoing projects and current events*

have diplomas or degrees with 16% having post-graduate qualifications. Here, at least 50% of the respondents are well-educated (**Table 2**).

Table 2 : Socio-economic Profile of Survey Respondents

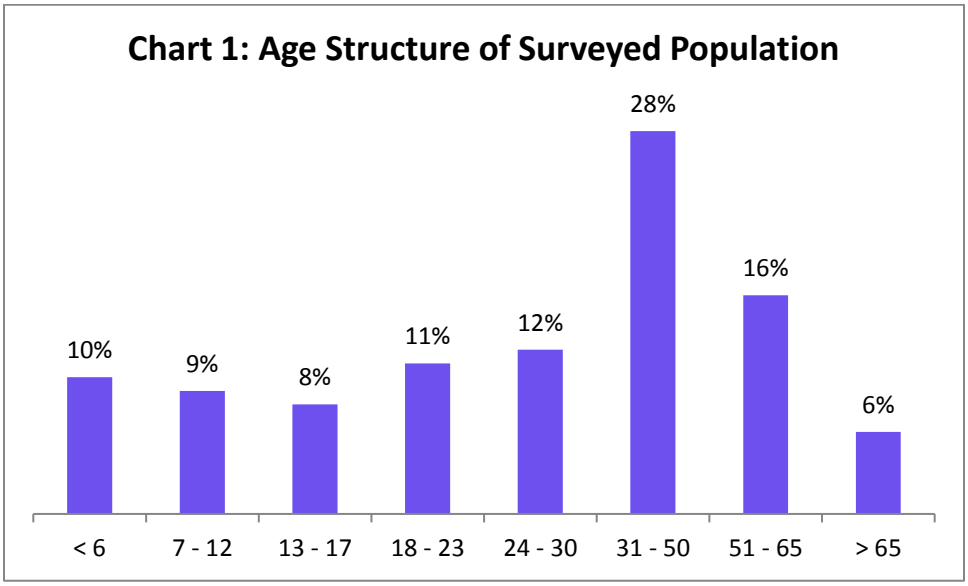
	Overall		Selangor		Kelantan	
		%		%		%
Surveyed households	1,550	100	1,160	74.8	390	25.2
Population in surveyed households	6476	100-	4805	74.2	1671	25.8
Average household size (persons per household)	4.1		3.1		4.2	
1.Ethnicity						
Bumiputera	1135	73.2	773	66.6	362	92.8
Non-Bumiputera	415	26.8	387	33.4	28	7.2
2.Gender						
Male	3245	50.1	2424	50.4	821	49.1
Females	3231	49.9	2381	49.6	850	50.9
3.Age Structure						
Below 30 years	3299	50.9	2406	50.1	893	53.4
31 years – 65 years	2814	43.5	2143	44.6	671	40.2
Above 65 years	363	5.6	256	5.3	107	6.4
4.Employment status						
Employees	1895	29.3	1637	34.1	258	15.4
Self-employed	715	11	383	8	332	19.9
Housewives	1136	17.5	789	16.4	347	20.8
Pensioners	785	12.1	342	7.1	443	26.5
Students and Unemployed	1945	30.1	1654	34.4	291	17.4
5.Educational Qualifications						
SPM/STPM/A level/Sijil	2070	32	1554	32.3	516	30.9
Diploma/Degree	514	7.9	386	8	128	7.6
Masters/PhD/Professional	1062	16.4	907	18.9	155	9.3
Primary and secondary	1923	29.7	1368	28.5	555	33.2
Not yet schooling/incomplete schooling/No formal education	907	14	590	12.3	317	19
Kampung houses	471	30.4	250	21.6	221	56.7
Bungalows and Semidetached	217	14.0	132	11.4	85	21.8
Terraces and link houses	782	50.4	714	61.6	68	17.4
Other types	80	5.2	64	5.5	16	4.1
Average length of stay in neighbourhood (in years)	18.8	-	16.9	-	24.5	-

Table 2: Socio-economic Profile of Survey Respondents (Cont'd)

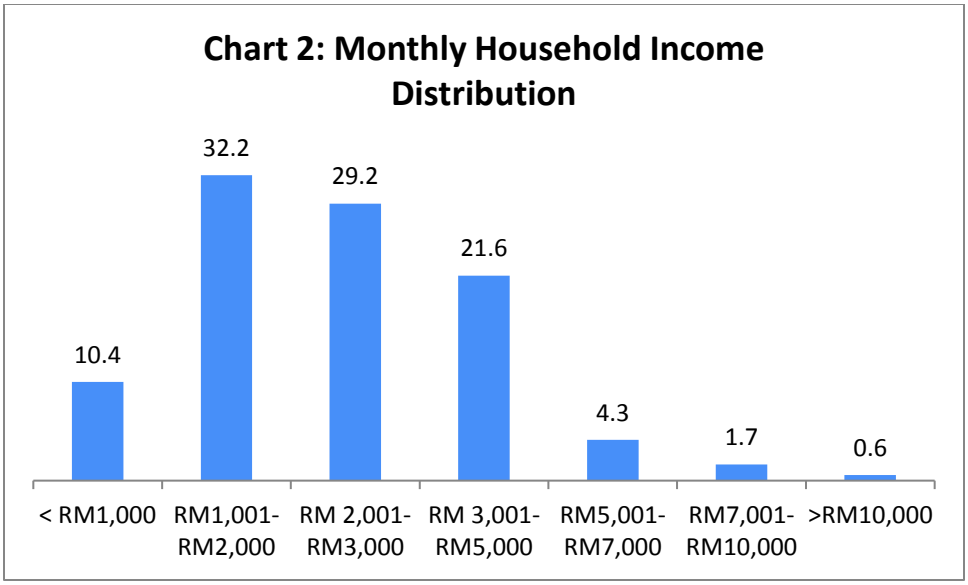
	Overall		Selangor		Kelantan	
Household Income		%		%		%
< RM1,000	274	10.4	156	7.6	118	20.6
RM1,001- RM2,000	850	32.2	605	29.3	245	42.7
RM 2,001- RM3,000	770	29.2	665	32.3	105	18.3
RM 3,001- RM5,000	570	21.6	487	23.6	83	14.4
RM5,001- RM7,000	112	4.3	97	4.7	15	2.6
RM7,001- RM10,000	44	1.7	39	1.9	5	0.9
>RM10,000	15	0.6	12	0.6	3	0.5
	2635	100	2061	100	574	100
Mean monthly household income (RM)			2697.7		2040	

Source: East Coast Rail: Perception Survey (August 2017)

c) Total population covered by the survey is 6474. The average household size is estimated at 4.1 persons per household. The age profile of the surveyed population shows that about two-third of the population are in the working-age group of between 18 years to 65 years. Twenty seven percent are in the school-going age and thus, are relatively young. Only 6% of the population is in the elderly group (**Chart 1**).



The distribution of monthly household income indicates that the majority of the surveyed households (55.1%) earn between RM2,000 and RM7,000 (rf Chart 2). The mean household income is estimated at RM2,697.70 per month for Selangor and RM2040 per month for Kelantan (**Table 2**).



2. Environmental-Related Issues in Respondents' Present Neighborhood

Throughout the corridor, most people are happy with their present neighborhoods-all segments are registering satisfaction levels that are consistently above 90% (**Table 3**). This high level of satisfaction means that people will be upset if there are disruptions to their living environment from the proposed project. It is important to this fact is taken into consideration when engaging with the public.

Table 3: Satisfaction with the Present Neighborhood

	Satisfied	%	Dissatisfied	%
Corridor	1,458	94.1	92	5.9
Selangor	1,087	93.7	73	6.3
2a Gombak North-Serendah	63	93.8	24	6.2
2b Serendah-Puncak Alam	358	92.5	29	7.5
2c Puncak Alam-Port Klang	366	94.8	20	5.2
Kelantan	371	95.0	19	5.0

Source: East Coast Rail: Perception Survey (February 2017)

Table 4 : Issues with Present Neighborhood

Corridor	Issues with Neighbourhood (%)		Level of Acceptance (%)		
	Yes	No	Low	Moderate	High
Access to public amenities	27.2	72.8	27.0	53.8	19.2
Access to schools (primary and secondary)	20.4	79.6	13.9	50.3	35.8
Noise pollution	18.3	81.7	24.0	51.2	24.7
Floods	17.4	82.6	22.6	35.9	41.5
Air pollution and dust	14.1	85.9	29.7	51.6	18.7
Traffic congestion	11.3	88.7	25.1	55.4	19.4
Vibrations	7.3	92.7	17.7	57.5	24.8
Road conditions	7.8	92.2	20.7	70.2	9.1
Others	1.5	98.5	45.8	12.5	41.7
Selangor	**Issues with Neighbourhood (%)**		**Level of Acceptance (%)**		
	Yes	**No**	**Low**	**Moderate**	**High**
Access to public amenities	24.0	50.8	27.7	51.3	21.0
Access to schools (primary and secondary)	15.4	59.4	12.6	42.3	45.2
Noise pollution	13.8	61.0	51.8	10.5	37.7
Air pollution and dust	12.4	45.0	32.3	52.1	15.6
Traffic congestion	10.6	64.2	24.8	55.2	20.0
Floods	7.1	67.7	29.1	45.5	25.5
Road conditions	6.5	68.4	20.0	69.0	11.0
Vibrations	6.1	68.7	16.0	44.0	40.0
Others	1.2	73.7	61.1	5.6	33.3
Kelantan	**Issues with Neighbourhood (%)**		**Level of Acceptance (%)**		
	Yes	**No**	**Low**	**Moderate**	**High**
Floods	41.0	59.0	52.5	29.4	18.1
Access to schools (primary and secondary)	19.7	80.3	18.2	75.3	6.5
Noise pollution	17.7	82.3	13.0	47.8	39.1
Access to public amenities	12.8	87.2	8.6	28.1	63.3
Air pollution and dust	6.9	93.1	11.1	48.1	40.7
Road conditions	5.4	94.6	23.8	76.2	-
Vibrations	4.6	95.4	-	55.6	44.4
Traffic congestion	2.6	97.4	30.0	60.0	10.0
Others	1.5	98.5	-	33.3	66.7

Source: East Coast Rail: Perception Survey (February 2017)

The issues in the neighborhoods are predominantly associated with social amenities like public facilities and schools. Only then, do we find respondents indicating they have issues with the environmental-related aspects like noise or air pollution and traffic. The exception is Kelantan because here floods are a constant worry so this issue dominates any issues they have in their

neighborhood. Others in this case are minor issues that are related with social problems (drug addicts and thefts), public health (Dengue), inadequate public services or utility disruptions).

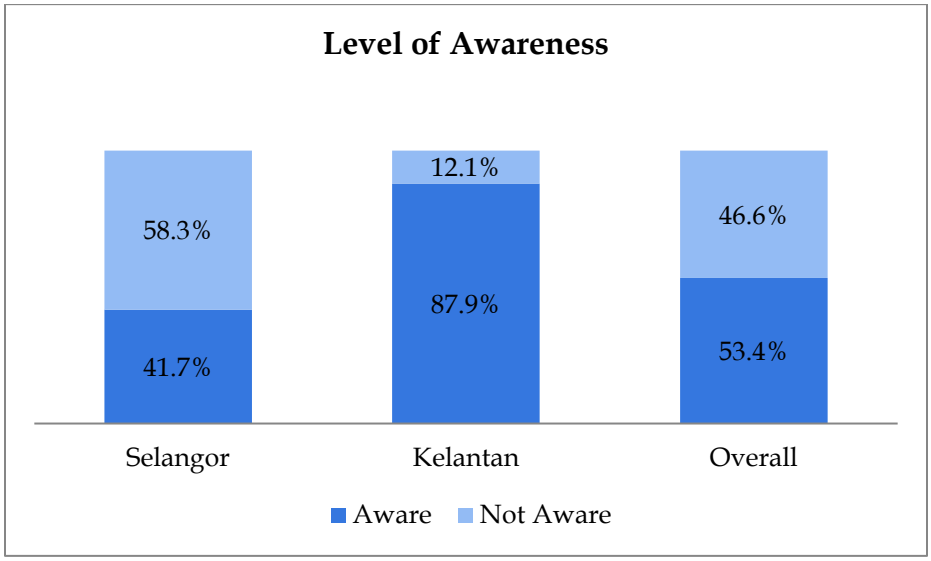
On the level of acceptability with such issues identified, most respondents have moderate level of acceptance. Three main issues where their level of acceptance tends to be low are (1) other issues (2) air pollution (3) access to public amenities. Again, there is a difference in Kelantan where floods are generally not acceptable for more than half of those who identified it as an issue.

3. Awareness of ECRL

Another aspect considered is respondents' awareness of ECRL. This is important because the level of awareness will shape respondents' perception of the ECRL and its impacts on their lives.

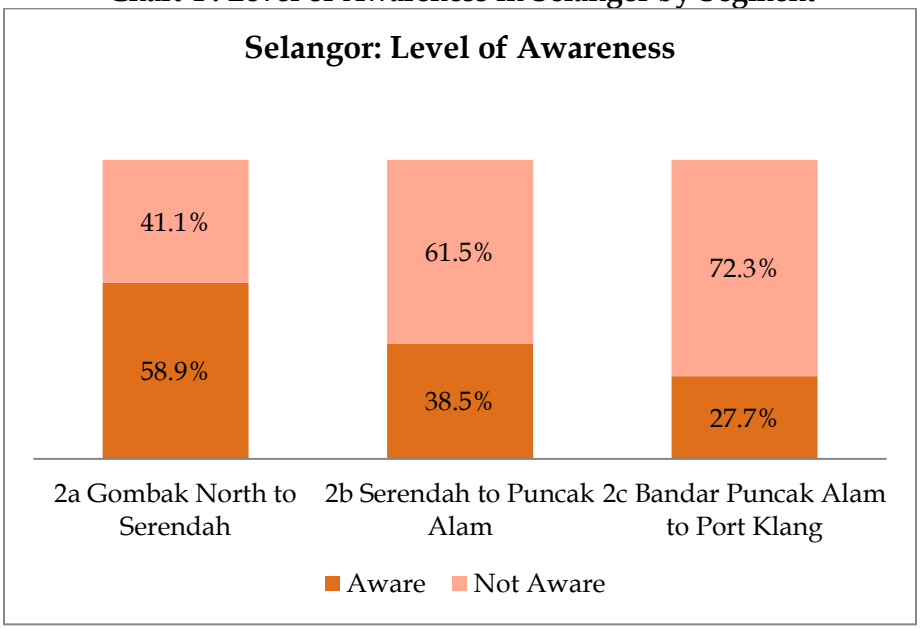
As expected, the level of awareness of ECRL is found to be much lower, at less than half. A closer look at respondents' level of awareness in Selangor indicates that those who live near to Gombak, where Phase 1 is to have its terminal station, have a relatively higher level of awareness compared to those living in the other segments of the Selangor corridor covered by Phase 2 of ECRL (**Chart 3**).

Chart 3: Awareness of ECRL



Source: East Coast Rail: Perception Survey (August 2017)

Chart 4 : Level of Awareness in Selangor by Segment

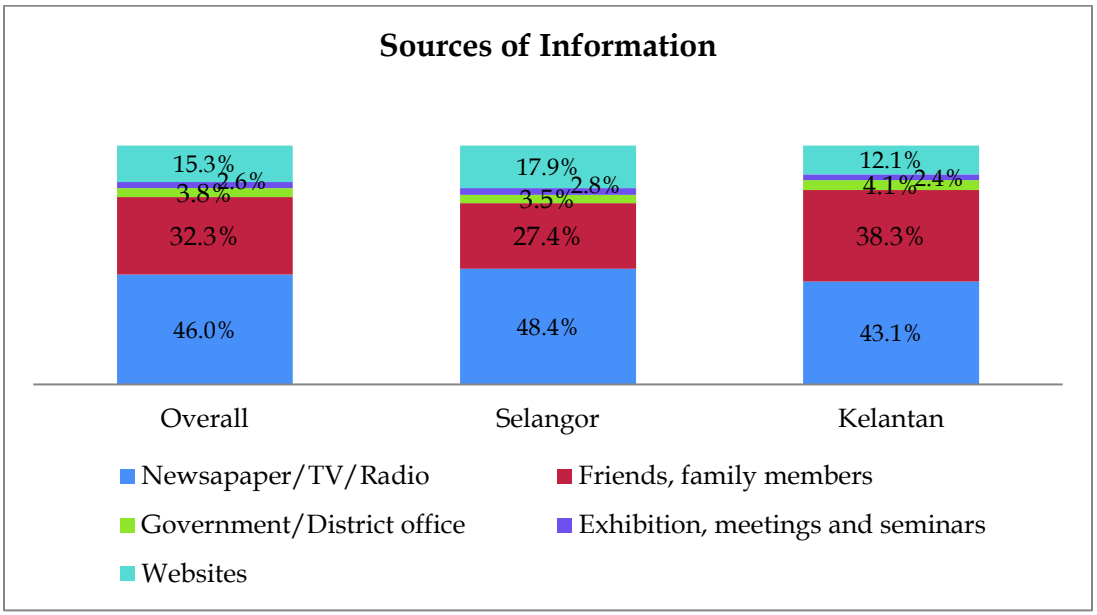


Source: East Coast Rail: Perception Survey (August 2017)

A look at the sources of information respondents rely upon to obtain facts on the ECRL (**Chart 5**) shows that people generally tend to depend on mainstream media such as newspaper, television and radio (46%) but they still pick up information through friends and family members (32%) making it a key source of information. This is not a reliable channel of information on such an important infrastructure, and indicates more strenuous effort be made to channel important facts on the ECRL to the people through more official sources. Interestingly, websites are gaining importance as an important source of information. As it stands now, it ranks third after mainstream media and friend and family members (**Chart 5**).

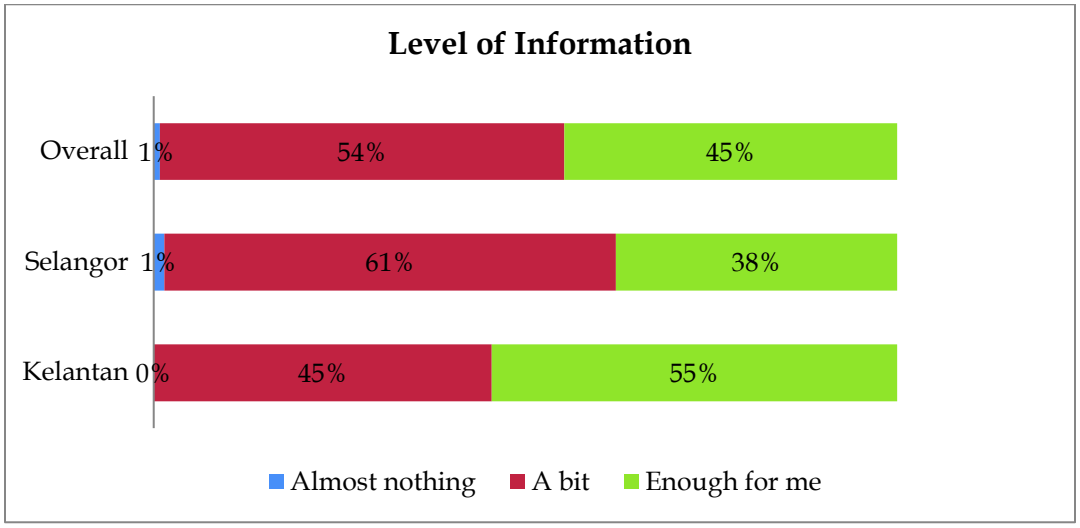
On the depth of knowledge on the ECRL, the survey found that people do not know a lot about ECRL. In fact, among those who have heard of ECRL, only 1% claimed they know a lot. Interestingly, more than half admitted (54%) that they know a bit and the remaining claimed that what they know is sufficient for them (**Chart 6**). Significantly, more than half (55%) among those in Kelantan who are aware of ECRL indicated that what they know is sufficient for them. This is important because this observation underpins the level of support they are likely to accord to the proposed ECRL (Phase 2). If the depth of information they have is scanty, it will also influence their support for ECRL, whether high or low. The level of awareness and knowledge of ECRL are important facts in determining people's support for the project.

Chart 5 : Level of Information on ECRL



Source: East Coast Rail: Perception Survey (August 2017)

Chart 6 : Level of Information on ECRL



Source: East Coast Rail: Perception Survey (August 2017)

4. Perceived Benefits of ECRL Project

In the survey, respondents are asked to identify five most important benefits of the ECRL. The findings are summarised in **Table 5**. Within the corridor, the five most important benefits are identified as:

1. Quick, easy and safe to use for many people
2. Saves travel time and increase productivity
3. Reduces risks of road accidents and accident-related deaths

4. Saves travel cost (tolls and petrol)
5. Creates more opportunities for employment and business

They are all socially oriented whereby people expect the railway to save journey time and costs and would reduce deaths and road accidents as more would switch to use rail than rely on highways. The perceptions of respondents in Selangor and Kelantan are likely to vary due to spatial and social differences in each state. In Selangor, quick, easy and safe to use for many people and savings in journey time are identified as the three most important benefits; in Kelantan, opinion differs with saving in journey time selected as the most important benefit, followed by quick, easy and safe to use for many people as second most important and reduction in traffic congestion on highways during festive seasons and school holidays seen as the third most important benefit.

The least important benefit in Kelantan is reduction in air pollution whereas in Selangor, the provision of opportunities for locals in the East Coast to travel within ECRL and outside is deemed the least important benefit of ECRL.

Table 5: Perceived Benefits of the ECRL

	Corridor			Selangor			Kelantan		
	Score	**%**	**Rank**	**Score**	**%**	**Rank**	**Score**	**%**	**Rank**
Quick, easy and safe to use for many people	1,111	71.7	1	801	69.1	1	310	79.5	2
Saves travel time and increases productivity	1,104	71.2	2	783	67.5	2	321	82.3	1
Reduces risks of road accidents & accident-related deaths	817	52.7	3	626	54.0	4	191	49.0	4
Saves travel cost (tolls and petrol)	766	49.4	4	657	56.6	3	109	27.9	9
Creates more opportunities for employment and business	570	36.8	5	444	38.3	6	126	32.3	7
Reduces air pollution	568	36.6	6	501	43.2	5	67	17.2	12
Reduces traffic congestion on highways during festive seasons & school holidays	530	34.2	7	323	27.8	9	207	53.1	3
Enhances market values of properties and land near and around stations	524	33.8	8	366	31.6	8	158	40.5	6
Serves as growth catalyst in areas near and around stations	516	33.3	9	437	37.7	7	79	20.3	11
Provide job opportunities for locals in the East Coast States	354	22.8	10	243	20.9	10	111	28.5	8

Table 5 : Perceived Benefits of the ECRL(Cont'd)

	Corridor			Selangor			Kelantan		
	Score	**%**	**Rank**	**Score**	**%**	**Rank**	**Score**	**%**	**Rank**
Provide opportunities for locals in East Coast States to travel within ECR & outside	310	20.0	11	145	12.5	12	165	42.3	5
Helps to stimulate growth of the East Coast States	255	16.5	12	149	12.8	11	106	27.2	10

Source: East Coast Rail: Perception Survey (August, 2017)

5. Perceived Concerns during Pre-Construction (Planning and Design) of ECRL Project

Respondents were asked their perceptions of the impacts from ECRL during pre-construction, construction and operations.

The pre-construction stage which is focussed on planning and design is a significant stage because it is when concerns over the alignment and how it would impact settlements along the route could be raised for consideration and discussion and possibly ratifications could be found at this early stage in order to reduce or minimise adverse impacts on communities. It is at this stage that land use implications such as potential impacts on settlements, people and forests and other economic activities can be further studied with the intent to find solutions that are acceptable physically, socially and financially.

Social concerns arising from this stage tend to revolve around the following aspects:

1) Loss of land, especially residential homes or cultural buildings/sites or key institutional amenities such as schools or hospitals when the alignment cuts through them or draws extremely close to them
2) Severance of settlements as the alignment cuts through some
3) Close proximity to the alignment that may cause permanent disruptions to living conditions from railway operations.
4) Disruptions to economic activities such as businesses or farming that could permanently cause them to cease operations.

Table 6 shows the perceptions of respondents on impacts during pre-construction. The two major concerns among them are identified as (1) land acquisition and (2) concerns over relocation and resettlement. They are especially worrying for those in Selangor where 81% of respondents identified land acquisition and 75% find possible relocation and resettlement as very or highly important concerns.

Respondents in Kelantan have a more varied range of concerns during pre-construction. In addition to land acquisition and relocation and resettlement, they have also added more dimensions to their concerns over potential loss of cultural/religious sites or buildings and the loss of income due to disruptions to their livelihood or employment. What appears more significant in Kelantan is the higher public concern over any disruptions to their religious or cultural sites or buildings and this appears to have precedent over their concerns over the personal loss of their lands and homes.

The perceived social impacts during pre-construction were scored using weights and the weighted percentage scores were computed. They were ranked to determine which impact is the most important to residents in the corridor on the whole and in each state respectively.

Table 6: Perceived Social Impacts During Pre-Construction

Social Impacts	Very High/High (%)	Moderate (%)	Low/Very Low (%)
Corridor			
Land acquisition	79.2	11.2	9.7
Worry over relocation and resettlement	71.6	18.6%	9.7
Disruptions to local neighbourhood due to severances caused by rail alignment	40.1	40.5	19.4
Loss of income due to loss of livelihood or employment	47.9	27.4	24.6
Loss of aesthetics and visual in neighbourhood	41.1	39.6	19.3
Loss of cultural/religious sites or buildings	45.0	21.9	33.0
Selangor			
Land acquisition	81.3	10.1	8.6
Worry over relocation and resettlement	75.3	16.5	8.2
Disruptions to local neighbourhood due to severances caused by rail alignment	38.5	39.6	21.9
Loss of income due to loss of livelihood or employment	43.4	26.4	30.2
Loss of aesthetics and visual in neighbourhood	44.4	33.6	22.0
Loss of cultural/religious sites or buildings	34.3	24.5	41.2
Kelantan			
Land acquisition	72.8	14.4	12.8
Worry over relocation and resettlement	60.5	25.1	14.4
Disruptions to local neighbourhood due to severances caused by rail alignment	44.9	43.3	11.8
Loss of income due to loss of livelihood or employment	61.3	30.5	8.2
Loss of aesthetics and visual in neighbourhood	31.3	57.4	11.3
Loss of cultural/religious sites or buildings	76.9	14.4	8.7

Source: East Coast Rail: Perception Survey (August 2017)

Among them, it is clear that the prospects of being affected by land acquisition are very important to them, followed by worry over relocation and resettlement and loss of income from disruptions to their livelihoods or jobs (**Table 6**). It stands out in both Selangor and Kelantan (**Table 7**) and the ranking of social impacts in each state **(Table 8 and Table 9**) shows the significance of land acquisition and relocation.

Table 7 : Ranking of Perceived Social Impacts During Pre-Construction

Social Impacts during Pre-Construction	Weighted Score	Weighted Percentage Score (%)	Rank
Land acquisition	6,518	84.1	1
Worry over relocation and resettlement	6,144	79.3	2
Loss of income due to loss of livelihood or employment	5,252	67.8	3
Loss of aesthetics and visual in neighbourhood	5,186	66.9	4
Disruptions to local neighbourhood due to severances caused by rail alignment	5,177	66.8	5
Loss of cultural/religious sites or buildings	4,948	63.8	6
Total Weighted Maximum Score	**7,750**		

Source: East Coast Rail: Perception Survey (August 2017)

Table 8 : Selangor and Kelantan –Perceived Social Impacts During Pre-Construction

Social Impacts during Pre-Construction -	Selangor			Kelantan		
	Very High/High (%)	Moderate (%)	Low/Very Low (%)	Very High/High (%)	Moderate (%)	Low/Very Low (%)
Land acquisition	81.3	10.1	8.6	72.8	14.4	12.8
Worry over relocation and resettlement	75.3	16.5	8.2	60.5	25.1%	14.4
Disruptions to local neighbourhood due to severances caused by rail alignment	38.5	39.6	21.9	44.9	43.3	11.8
Loss of income due to loss of livelihood or employment	43.4	26.4	30.2	61.3	30.5	8.2
Loss of aesthetics and visual in neighbourhood	44.4%	33.6	22.0	31.3	57.4	11.3
Loss of cultural/religious sites or buildings	34.3	24.5	41.2	76.9	14.4	8.7

Source: East Coast Rail: Perception Survey (August 2017)

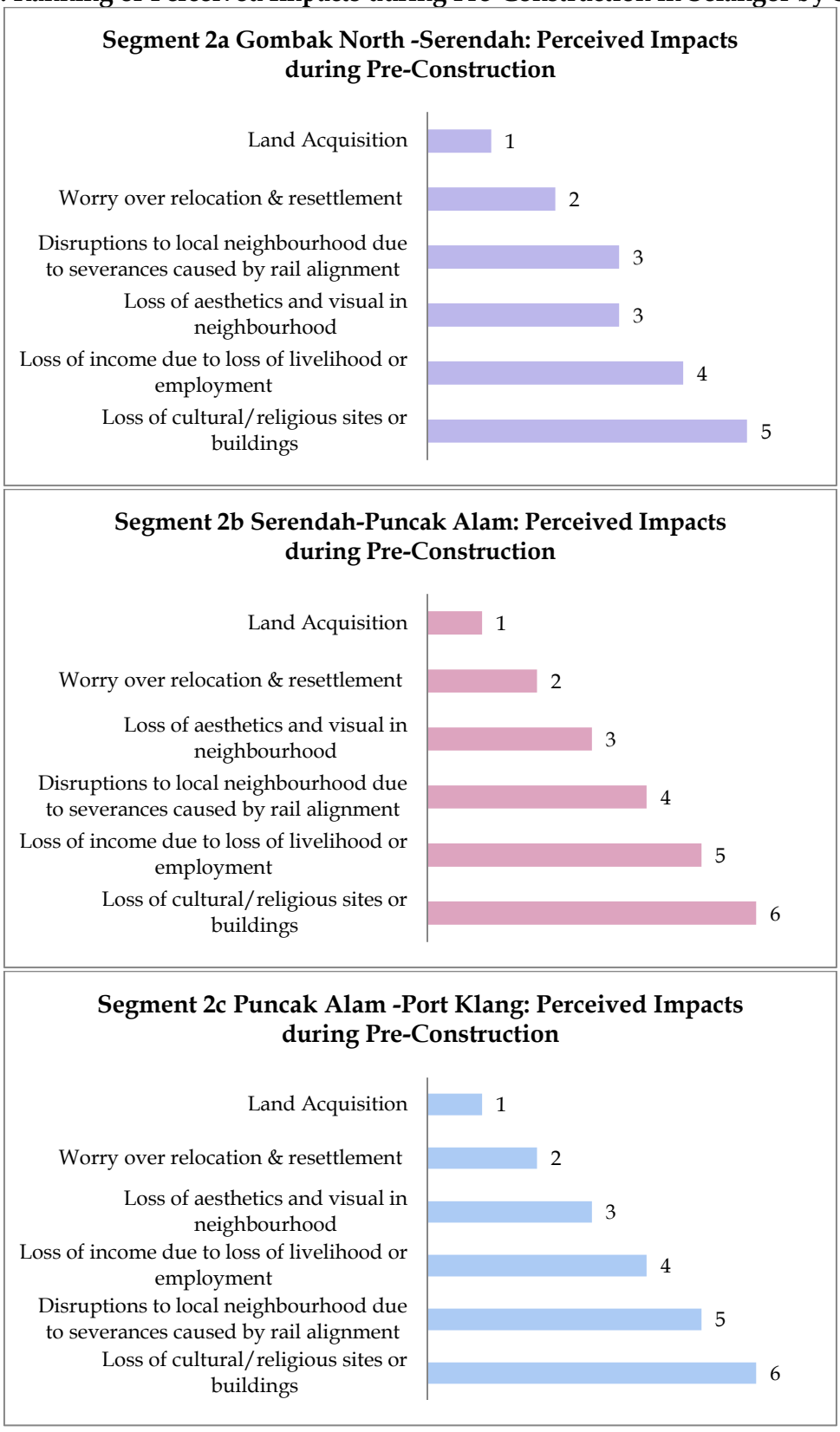
Table 9: Selangor and Kelantan –Ranking of Perceived Social Impacts During Pre-Construction

Selangor				Kelantan			
Social Impacts during Pre-Construction	**Weighted Score**	**Weighted Percentage Score (%)**	**Rank**	**Social Impacts during Pre-Construction**	**Weighted Score**	**Weighted Percentage Score (%)**	**Rank**
Land acquisition	4,907	84.6	1	Land acquisition	1,611	82.6	1
Worry over relocation and resettlement	4,670	80.5	2	Loss of cultural/religious sites or buildings	1,606	82.4	2
Loss of aesthetics and visual in neighbourhood	3,889	67.1	3	Loss of income due to loss of livelihood or employment	1,563	80.2	3
Disruptions to local neighbourhood due to severances caused by rail alignment	3,773	65.1	4	Worry over relocation and resettlement	1,474	75.6	4
Loss of income due to loss of livelihood or employment	3,689	63.6	5	Disruptions to local neighbourhood due to severances caused by rail alignment	1,404	72.0	5
Loss of cultural/religious sites or buildings	3,342	57.6	6	Loss of aesthetics and visual in neighbourhood	1,297	66.5	6
Total Weighted Maximum Score	5,800			Total Weighted Maximum Score	1,950		

Source: East Coast Rail: Perception Survey (August 2017)

A closer look on impacts into the segments in Selangor is given in **Chart 7.** Selangor is subdivided into 3 segments, i.e. Gombak North – Serendah; Serendah-Puncak Alam; and Puncak Alam-Port Klang. The perceived impacts were ranked. It shows that concerns over land acquisition and relocation are accorded top priority by respondents in the various segments across the railway corridor in Selangor.

Chart 7 : Ranking of Perceived Impacts during Pre-Construction in Selangor by Segment



Source: East Coast Rail: Perception Survey (August 2017)

6. Perceived Concerns during Construction of ECRL Project

During construction, perceived concerns over impacts are a combination of social and environmental aspects. No longer are impacts confined to just social issues' people are worried on their living environment as a result of construction of the railway. Their daily routines could be disrupted in many ways by nearby construction activities. The findings are summarized in **Table 10.**

Table 10: Perceived Impacts During Construction

Social and Environmental Impacts during Construction		Very High/High (%)	Moderate (%)	Low/Very Low (%)	Total (%)
Social	Damage to properties	65.5	22.3	12.3	100.0
	Utility disruptions	62.3	23.4	14.4	100.0
	Community safety and security	63.1	25.9	11.0	100.0
	Risk to community health from diseases such as Denggi/Malaria and others	57.5	28.1	14.3	100.0
Environmental	Air pollution and dust	86.1	9.2	4.7	100.0
	Floods including flash floods	50.8	26.2	23.0	100.0
	Close proximity to construction sites	61.9	24.3	13.7	100.0
	Noise from concrete works and piling	61.6	26.2	12.2	100.0
	Vibrations from construction activities	57.9	27.4	14.7	100.0
	Traffic congestion	42.8	40.7	16.5	100.0
	Disturbances to ecology of the area and wildlife	27.4	42.9	29.7	100.0

Source: East Coast Rail: Perception Survey (August 2017)

Some environmental impacts are observed to be significant as people worry over air pollution and dust and noise and even vibrations from close proximity to construction sites. At the same time, they are concerned over social issues related to safety and security matters, damage to their homes and properties and utility disruptions which if prolonged, could be costly in terms of time loss and lower productivity. The combination of social and environmental impacts is shown in **Table 11** on ranking. Worry over air pollution and dust is pushed up to the key top ranked impact during construction, followed by social concern over community safety and security and followed closely by worries over potential noise from construction and then social issues on damage to property and utility disruptions.

Table 11: Ranking of Perceived Impacts during Construction

Social and Environmental Impacts during Construction		Weighted Score	Weighted Percentage Score (%)	Rank
Environmental	Air pollution and dust	6,679	86.2	1
Social	Community safety and security	5,953	76.8	2
Environmental	Noise from concrete works and piling	5,823	75.1	3
Social	Damage to properties	5,773	74.5	4
Social	Utility disruptions	5,730	73.9	5
Environmental	Close proximity to construction sites	5,727	73.9	6
Environmental	Vibrations from construction activities	5,667	73.1	7
Social	Risk to community health from diseases such as Denggi/Malaria and others	5,642	72.8	8
Environmental	Floods including flash floods	5,330	68.8	9
Environmental	Traffic congestion	5,212	67.3	10
Environmental	Disturbances to ecology of the area and wildlife	4,682	60.4	11
	Total Weighted Maximum Score	**7,750**		

Source: East Coast Rail: Perception Survey (August 2017)

There are differences in perceptions between people in Selangor and Kelantan. Respondents in Kelantan live in relatively rural environs as opposed to most in Selangor who stay in urbanized and highly dense settings. Thus, they have different priorities during construction. What is evident though are most places less importance on disturbances to ecology, more so among those in Selangor (**Table 12**). Both groups place high priority on potential air pollution and dust but in Kelantan, higher proportions of people are worried over floods, damage to properties while the majority of respondents in Selangor take a moderate stance on many potential impacts during construction. The rankings of impacts during construction in both states are summarized in **Table 13**.

Table 12: Selangor and Kelantan – Perceived Impacts during Construction

Social Impacts during Construction		Selangor			Kelantan		
		Very High/High (%)	Moderate (%)	Low/Very Low (%)	Very High/High (%)	Moderate (%)	Low/Very Low (%)
Social	Damage to properties	40.8	43.1	16.0	71.0	21.8	7.2
	Utility disruptions	36.9	44.1	19.0	69.2	21.8	9.0
	Community safety and security	39.9	45.3	14.8	61.3	31.0	7.7
	Risk to community health from diseases such as Denggi/Malaria and others	33.4	48.0	18.6	60.8	31.3	7.9

Table 12: Selangor and Kelantan – Perceived Impacts during Construction (Cont'd)

Social Impacts during Construction		Selangor			Kelantan		
		Very High/High (%)	Moderate (%)	Low/Very Low (%)	Very High/High (%)	Moderate (%)	Low/Very Low (%)
Environmental	Air pollution and dust	72.1	22.2	5.7	82.6	9.7	7.7
	Floods including flash floods	22.6	49.2	28.2	78.7	14.4	6.9
	Close proximity to construction sites	36.6	46.5	16.9	69.5	21.8	8.7
	Noise from concrete works and piling	40.2	43.5	16.4	56.7	36.2	7.2
	Vibrations from construction activities	33.3	47.3	19.4	63.3	29.7	6.9
	Traffic congestion	24.2	56.4	19.4	35.6	57.2	7.2
	Disturbances to ecology of the area and wildlife	13.4	54.1	32.5	27.4	61.0	11.5

Table 13: Selangor and Kelantan – Ranking of Perceived Social Impacts during Construction

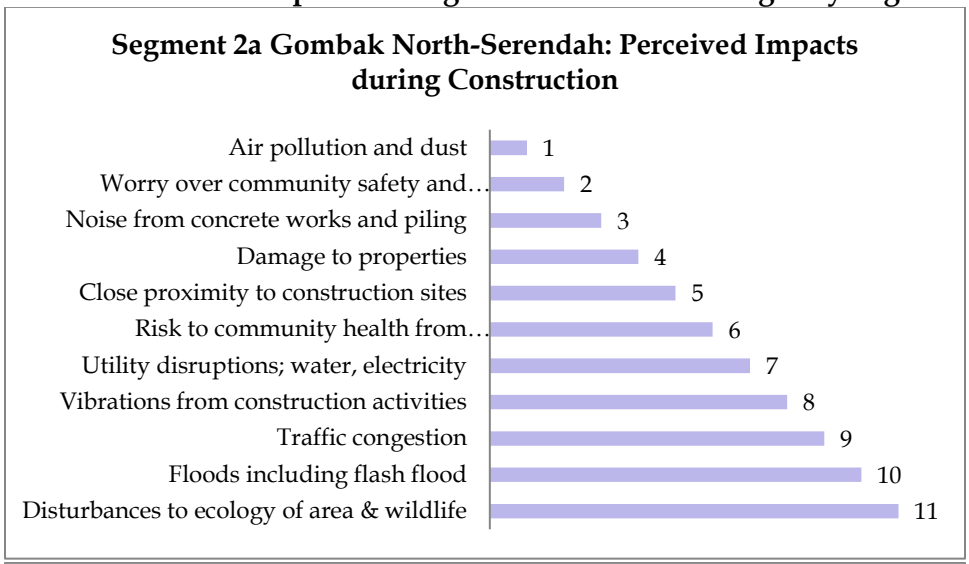
Social and Environmental Impacts during Construction	Selangor			Social and Environmental Impacts during Construction	Kelantan		
	Weighted Score	Weighted Percentage Score (%)	Rank		Weighted Score	Weighted Percentage Score (%)	Rank
Air pollution and dust	5,006	86.3	1	Air pollution and dust	1,673	85.8	1
Community safety and security	4,415	76.1	2	Floods including flash floods	1,604	82.3	2
Noise from concrete works and piling	4,320	74.5	3	Vibrations from construction activities	1,571	80.6	3
Damage to properties	4,241	73.1	4	Utility disruptions	1,540	79.0	4
Close proximity to construction sites	4,193	72.3	5	Community safety and security	1,538	78.9	5
Utility disruptions	4,190	72.2	6	Close proximity to construction sites	1,534	78.7	6
Risk to community health from diseases such as Denggi /Malaria and others	4,145	71.5	7	Damage to properties	1,532	78.6	7
Vibrations from construction activities	4,096	70.6	8	Noise from concrete works and piling	1,503	77.1	8
Traffic congestion	3,860	66.6	9	Risk to community health from diseases such as Denggi/Malaria and others	1,497	76.8	9

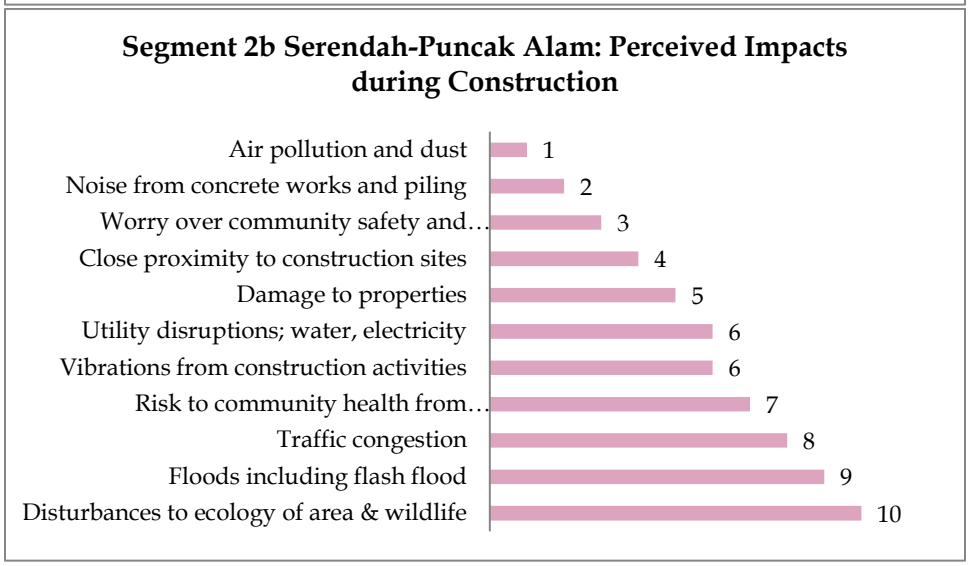
Table 13: Selangor and Kelantan – Ranking of Perceived Social Impacts during Construction (Cont'd)

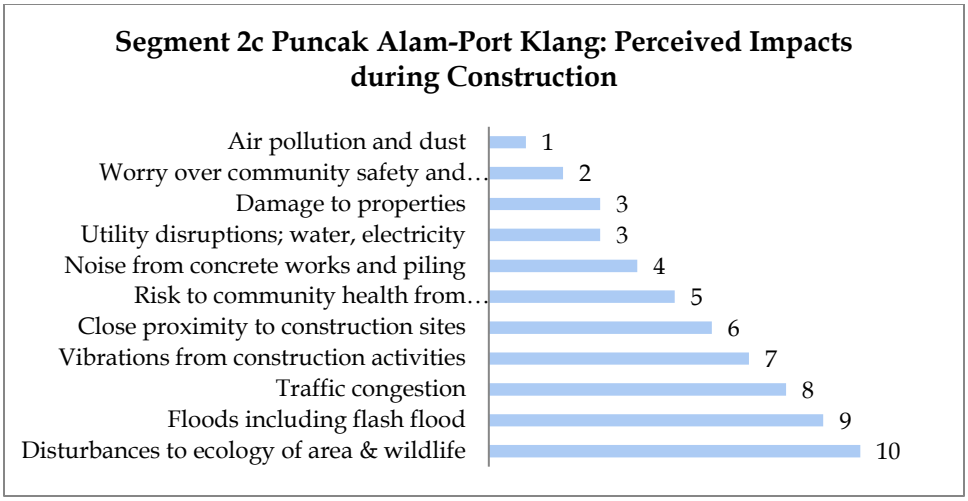
Social and Environmental Impacts during Construction	Selangor			Social and Environmental Impacts during Construction	Kelantan		
	Weighted Score	Weighted Percentage Score (%)	Rank		Weighted Score	Weighted Percentage Score (%)	Rank
Floods including flash floods	3,726	64.2	10	Traffic congestion	1,352	69.3	10
Disturbances to ecology of the area and wildlife	3,406	58.7	11	Disturbances to ecology of the area and wildlife	1,276	65.4	11
Total Weighted Maximum Score	5,800			Total Weighted Maximum Score	1,950		

Source: East Coast Rail: Perception Survey (August 2017)

Chart 8: Perceived Impacts during Construction in Selangor by Segment







Source: East Coast Rail: Perception Survey (August 2017)

7. Perceived Potential Impacts During Operations

During operations, the impacts from the railway are not confined to perceived negative impacts as the railway is expected to generate benefits to people. It is the anticipated potential benefits that underpin the proposal to build this railway. The benefits veer more towards economic because this railway is built on the premise it would open up the East Coast region to investment, creating opportunities for business growth and jobs.

Respondents are observed to still have negative perceptions on the railway operations possibly because they are uncertain that such issues could be addressed adequately during planning and design. The survey findings also show relatively large proportions of people continue to be concerned over impacts during railway operations with small proportions indicating they are less worried (**Table 14**). They continue to be worried over public safety and security; they think noise pollution and vibrations would be troubling, and they anticipate that there would still be air pollution and dust. These three concerns dominate their perceptions during operations and reveal that they are not convinced that mitigation actions during planning and design could adequately address their fears.

Table 14: Perceived Impacts During Operations

	Very High/High %	Moderate %	Very Low/Low %	Total %
Issues over community safety and security	83.2	7.9	9.0	100
Loss of aesthetics in neighbourhood	38.4	43.9	17.7	100
Loss of income and livelihood as a result of land acquisition and relocation	52.6	27.5	19.9	100
No access to railway station	32.5	39.3	28.2	100
Loss in property values due to close proximity to railway tracks or station	43.9	34.8	21.2	100
Noise pollution and vibrations	78.1	13.8	8.1	100

Table 14: Perceived Impacts During Operations

	Very High/High %	Moderate %	Very Low/Low %	Total %
Increased risks of floods and flash floods	45.4	29.5	25.1	100
Air pollution and dust	62.7	25.0	12.3	100
Risks of traffic congestion near stations	40.1	37.2	22.8	100

Source: East Coast Rail: Perception Survey (August 2017)

Safety and security is regarded as a major problem even when the railway is operational indicating that people do not have sufficient knowledge of the railway operations, especially electric railway and its safety requirements. As in the case of ECRL Ph 1, people are still unclear as to how the railway could change their lives, for example, during discussions with villagers, the question of mobility of schoolchildren, elderly and even livestock is raised. They are unsure of whether they could cross the ROW of the railway. Among those in Kelantan, they expect the situation would be similar to the present KTM line in Wakaf Bharu. Additionally, many in Kelantan have no clear visual of how elevated structures would be like. All these constraints tend to influence their perceptions on ECRL.

The weighted percentage scores and ranking in **Table 15** show the three-top rank negative impacts during operations are (1) issues over community safety and security; (2) noise pollution and vibrations; and (3) air pollution and dust.

Table 15: Ranking of Perceived Impacts During Operations

Perceived Impacts during Operations	Weighted Score	Weighted Percentage Score %	Rank
Issues over community safety and security	6,540	84.4	1
Noise pollution and vibrations	6,409	82.7	2
Air pollution and dust	5,841	75.4	3
Loss of income and livelihood as a result of land acquisition and relocation	5,480	70.7	4
Loss of aesthetics in neighbourhood	5,157	66.5	5
Increased risks of floods and flash floods	5,144	66.4	6
Loss in property values due to close proximity to railway tracks or station	5105	65.9	7
Risks of traffic congestion near stations	5,046	65.1	8
No access to railway station	4,784	61.7	9

Source: East Coast Rail: Perception Survey (August 2017)

8. Level of Support for ECRL Project

The level of support for ECRL in the corridor as well as in Selangor and Kelantan for ECRL is summarised in **Table 16**. Generally, the proportion of respondents that are very highly or highly supportive is estimated at 51%, with 49% in Selangor indicating this level of support and 57% in Kelantan. At slightly more than half, the level of support seems low throughout this

part of the ECRL corridor. Much of this is because a large number of respondents tend to adopt a moderate support level i.e. almost a third or 31% in the corridor indicates moderate support for ECRL. In Selangor, the proportion taking a moderate stance touches almost 30% and in Kelantan, around 36% indicates moderate support. **Table 17** shows the weighted responses on support for ECRL. Based on the weighted percentage scores that consider moderate views, the overall support for ECRL within the corridor is estimated at 67.7 or slightly more than two-thirds of respondents support the railway development. A higher weighted score for support is observed in Kelantan (72.9%) relative to Selangor (66.0%). In Selangor, the level of support for ECRL is relatively low, especially in Segment 2C where potentially adverse social impacts could be relatively serious in terms of acquisition (**Table 18**).

Table 16: Level of Support for ECRL

Level of Support	Very High/High %	Moderate %	Very Low/Low %	Total %
Corridor	50.6	31.2	18.1	100.0
Selangor	48.5	29.6	21.9	100.0
Kelantan	56.9	36.2	6.9	100.0

Source: East Coast Rail: Perception Survey (August 2017)

Table 17: Weighted Percentage Score on Level of Support for ECRL

	Weighted Maximum Score	Weighted Score on Support	Weighted Percentage Score on Support %
Corridor	7,750	5,250	67.7
Selangor	5,800	3,828	66.0
Kelantan	1,950	1,422	72.9

Source: East Coast Rail: Perception Survey (August 2017)

Table 18: Selangor – Level of Support for ECRL by Segment

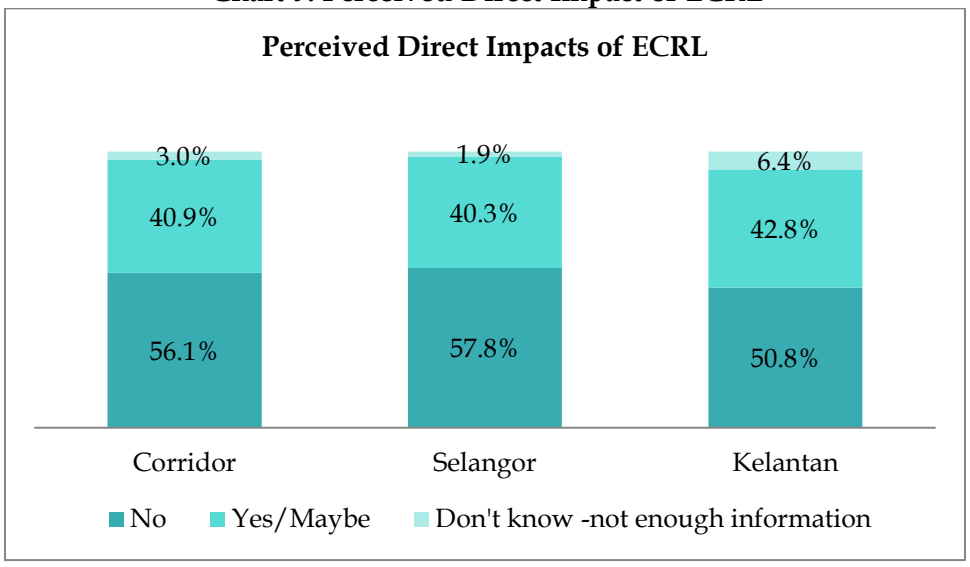
Segment		Very High/High (%)	Moderate (%)	Low/Very Low (%)
2a	Gombak-Serendah	60.2	26.4	13.4
2b	Serendah-Puncak Alam	48.1	25.8	26.1
2c	Puncak Alam-Port Klang	26.2	36.5	37.3

Source: East Coast Rail: Perception Survey (August 2017)

9. Perceived Potential Direct Impact

The support level is likely influenced by respondents' perception on how ECRL would directly impact them and their families. On this, more than half in the corridor (56.1%) believe that they and their family would not be directly impacted (**Chart 9**)

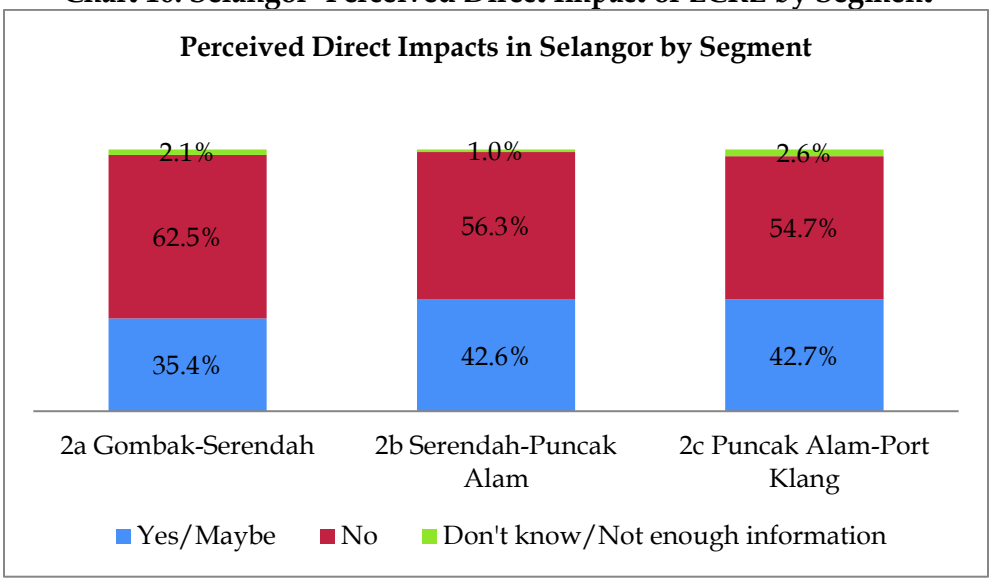
Chart 9: Perceived Direct Impact of ECRL



Source: East Coast Rail: Perception Survey (August, 2017)

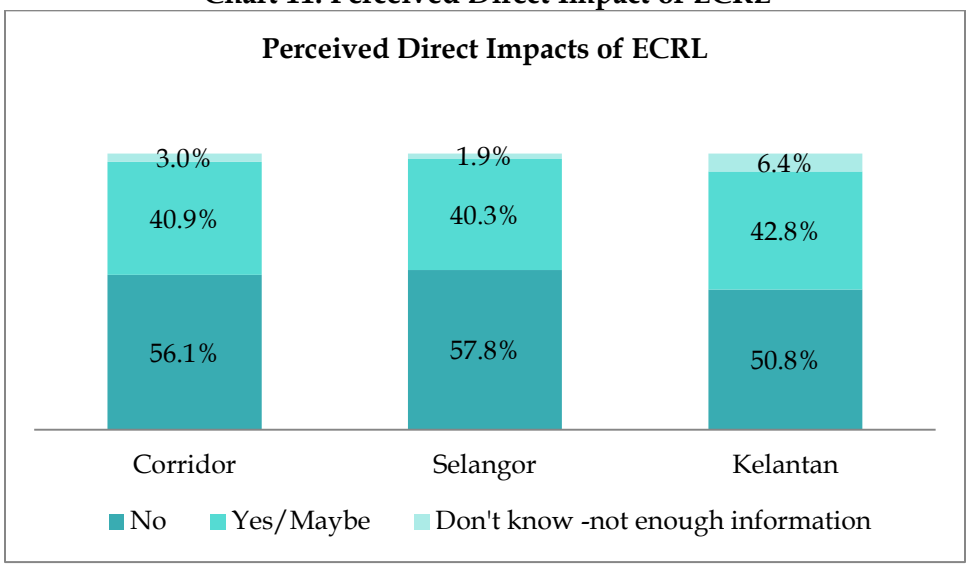
Among them, 57.8% in Selangor believes they would not be directly impacted and this is reflected in Segment 2b and Segment 2c where awareness level of ECRL is low (**Chart 10**). In Kelantan, the proportion who thinks they are not being directly impacted (50.8%) is lower than Selangor but interestingly, a higher percentage of 42.8% believes they would be directly impacted compared to Selangor. This could be a higher proportion of people in Kelantan is finding that they have access to inadequate information (6.4%) whereas in Selangor, only 1.9% claims they do not know enough of ECRL to respond. (**Chart 11**)

Chart 10: Selangor -Perceived Direct Impact of ECRL by Segment



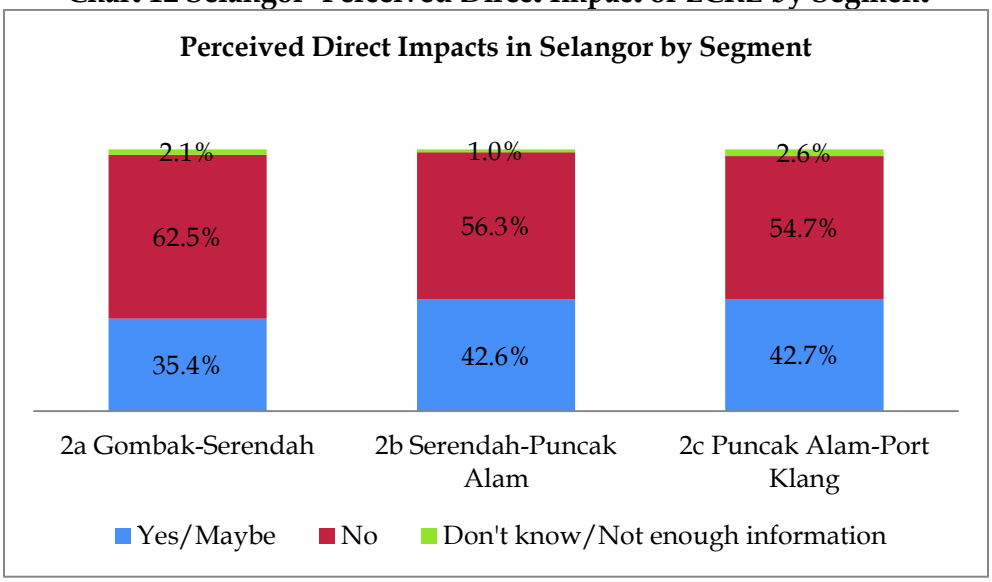
Source: East Coast Rail: Perception Survey (August 2017)

Chart 11: Perceived Direct Impact of ECRL



Source: East Coast Rail: Perception Survey (August 2017)

Chart 12 Selangor -Perceived Direct Impact of ECRL by Segment



Source: East Coast Rail: Perception Survey (August 2017)

11. Perceptions on Importance of Mitigation Measures to reduce Social Concerns

The survey also explores perceptions on probable mitigation actions that may be acceptable to the public in the ECRL corridor with the objective to determine which actions are likely to go down well with the public in resolving their fears and worries over the implementation of ECRL during pre-construction, construction and post-construction.

An important aspect of mitigation actions is the ability to communicate to the public with regards to the proposed project and the measures that are being put forward to address their concerns. Additionally, the level of awareness is observed to vary within the corridor, with

those in Kelantan indicating that they are very much aware and those in Selangor who are generally not aware of ECRL except for those in and around Gombak who because of the proposed terminal at ITT Gombak, have heard of it being in this part of Selangor.

Table19 indicates the preferred methods that the public would like to like being used to communicate important impacts from the proposed project. Communications are important for a major project particularly for the public in recent years. Nowadays, the public expects better flows of information and engagements when such a major project is being planned in their neighbourhood.

Table 19: Preferred Methods of Communications

	Corridor (%)	Selangor (%)	Kelantan (%)
Mainstream media; Newspaper, TV, Radio	97.9	97.5	99.0
JKKKs, RAs, KRTs, JMBs	50.3	37.2	89.0
Local Authority, PBT, Public noticeboards	52.8	49.6	62.3
Social media; Facebook; Twitter; Instagram	4.8	43.4	43.8
SMS; Private messaging; Whatsapp	20.3	16.4	32.1
Billboards	32.6	33.9	28.7
Email	7.9	7.6	8.7

Source: East Coast Rail: Perception Survey (August 2017)

12. Perceived Important Mitigation Measures

Various mitigation measures were put forward to respondents to elicit a perception of importance but this does not imply that this set of measures is comprehensive and the level of importance would mean that a lesser important measure should be omitted. What it does is to help to prioritise mitigation measures to address key concerns at different stages of development given time and budget constraints. The findings do not imply that proposed measures to address concerns should be removed.

During planning and design (**Table 20**), compensations and relocation plans are seen as vital, followed by the designs on noise barriers and vibration reduction. Compensation and relocation plans are highly important to people in both states. Similarly, actions on noise and vibrations are also important in the two states. However, flood mitigation measures appear to rank fifth on the whole and this is due to the bias in sample towards Selangor which carries the largest segment in the ECRL Ph2 (**Table 21**). In Kelantan, it must be emphasised that flood mitigation actions are highly important because people deal with this annually and to them the ECRL Ph2 is running across low-lying flood plains (**Table 22**).

Table 20: Perceived Importance of Mitigation Measures

Stages of Development	Mitigation Actions	Very High/High (%)	Moderate (%)	Low/Very Low (%)
Planning and Design	Compensation for loss of property	85.7	7.7	6.6
	Relocation plan	72.6	19.7	7.7
	Noise barriers	64.3	29.5	6.3
	Measures to reduce vibrations	60.2	31.1	8.7
	Flood mitigation plan	54.3	26.3	19.4
	Public engagement plan	46.8	35.2	18.0
	Mitigation plan to improve visual and aesthetics in the neighbourhood	38.6	40.1	21.2
Construction	Safety and security measures	74.7	18.6	6.7
	Public health management plan	61.0	27.0	12.1
	Environmental management plan	52.3	35.0	12.6
	Traffic management plan	45.9	40.1	14.0

Source: East Coast Rail: Perception Survey (August 2017)

Table 21: Selangor -Perceived Importance of Mitigation Measures

Stages of Development	Mitigation Actions	Selangor		
		Very High/High (%)	Moderate (%)	Low/Very Low (%)
Planning and Design	Compensation for loss of property	85.9	8.1	6.0
	Relocation plan	71.8	21.5	6.7
	Noise barriers	62.3	30.9	6.8
	Measures to reduce vibrations	56.5	33.4	10.1
	Flood mitigation plan	44.4	31.1	24.5
	Public engagement plan	43.8	34.0	22.2
	Mitigation plan to improve visual and aesthetics in the neighbourhood	36.2	37.4	26.4
Construction	Safety and security measures	73.0	19.5	7.5
	Public health management plan	58.9	26.5	14.7
	Environmental management plan	50.3	34.7	15.0
	Traffic management plan	46.5	37.2	16.3

Source: East Coast Rail: Perception Survey (August 2017)

Table 22: Kelantan -Perceived Importance of Mitigation Measures

Stages of Development	Mitigation Actions	Kelantan		
		Very High/High (%)	Moderate (%)	Low/Very Low (%)
Planning and Design	Compensation for loss of property	85.1	6.4	8.5
	Flood mitigation plan	83.8	12.1	4.1
	Relocation plan	74.9	14.6	10.5
	Measures to reduce vibrations	71.3	24.1	4.6
	Noise barriers	70.0	25.4	4.6
	Public engagement plan	55.9	38.7	5.4
	Mitigation plan to improve visual and aesthetics in the neighbourhood	45.9	48.2	5.9
Construction	Safety and security measures	79.7	15.9	4.4
	Public health management plan	67.2	28.5	4.4
	Environmental management plan	58.5	35.9	5.6
	Traffic management plan	44.4	48.5	7.2

Source: East Coast Rail: Perception Survey (August 2017)

AP – F3 | STAKEHOLDER ENGAGEMENT NOTES

FGD 01: Penggawa, Penghulu and Representative from Kg Wakaf Delima, Wakaf Baharu

Venue: Pejabat Penggawa Wakaf Baru, Tumpat

Date: 5 September 2017

Time: 2.30 pm -5.30 pm

Present:

Name	Position
1. Hassan bin Dollah	Penghulu Wakaf Delima
2. Mohd Termizi Mat Yusuff	Penggawa, Daerah Tumpat
3. Mansor bin Ibrahim	Penolong Penggawa, Wakaf Baharu
4. Tuan Salleh Tuan Abdullah	Penggawa
5. Azoka bin Awang	Penghulu
6. Abdul Manap	Wakil Penduduk
7. Mohd Nor Mat	Penghulu

Social Profile

The Penghulu from mukim Wakaf Delima represented eight villages as follows:

1. Kg Banggol Petani
2. Kg Lambor
3. Kg Pondok Lambor
4. Kg Delima
5. Kg Perepok
6. Kg Bechah Temalong
7. Kg Perepok Kulim
8. Kg Tok Tong
9.

These villages have a total of 800 houses, which accommodate roughly 3,600 people. Most people here are paddy farmers. Some plant coconuts. Farms are small, resulting in low income. Settlements here are scattered unlike in highly urbanized areas. Small agricultural holdings mean that land area is small so any acquisition would not give affected owners much monetary compensation, making it difficult for them to buy land to replace what have been acquired.

A major concern here is flooding in the villages. It is a major problem.

Map Viewing

There is considerable interest by participants in the alignment. Their fears are over land acquisition and proximity. Participants were given about 40 minutes to view the alignment and to ask questions on it. A number of them are aware of an earlier proposed location of station at Wakaf Bharu and were confused with this new proposed location.

Key Perceived Social Impacts from ECRL

During Planning and Design stage, the concerns are:

1. **Floods**

   Floods are the major concern. They could not understand how the railway could be built in areas that are so prone to flooding and not just flash floods but major floods that occur frequently. Taman Kasturi is a flood-prone area and will flood each time it rains. They wonder how they can access the station if flood level is high. They think it is important that to pay close attention to resolve the flood problems here as such problems would impact on the railway eventually. They cited cases where the construction of roads has not captured this problem well and the result is to aggravate flooding here. They suggest that MRL and its team of engineers should discuss with JPS to work out a viable solution for all.

2. **Relocation**

   The general feedback is people here are not strongly opposed to acquisition but what they object to is the fact that acquisition leaves them without any place to live if their homes are affected. The issue is:
   If their homes are acquired; they do not know where to find alternative places to stay. No one seems to look into this issue and it is a major problem for affected homeowners. Firstly, compensation could be late and there's no money to buy an alternative place. Secondly, prices have gone up and compensation may not be enough for them to buy another home within the same vicinity to replace what they lost. Thirdly, there could be no available housing nearby and people can be at a lost as to where to find places to live.

   They think this is a major obstacle to acquisition and an mitigation action must be found to address this problem to ease the conflicts arising from acquisitions. They suggest a relocation scheme or plan has to be drawn up to address this issue even though they know that due to the scattered settlements, the impacts are dispersed across many individuals unlike in a highly dense settlement.

During Construction, three key issues are identified:

1. **Noise and air pollution**

   Noise is seen as a problem during construction. It would disturb villages and settlements nearby. Places here are generally quiet.

   Construction could also cause air pollution and dust in their villages.

2. Soil Erosion

Soil erosion can be problematic. Villagers fear such occurrences as they could aggravate existing flooding problem. They want mitigation measures to be in place during construction that will prevent soil erosion.

3. Social Conflicts with Foreign Workers

The presence of foreigners will create social conflicts. They find that at present, foreign workers do pose problems for their womenfolk. They would prefer that their presence be managed properly so that the foreigners do not move into their villages and cause unnecessary disruptions or disturbances. For them, the presence of foreign workers in construction poses safety concerns.

Not only do foreign workers pose a threat on safety of womenfolk, they can bring in diseases and are a health risk for villagers.

During operations, they do not foresee any problems or concerns. It is possible that there could be noise but they are unsure as to how this could impact them.

Benefits and Support for ECRL

On benefits, they do not identify any but generally believe that the ECRL should benefit the East Coast Region.

On support, they have no objections to the ECRL and appear relatively excited in having the rail reaching Pengkalan Kubor and Wakaf Bharu.

Request for Technical Briefing on ECRL in Jajahan Tumpat

A request is made by Pejabat Tanah Jajahan Tumpat through the Yang amat Berusaha Tuan Ketua Jajahan for an official briefing of the ECRL Ph 2. They intend to invite various JKKKs to this briefing. They ask that it be a TECHNICAL BRIEFING because their interest is to discuss possible impacts on flooding in their area as a result of ECRL and potential mitigation measures that are being considered by the Project Proponent. They hope that technical experts can be available to brief and explain to them.

FGD 02: JKK/Representative from Kg Kubang Panjang, Kg Cherang, Kg Telok, Kg Cabang Empat

Date: 6 September 2017

Time: 9.30am – 11.30 am

Venue: Bilik Mesyuarat Masjid Kariah, Kg Chabang Empat, Tumpat

Present:

1. Hj Jali bin Musa	Pengerusi JKKKP
2. Beng Khieu A/L Eh Si	PSKKP Kok Soraya
3. Abd Manaf bin Kasim	Setiausaha JKKKP
4. Mohd Nawi Wan Sulaiman	Penduduk
5. Mohd Saufi Salleh	Penduduk
6. Mohd Riffin Yusof	Penduduk
7. Azhar	Penduduk
8. Mokhtar	Penduduk
9. Mamat Jusoh	Penghulu Mukim
10. Naimah Husain	Penduduk
11. Johari bin Mohd Yusoff	Penghulu Bechak Resak
12. Mohamed Noor bin Awang Hamat	S/U Mukim Periok
13. Wan Mohd Azam	D.O.Q Kg Periok
14. Hj Abdullah bin Hj Mat	Mantan Penghulu Pasir Putih
15. Mahodi Deromar	Ayu Fochian
16. Ahmad Zaki Md Amus	Guru
17. Jaafar bin Mohamad	Peniaga
18. Halijah bt Awang	Kg Telok

Social Profile

The area under discussion is in Kg Chabang Empat, stretching from Kg Telok to Tendong. Many villages were found along this stretch but a number of them are located away from the alignment and outside the 1,000m corridor. The railway alignment is on agricultural lands such as paddy fields.

The villages from where the participants came from include the following:

- Kg Telok
- Kg Tendong
- Kg Chabang Empat

Map Viewing

Most of the participants were interested in the proposed alignment and were given time to view the map of the area and to ask questions. About 20 minutes were allocated for this exercise.

It is noted that many were confused over Phase 1 and Phase 2 especially around Wakaf Bharu. Some participants were aware of Phase 1 and had seen maps displayed under the Railway Scheme or they had attended previous discussions on Ph 1. They were unaware of a change in alignment and came to the meeting, hoping to find out more of the previous alignment in Wakaf Bharu. Some informed that they saw people surveying near their homes.

Complaints against ECRL

1. The state and local authorities should be informed of this new alignment. Some participants have gone to such authorities to find out more about land acquisition and affected lots but found that local authorities including the Land Office are not able to furnish them with relevant information on affected lots. It makes the people angry and upset over this failure to interact and interface with them.

2. In addition, surveyors related to the Project should not be coming to their homes to survey without proper authorization from appropriate authorities. They are angry over this, seeing it as a lack of etiquette and respect for villagers whose lives could be strongly disrupted by the railway development.

3. They would like to put forward this advice for MRL in handling the locals on the ECRL development:

    - Anyone related to ECRL who intends to do work near to people's homes should at least ensure that prior notice is given to the villagers so that they are aware of this happening. Such intrusions are not socially and culturally acceptable as well as it could pose worries over security and safety of locals.

    The SIA team had taken steps to ensure that the JKKKs here were issued letters of introduction and notifications of meetings and discussions on the ECRL.

4. A sharing of their experience over Ph1 was provided to reflect their feelings. They claimed that the display of lots under the Railway Scheme was not done properly and details were not available. There was no one at hand who could explain to them on procedures and what to do with the Objection Forms handed to them. Their view is it was a waste of their time. On this, they find that attending this FGD is a waste of time because details are still not available. The general conclusion is they are wasting their time running in circles to try to resolve worries over acquisition and relocation without any help from relevant authorities or an action plan they could refer to.

Key Perceived Social Impacts from ECRL

1. Floods

Floods are a key issue in the discussion. Participants could not understand how the railway line could be designed to run through these low-lying areas. To them, they find the at-grade alignment to be troubling even with the embankment. The flood waters are too high, possibly 3 to 4 ft, so it may not accommodate the electric tracks. The suggestion is to have elevated tracks. Furthermore, a request is made that the authorities consider running the railway tracks underground. Going underground would remove the issue of land acquisition and possibly the question of major floods.

2. Land Acquisition and Relocation

Like those in Mukim Wakaf Delima who were engaged, the participants argue that land acquisition without proper relocation plan is a no-go. They believe that having a proper relocation plan is crucial here. There have been cases where old people finding they are affected by acquisition under Ph 1 are not able to cope with the distress, not knowing what to do. It would be difficult for them to find an alternative place to move to.

According to them, a relocation or resettlement plan is essential. They agree that the plan should be in place in conjunction with acquisition so that affected families know where they could move. The compensation payment could be later but more importantly, affected people have this psychological comfort of knowing they have a place to move to.

3. Social Conflicts with Foreign Workers

They want foreign workers to be properly managed. They feel the presence of these workers tend to create social conflicts in their communities.

The two main issues over ECRL implementation, i.e. floods and land acquisition without relocation weigh heavily on the participants. The representative from Kg Padang Embong in Tendang states categorically that he and the villagers he represents are unhappy over the ECRL and do not support it.

Other representatives are not happy with it but believe that under the right conditions, they would support the project. The conditions they give are:

- The alignment passing through their area should be elevated in order to avoid the floods
- The construction should be done properly to avoid exacerbating the existing floods as their experience showed that often so-called culverts fail to do the work of channeling excess water, resulting in more frequent flooding.
- A relocation plan is essential to assist them affected by land acquisition. This plan must be done in tandem with acquisition in order to ease psychological worries.

Request for Technical Briefing on ECRL in Jajahan Tumpat

They request for a technical briefing. The briefing must address:

- Floods and proposed actions
- Relocation plan
- Noise and other technical aspects

The underlying rationale is to enable them to receive technical facts on matters that affect them significantly. When they heard of a request for technical briefing by Pejabat Tanah Jajahan Tumpat, they inform they would like to join such briefing, if it takes place.

FGD03: Guru Besar/PIBG of SK Pengkalan Kubor, Sek Men Tendong, Sek Keb Cabang, Representative from Pusat Kesihatan and village representatives

Date: 6 September 2017

Time: 2.30pm – 4.15pm

Venue: Bilik Mesyuarat Sekolah Menengah Tendong

Present:

1. Ahmad Marzuki Ab Hamid	PK-Ko SMK Tendong
2. Sanusi Awang Hamat	PK Hon SMK Tendong
3. Samsiah bt Safie	PKP SMK Tendong
4. Norasimah Ab Rasid	Pengetua, Tendong
5. Nor Adlina bt Ibrahim	PK-Ko Sek CBG
6. Adira bin Nawi	PK-Ko Sek Peng Kubor(2)
7. Abd Aziz Che Omar	Penduduk
8. Che Awang Che Mat	Guru Besar
9. Mohd Yusoff Abdullah	PKKKP
10. Mohd Rusly Hasmarizal	Penolong Pembantu Perubatan
11. Noriati Aziz	Pegawai Tadbir (Kelinik Kesihatan, Tendong)
12. Mohamed bin Mat Zin	Penduduk, Kubang Palas
13. Zawawi bin Isa	Penduduk, Kubang Palas
14. Ariffin bin Idris	YDP, PIBG SMKT
15. Suzana Hj Azmi	Guru Besar Sekolah Kebangsaan Pengkalan Kubor
16. Abd Hamid Ahmad	Pesara Kubang Palas
17. Zainuddin Sulaiman	Penduduk
18. Baharuddin Omar	Penduduk Kg Pendang Embun
19. Wan Nabilah Wan Harun	Pelajar
20. Che Ismail Che Husin	Guru
21. Che Nasrun bin Ismail	Peniaga
22. Rosnani bt Md Yusof	Penduduk
23. Mohd Adam Ahmad	Penduduk, Kubang Palas
24. Zakaria Mat Min	Imam Mesjid

Social Profile

The discussion group combines both institutional and village representatives. Institutional representatives are important stakeholders in the engagement process. They provide different perspectives from residents and their viewpoints add to an overall understanding of opinion of ECRL from different segments of society.

The discussion was held within the grounds of SMK Tendong, a large secondary school in this part of Kelantan. It has 902 students and 92 teachers. It caters to first

formers right up to sixth formers. There were also representations from smaller primary schools nearby. Among them was SK Chabang Empat and Sekolah Pengkalan Kubor which is located about 400m away from the proposed Pengkalan Kubor station.

Representation was also available from the nearby government clinic to give insight on possible impacts on health.

The Penghulu for Kg Padang Embun was also present. Kg Padang Embun is large, with 1,200 houses and about 4,000 population.

Map Viewing

Time was allowed for map viewing to enable participants to understand the alignment. About 15 minutes were allocated for this, with flexibility to return to the map at a later time if necessary.

Key Perceived Social Impacts from ECRL

Planning and Design Stage

1. Floods

Concerns over floods remain the key focus of the discussion. Across the board, everyone agrees that floods are a major problem in Kg Tendong. In 2014, SMK Tendong was under 4 feet of water.

Everyone believes this must be addressed before the railway can be built and operate smoothly. In their mind if this is not done, it would continue to cause problems.

They do not agree to an underground railway due to the floods but are open to an elevated structure across the flood plains.

2. Land Acquisition and Relocation

Land acquisition is a major issue mainly because of the absence of a relocation plan. To them, acquiring land without affecting homes is not as troubling as when homes are involved. This is because affected homeowners have problem finding alternatives. They find that prices would have risen; their compensation may be inadequate. They want to stay near to their present neighborhoods.

They suggest that relocation plan to be drawn up for those whose homes are affected. The relocation site should be near to where they are currently located. If there are more in their neighborhood being affected, they would like to be resettled as a group rather than be dispersed individually.

The feedback on acquisition of agricultural land is more positive in that it is more acceptable as people can buy land elsewhere to replace what is acquired and continue with their activity.

3. Disruptions to Living Environment

Representatives from nearby government clinic are concerned that the alignment may affect local roads and disturb their ambulatory services. They request that measures be taken to avoid such occurrence. They also fear that floods could further aggravate the situation. Their emergency response services require clear pathway for ambulances to operate.

Proximity to station is another problem. SK Pengkalan Kubor is about 300-400m away from the proposed station at Pengkalan Kubor. Its headmistress is very worried over this close proximity. This is because she finds that in a rural setting, young children are often allowed to roam about and this development will be an attraction over which safety and security issues may arise. During both construction and operations, safety of these schoolchildren could be compromised.

Construction Stage

1. Concerns are over:

- Noise is identified as a concern by most participants including headmistress of SK Pengkalan Kubor
- Safety issue from presence of heavy construction vehicles.
- Danger to young schoolchildren and even livestock near to construction sites
- Air pollution from construction activities

2. Social Conflicts with Foreign Workers

They want foreign workers to be properly managed or have the numbers reduced. They fear a large number of foreign workers could create conflicts in their communities. It is also important that foreign workers are certified as healthy for fear that they would introduce diseases into their area.

During Operations
Generally, no issues were identified except by SK Pengkalan Kubor where noise from operations may pose some problem.

Level of Support for ECRL

The response is mixed with most saying that they do not see any direct benefits to them. If they do not benefit, they do not see a need to give it a support. Their argument is not many of them would use the railway to travel to Kuala Lumpur so the need does not arise.
They think it would have been better to rehabilitate the existing KTM line and use it rather than build another line.

Malay Reserve Land

The status of Malay Reserve Land is raised. They want this status to be accorded to any land that is being replaced by what is acquired by ECRL. This will add another problematic dimension to acquisition of land here.

K 01: Case Interview with representatives from Mukim Telaga Bata

Venue: Sekolah Kebangsaan Bunuhan Tumpat

Date: 5 September 2017

Time: 9.30am – 10.45am

Present:

1. Cik gu Zamri Mukhtar	Guru Besar
2. Razali Che Mat	Penghulu Telaga Batu
3. Ibrahim bin Pa'adik	Wakil Masjid Al-Itqan Telaga Bata
4. Shaharudin Yaacob	Wakil Masjid Al-Itqan Telaga Bata

Social Profile

Five villages are represented by Penghulu Telaga Bata. They include:

- Kg Telaga Bata
- Kg Nechang
- Kg Kubang Panjang
- Kg Kubu
- Kg Palas Merah

Altogether, there are more than 500 houses in the 5 villages. Total population is estimated at 4,000 – 5,000. Agriculture, especially paddy cultivation, is a main activity. Most people work in farms or as general contractors. Many are self-employed.

A major concern in this area is the place is subject to flooding. Its floods are not aligned to Sg Kelantan but are affected by Sg Golok in Thailand. This means it may be sunny in Kota Bharu but this place floods because of rains in Thailand. Floodwaters can reach up to 4 -5 feet. Major floods occur twice or three times a year.

Paddy is a major crop and an important source of income for villagers here. Paddy is grown twice or three times a year. According to the Penghulu, revenue from paddy cultivation is relatively good. People could earn around RM2,000 to RM3,000 a month. Disruptions to their farms would affect their income.

Three Key Perceived Social Impacts from ECRL

The three main concerns are:

1. **Proximity of Alignment to New Mosque**
   One is the location of a new mosque near to the alignment. The mosque, Masjid Al Akon, is under construction and would be ready before the railway is

completed. It will house a religious school. The issue of noise from the railway operation is worrying. The request from participants, especially the Chairman of the mosque committee is to have adequate noise barriers to reduce operational noise from the train. The noise barrier must be effective because of the religious school within the new mosque premise.

2. Floods

Floods are problematic. The lands over which the alignment runs over are soft and wet because they are paddy fields. It is understood that such fields are private lands and not part of a government irrigation scheme. The concern is stability of the site and dangers it may pose to people around. Floods have always been an issue in Kelantan; the construction of ECRL could exacerbate this problem for the villagers. More must be done to alleviate this problem.

3. Social Conflicts with Foreign Workers

During construction, there is concern over the influx of foreign workers. These foreigners may clash with the locals due to cultural and social differences. They accept the need to hire foreign workers, as locals are not prepared to do construction works. The locals have an attitude that may make hard for them to work on construction works. Many prefer to work four days a week and to stop work at 5pm; making it hard for them to work in the ECRL construction. In order to mitigate potential social conflicts with foreign workers, they suggest that foreign workers be housed in managed labour camps and not live within their villages. They cite the MRT1 experience as an example of how foreign construction workers could be managed.

Safety is another concern that is confined to the new mosque. As the proposed railway is elevated and is likely to transact Jalan Nechang which leads to the new mosque, they worry that the road would be blocked during construction and operations, making it difficult for users, especially children, to access the mosque. The mosque administration requests that this matter be looked into and to avoid any possible blockage of the access road into the mosque.

Other Social Issues

- Paddy lands are affected by the railway alignment. The paddy lands are private lands. They are actively cultivated and a source of income and livelihood. If the lands are acquired, people would lose their livelihood.
- The question here is if the railway tract is elevated; can the land below be used for cultivation? It would be a waste if the land is blocked and not utilized at all.

Non -Issues

- The land below could still be used for cultivation the land is elevated. The Penghulu believes that the villages are located away from the alignment and hence, are not affected by land acquisition. As a result, relocation issues would not arise.

- They are not likely to be impacted by noise or air pollution during construction. These problems are also not expected to arise during operations. This is because settlements here are generally scattered so there is less cumulative negative impacts.

Benefits and Support for ECRL

- Places around stations are expected to be centres for development. However, for those without access to the stations and are far from them, there would be no benefits or gains.
- The participants are happy with having the ECRL even though they have the three main concerns which they hope the authorities would look into.

Suggestions

- Participants informed that the ADUN for Pengkalan Kubor suggest that the ECRL line should be extended to Pulau Ular which is a short distance away from the present proposed station at Kg Mentua in Pengkalan Kubor. The underlying rationale to shift the station to Pulau Ular is to take advantage of the strong interactions between the Thais and Malaysians at the border. Due to close family ties with those in Thailand, there is active trade between the two areas at the border. Pulau Ular will be ideal for a proposed station because of its proximity to the Thai border.
- Secondly, there are plans to expand the Free Trade Zone that would extend into Pulau Ular. This is a state proposal and would be a win-win situation for both ECRL and the State if the proposed station is shifted to Pulau Ular.

The New Mosque

FGD S01: Kota Puteri, Taman Saujana Rawang, Batu Arang, Taman Ehsan

Venue: Dewan Orang Ramai Taman Ehsan Ibu

Date: 16 September 2017

Time: 10.50 am – 11.50 am

Present:

Name	Position
1. Hj Ahmad Badli Zainal Abidin	Iman Surau Serendah
2. Sani Hamid	Pensioner
3. Abd Aziz bin Raub	Pensioner
4. Wan Kamaruddin	Pensioner
5. Baharuddin	SU JKKK
6. Khairuddin	Student
7. Marinawati	Housewife
8. Shaharun Alias	Pensioner
9. Abd Manaf Ahmad	Pensioner
10. Sa'ad bin Busu	Pensioner
11. Ab Wahab Shaari	Pensioner
12. Saparuddin	Resident
13. Mohd Yusof	Residen
14. Raja Muzzafar Shah	JPS Gombak/Pen Pengerusi JKK Taman Ehsan Ibu
15. Nazri Zakaria	Pensioner
16. Maarof Abd Hamid	Pengerusi JKK Sg Choh
17. Zulkafli Ali	AJK KRT
18. Jamaluddin	Resident

Social Profile

Participants were from urban or semi-urban areas in and around Serendah. They are exposed to noise from KTM train as well from the North-South Expressway. Local roads are exposed to relatively high incidence of traffic so the noise issue is a problem.

The area is also subject to flooding so it worries them whenever there is any major construction project.

Highway construction has resulted in severance of some communities here. Such severance makes the nearby highway dangerous to local residents, especially children whose mobility has to be curtailed by their parents to keep them safe from untoward road accidents and injuries/deaths.

Map Viewing

Residents were given about half an hour to view the alignment in their area and to study potential implications on them. There were considerable issues they believed would affect them if the present alignment is maintained. They make suggestions to amend the present alignment away from their settlements, pointing out that the present alignment, when built, would be extremely disruptive to them and their communities.

Key Perceived Social Impacts from ECRL

During Planning and Design stage, the concerns are:

1. **Present Alignment**

   The most significant feedback is they are not supportive of the proposed alignment moving through the town of Serendah. Their concerns are:
   - It would be noisy for residents. Already, the present KTM generates noise; often making it difficult for residents to sleep.
   - Flooding may be an issue and they are worried
   - Safety of their children because of severance of neighbourhoods that constraints mobility
   - Cutting off some Malay Reserve Lands and making them inaccessible (See Figure 1). The Malay Reserve Land lots are orchards; most are cultivated. The ECRL would sandwich these lots which would lie between the ECRL and the new Serendah By-Pass. The lots would not benefit from both developments and being inaccessible and near to such developments would cause these lots to lose any potential development value, virtually rendering them useless for future development. The proposed station at Serendah is some distance. If this be the case, it would be better to acquire these lots, then, to leave them in this position that render them with one potential development values.

2. **Noise and Vibrations**

   The ECRL as it stands will give rise to noise problem to residents in surrounding settlements. Already, the KTM has noise impacts on them, making it difficult for some people, especially children, to sleep. They do not want to be sandwiched between the two railways and be subject to noise impacts. In addition, they are also subject to noises from the N-S Expressway and with the new Serendah By-Pass, they would be subject to more noises.

During Construction, concerns are over
1. Noise from construction activities;
2. Presence of heavy construction vehicles on their narrow roads, putting their safety at risk,;
3. Flooding risks;
4. Traffic congestion.

Recommendations

1. They propose amendments to the present alignment as follows:
   Move the alignment further north away from them into areas covered by plantations. A station can be placed at an area near to the toll booth of the N-S Expressway where there is ample space to accommodate.

   Figure 2 shows the proposed amendment.

2. Acquire the Malay Reserve lands indicated in Figure 1 if the present alignment is left as it is which would render these lands unfit for future development, causing these land to lose values

3. Propose a safety insurance (during construction period) – high risk project

Summary

1. The residents here do not object to the ECRL, recognizing that it would have long-term benefits to users but by going through their small town, it will disrupt and disturb the present residents.
2. They request that the present alignment to be relocated away from them. (refer to the sticky notes from some of the participants)
3. They suggest that a station can be built near to the toll booths of the N-S Expressway in line with their proposed amendment
4. Ensure that there is no severance to the communities by having the alignment cutting through the settlements

Sticky notes from the participants

Jamaludin 017-3223284.

① By pass dari melalui
Tmn Ehsan Ibu –
Harga kawasan industri shj.

② Pemindahan stesen di
Serendah stesen ke
stesen komuter

KETIKA PEMBINAAN LANDASAN

① ADAKAH JALAN SEDIA ADA
DI BESARKAN – SOLUTION?

② RAIL AKAN MELALUI
BUKIT DI BELAKANG TAMAN
EHSAN IBU = SOLUTION?

③

Proposal

1. ECRL 2 ~~ss~~ melalui
laluan Bukit ~~Kerig~~ Choh
bersebelahan Highway Serendah
Selayang, Tanah rizab
Melayu perlu dpt faedah
pampasan –

2. Laluan perlu di ~~[illegible]~~
kaji semula – Alih stesyen
Serendah ke ~~ke~~ sebelah
Toll Plaza – Toll Sg. Buaya.

1) Cadangan laluan yang
sesuai tidak terlibat
dengan Taman Rumah dan
kawasan kampung.

2) Cadangan yg ada tidak
sesuai bagi kawasan
Taman Ehsan Ibu.

Wahab

Impak bising GETARAN

Saya harap buat
Tempat LAIN

Jitung buat d.k.

TIM EHSAN IBU

IMPAK BURUK
BISING
FLOOD
GANGGUAN KESIHATAN.
TIDAK SOKONG

Laluan
Cadangan Alternatif dpt
tidak
Kilang-Kilang dan mengganggu
Penduduk Perumah.
We have no benefit to us.

1.) minta dialihkan laluan. elakkan laluan di taman ehsan kerana lg bahaya.
2.) perlu di laluan kawasan perindustrian.
3.) elakkan di kawasan kediaman.

IBU SOSIAL DAN
ALAM SEKITAR

~~ALIHKAN~~
~~KAWASAN LAIN~~
LENCONG
KAN DARI TMN
EHSAN/IBU

RISIKO PENDUDUK

- Jika Pembinaan (Risiko) penduduk mohon untuk perlindungan / insurans. sebagai projek kekal di sifu

lencong dari Taman
ehsan/ibu

Figure 1: Affected MR Land that will be sandwiched by ECRL and Serendah by Pass

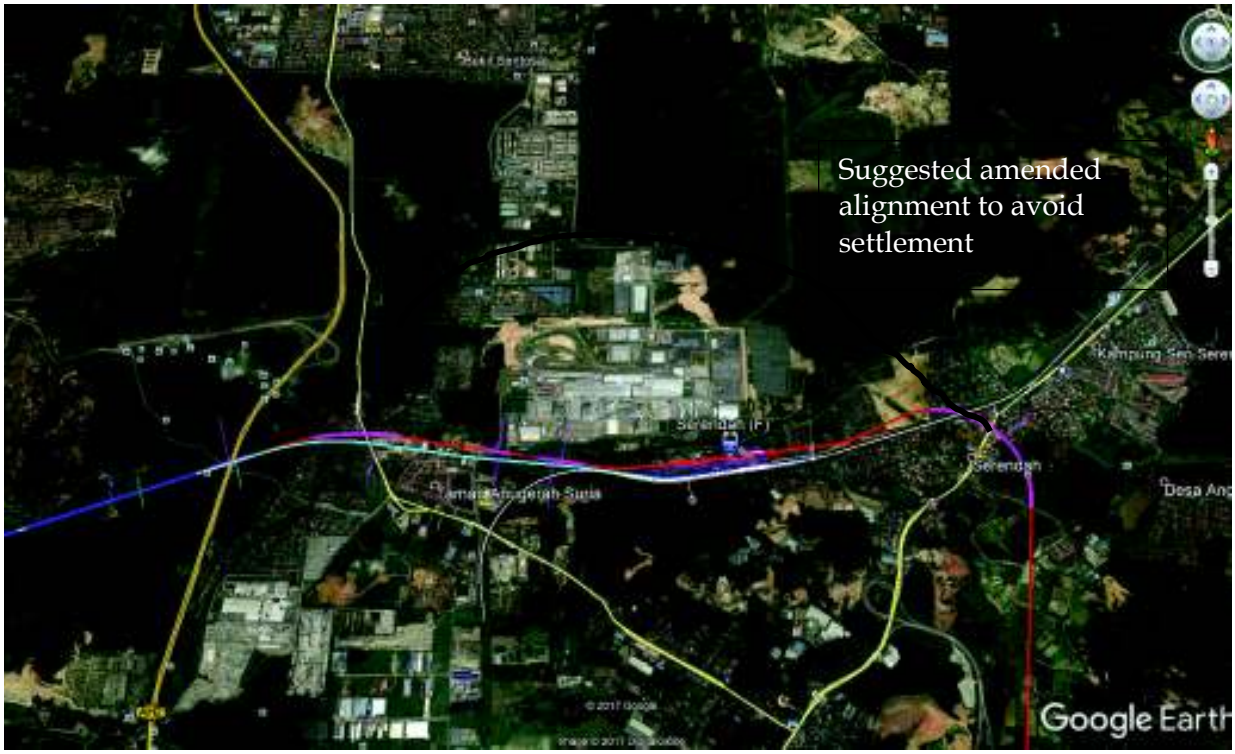


Figure 2: The Proposed Alignment (black)

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FGD S02: Representatives from Alam Suria, Puncak Alam

Venue: Bilik Mesyuarat, SMK Puncak Alam 3

Date: 17 September 2017

Time: 10.00 am – 11.50 am

Present:

Name	Position
1. Suriati bt Maharom	Pengetua, SMK Puncak Alam 3
2. Fatimah bt Mohd Ariff	Penolong Kanan Kokarikulum (KOKO)
3. Noor Aidazura bt Osman	Guru SMKPA3
4. Fadzli Osman	Pengerusi SAT
5. Mustafha Kamal Abd Jalil	SU-JPP
6. Muhamad Noor	AJK SA7
7. Suhaini bt Mat Said	AJK SA7
8. Hamzah Fauzi Mahuddin	Penduduk Alam Suria SA3
9. Mohd Shukri Taib	Pengerusi Penduduk Surau Hj Ismail
10. Mohd Hanif b Md Sultan	Pengerusi Penduduk Alam Suria
11. Mohd Zuhairi Zainal	SU PPSFSA5
12. Muhamad Nor Baharin	Penduduk SA5
13. Muhamad Asri	Penduduk Fasa 1
14. Normah Hassan	Penduduk fasa 1

Social Profile

Bandar Puncak Alam is a large town with an estimated population of around 30,000. Its origins were from oil palm estate under FELDA but in the 1990s, it was converted for development. The large township is in fact made up of numerous sub-townships such as Alam Perdana, Alam Jaya, Shah Alam 2, and Ambang Suria. Nearby is the new campus of Universiti Teknologi Mara (UiTM) that is able to accommodate 41,000 students and staff from 15 faculties. The area is under Majlis Daerah Kuala Selangor but its close proximity to Shah Alam, makes it part of Greater Shah Alam.

Map Viewing

Time was allotted for map viewing of the alignment after presentation to allow participants to take a closer look at the proposed ECRL as many are not aware that the ECRL is designed to pass through this part of Selangor. To them, the ECRL is associated with the East Coast Region but not Selangor so they were surprised to find out its alignment would cross the northern part of Selangor. They mostly found out about the railway from the Perception Survey (ECRL) last August.

Upon learning more about it, many are interested to find out whether the proposed railway will provide passenger services. They also want to know whether there would be a station nearby.

Key Perceived Social Impacts from ECRL

Planning and Design Stage

1. Disruptions to Living Environment

Their greatest concern is the proximity of the proposed railway to their housing areas. For them, the ambience of their housing estate is excellent. The key selling point to them when they bought their homes is the quiet and serenity of the place. When informed that the railway alignment is about 300m away; there are residents who express unhappiness over this.

The key concern is noise and vibrations during operations if the alignment remains as it is. The request is to shift the alignment further north where lands are still undeveloped and covered by oil palm plantations. One suggestion is to go further north where settlements are less dense. When told that there are villages there which could be adversely impacted, the suggestion is to find an alternative that perhaps lie between the villages and their housing area. Another suggestion was to shift the alignment more towards UiTM.

A representative of the developer of Shah Alam 2 was present and also voiced concern that with the development of the West Coast Expressway (WCE), the township could be sandwiched by the two major linear infrastructures. They seek more information from the Project Proponent and is prepared to meet and discuss the implications of the proposed railway on their development.

Some are disturbed that the railway would be They pay for this value when they and they pay Representatives from nearby government clinic are concerned that the alignment may affect local roads and disturb their ambulatory services. They request that measures be taken to avoid such occurrence. They also fear that floods could further aggravate the situation. Their emergency response services require clear pathway for ambulances to operate.

2. Floods

Participants inform that their township is susceptible to flooding. Ambang Suria is one such area. Flooding tends to occur whenever there are heavy rains. A request is to look into this.

3. Land Acquisition and Relocation

There is no land acquisition here so this issue does not arise.

Construction Stage

1. No major concerns during construction were voiced. Likely they are familiar with such situation. They do indicate that there could be minor concerns over (1) dust and (2) foreign workers. However, they believe these can be tackled.

During Operations
Issues during operations are linked to proximity of alignment. If their complaints over the alignment during Planning and Design are not considered and this present alignment remains, then, they fear they would be subject to noise and vibrations. On mitigation measures and noise barriers, they are skeptical and would prefer to know more, both on expected noise level and the types of barriers used and their efficacy. They believe that it is not possible to compare the MRT situation with the proposed ECRL, especially the noise that may be generated by the freight train.

Level of Support for ECRL

The response is mixed. Whilst they have no strong objection to the ECRL, they query whether there would be sufficient demand from passengers. They think that at least 80% of the residents would not accept the present alignment in their area.

Railway Scheme

As they are unhappy with the stretch of alignment in their township, they would like to have more details on the alignment. They are interested to know more from the Railway Scheme and request that they are informed of the commencement of the scheme so they could examine closely the preferred alignment.

FGD S03: Representatives from housing area (7) in Kapar Setia

Date: 17 September 2017

Time: 2.35 pm – 3.40 pm

Venue: Lobby Flat Taman Kapar Setia, Klang

Present:

Name	Position
1. Zafriakma	Bendahari Surau
2. A. Sabri	AJK
3. Ghazi	AJK
4. Zaimany Abu	AJK
5. Khalid	AJK
6. Rohaizan bt Ridwan	AJk
7. Dayang Zainu Zamah	AJK
8. Siti Jariah Jurami	AJK
9. Roslee Tauhid	AJK
10. Norhayati bt Mat	Penduduk
11. Hamzuri Abd Halim	Penduduk
12. M. Ihsan b. Sulaiman	Penduduk
13. S. Mathan	Bekas Pengerusi, KRT
14. S. Ramish	AJK KRT
15. Mohd Fauzi	AJK
16. S. Matheayam	AJK
17. M. Azahar	AJK
18. Mohd Fauzi	AJK
19. Normah Dahlan	AJK
20. Fahmi	AJK
21. Hairul Azezan Awang	Penduduk

Social Profile

There are around 7 housing areas grouped under Kapar Setia. It is estimated that there are 1,000 households here, giving rise to a population of 4,000 to 5,000. The housing area is well-established, having been here for at least years. The ethnic mix is about 45% Malays, 45% Indians and 10% Chinese. The people here work predominantly in private sector. The indicative age structure shows relatively young population – 90% are below 50 years and 10% are above 50 years.

Map Viewing

Time was allotted for map viewing of the alignment after presentation. As the alignment is relatively close to the housing area –at one point, it is about 150m away, it was important to
indicate to them that there is a provisional station nearby. Many support this as it would benefit them, enabling them to access and make use of the ECRL.

Key Perceived Social Impacts from ECRL

Planning and Design Stage

1. Disruptions to Living Environment

A key concern among them is the close proximity of the alignment. They are worried that the train would be noisy during operations, especially the freight line.

Two major issues are Noise and Vibrations. They worry about the long term effect on them from noise emitted by the train during operations. Another worry is if they do not complain now about the alignment; during operations when the train is noisy and unbearable, they would not know who to complain to and what could be done then. Another observation is the fear that the freight train can be noisy.

They suggest that the alignment be shifted further away, possibly beyond 200m from their homes to avoid noise and vibrations and any disturbances. One of the housing areas (single-storey houses) is believed to be below 200m away from the alignment-residents there are concerned over this proximity.

2. Floods

Some parts of the housing estate are subject to flooding, i.e. Taman Kapar Setia where the single storey houses are located. Request that attention be paid to this as it could be problematic during construction.

3. Land Acquisition and Relocation

As there is no land acquisition, this issue was not raised.

Construction Stage
Due to close proximity, there are numerous concerns as follows:

- Cracks to existing buildings
  Residents whose homes are nearer to the proposed alignment want to know what protection is available if vibrations from construction works result in cracks.

- Damage to existing roads
  There are concerns that the presence of heavy construction vehicles will damage existing roads, causing potholes and making it difficult for residents. They hope some action could be taken to avoid this.

- Construction activities at night
  They want to know if there would be construction activities at night and how would they obtain information on such possibility. For those who live nearer to the alignment, they worry about whether their families could be affected by night construction.

- Foreign workers
  They believe that presence of many foreign construction workers could affect their (a) health (b) create social conflicts as the safety of their families and security of their homes may be at risk. They point out that hiring foreign workers may be easy for contractors but there are social costs to nearby communities because (a) locals would not be employed as it is far cheaper to use foreign workers (b) foreign workers are willing to accept less favourable working conditions than locals (c) foreign workers could bring diseases into the areas and put the communities at risk.

  They accept that it may not be possible to hire all local workers to work but given that there is a large number of youths who are unemployed, more efforts should be made to see how they could be attracted to work in such activities –perhaps better pay, better work conditions, better safety measures and dedicated training.

- Safety of Residents during Construction
  They note that there have been a number of deaths related to accidents as a result of the construction of West Coast Expressway (WCE) and they fear a similar situation when ECRL is under construction. They want more preventive measures to avoid this. Safety is also important during operations.

- Duration of Construction
  Some find that the period of construction appears lengthy and want to know when construction is likely to commence in their area. It helps them to know more.

During Operations

Issues during operations are not highlighted as they would prefer the alignment to be shifted away from them. In doing this, they think there would not be any issues. Having a station would be beneficial to them.

Level of Support for ECRL

They support the ECRL but with some conditions as follows:

- If possible, shift the alignment further away –perhaps more than 200m
- Make sure that the Dilapidation Survey is done to avoid issues over cracks to building during construction

- Have a 'Hotline' service during construction so that they can call and make complaints and receive feedback
- Have the contractors to meet up with the RAs periodically as they believe such 'Meet and Exchange' sessions, however, short, enable them to know when major construction works would start and when to anticipate disturbances or disruptions in their living environment
- Tackle the flooding problem because it could be aggravated during construction

FGD S04: JKK/Representatives from Kg Datuk Harun, Taman Serendah Utama, Kg Tok Pinang, Kg Damai, Taman Melati, Taman Desa Kiambang

Date: 19 September 2017

Time: 9.30am –11.40 am

Venue: Balai Raya Kg Sri Serendah, Ulu Selangor.

Name	Positiion
1. Mustafa b Muhammad	Resident, Taman Desa Kiambang
2. Abd Jalil bin Sambah	Representitive Kg Sri Serendah
3. A. Kadir Ahmad	Resident, Taman Desa Kiambang
4. Hamka b Ramlan	Resident, Taman Desa Kiambang
5. Sheikh Md Faadhil	Resident, Taman Desa Kiambang 3
6. Ahmad Firdaus Buyong	Resident, Taman Desa Kiambang 3
7. Hj Kamarul Azmi	Resident Kg Tok Pinang
8. Mohd Saiful Saffie	Taman Desa Kiambang
9. Ahmad Shazali Hashim	Taman Cempaka
10. Daud b. Moro	Taman Sri Serendah
11. Shamsuddin Sharip	Taman Melati
12. Azlan Daud	Taman Desa Kiambang
13. Ho Yeng Chew	Kg Seri
14. Jani b Shafie	Taman Desa Kiambang
15. Mohd Fuad Misron	Kg Dato' Haron
16. Mohd Haron	Kg Desa Kiambang
17. Norhaizan Zamani	Naib Pengerusi KRT
18. Shahrul Anil	Taman Melati
19. Shila Kadirani Othmari	KRT Taman Melati
20. Rusmi Minhat	Penghulu
21. Zulkifli Rahim	Taman Melati
22. M. Rozihaizad Nordin	Taman Cempaka
23. Shah Affendi Soleh	Resident
24. Shamsul Saleh	Kg Tok Pinang
25. Kelana Saihi	Kg Tok Pinang
26. Mohamad Iqbal	Resident
27. Ho Yik Seng	Resident
28. Zarina Tajuddin	Resident

Social Profile

There are five major settlements here as follows: Taman Melati, Kg Tok Pinang, Desa Kiambang, Taman Desa Kiambang and Kg Damai. The number of households here is estimated at around 3,000 with about 20,000 people. Most of people work in private sector. The majority are also below 50 years of age.

Map Viewing

Time was allotted for map viewing of the alignment after presentation of quick facts on the proposed ECRL. The preferred alignment cuts through three housing areas, i.e. Kg Tok Pinang, Taman Melati, and Taman Desa Kiambang. Residents observed that some homes will have acquired to accommodate the railway.

Key Perceived Social Impacts from ECRL

Planning and Design Stage

1. Potential Land Acquisition

Participants are upset that the preferred alignment cuts through some parts of their housing areas, resulting in acquisition. They ask for more details on the lots, especially those affected. Some are visibly worried and upset by this. In Taman Desa Kiambang, it was pointed out by residents that at least two rows of houses may be subject to acquisition. For small housing areas, this would mean a complete disruption because the remaining areas not subject to acquisition would have to live permanent with the railway next to them. They fear the noise and other disruptions, especially from a freight train. According to them, it would better to just acquire the entire housing area then to leave some in this unsettling condition where they have to be subject to noisy train during operations. They believe that if they accept the present alignment, and the presence of the proposed railway yard, the tranquil atmosphere of their settlement, especially in Taman Desa Kiambang, would be destroyed.

As a result, the group made some suggestions on possible amendments to the alignment to help them cope with potential acquisition and disruptions to their homes. They offer two suggested adjustments to the present alignment and request that they be considered seriously as they believe the alignment should not be in the first place be drawn without considering the people who live in this area (See Figure 1 below).

2. Potential Disruptions to the Living Environment

The residents are concerned that the length of the alignment crossing their area is relatively long. Some of housing areas are affected by acquisition; others that are not affected may be too close to the alignment resulting in disruptions from noise and vibrations.

3. Potential Aggravation of Floods

The residents informed that their areas are subject to flooding. The Penghulu affirms that flooding is due to the river overflowing during heavy rainfall. There is concern that this problem may not have been considered in the design of the ECRL. Request is that JPS is consulted on this potential issue.

4. Potential Impact on Forest Reserve

Query raised on whether nearby forest reserve will be affected. They accepted the explanation that tunneling will be used to protect forest reserves.

5. Possible Relocation

They believe that for those affected by acquisition, relocation will be difficult because they have to move away. They are unsure about issues related to compensation, payments and affordability of alternative housing.

Construction Stage

Due to close proximity, there are numerous concerns as follows:

- Risk to public health
- Aggravation of flooding conditions
- Vibrations during construction
- Safety due to construction vehicles on their narrow roads
-

The local Chinese primary school is observed to be nearby to the alignment. Although it is not subject to acquisition, there is concern that its operations may be affected by noise and vibrations during construction.

During Operations

During operations, due to perceived proximity of the railway and its yard, they continue to worry over:

- Aggravation of floods
- Noise especially from operations of freight trains
- Noise from the railway yards
- Traffic congestion from freight vehicles on their narrow roads
- Safety and security of local population from presence of heavy freight vehicles

Level of Support for ECRL

They acknowledge that the proposed ECRL has its benefits. They believe that a freight train is especially beneficial to the industrial sector. They support the project but on condition that it does not seriously affect the lives of the local population.

What they want

- Amend the present alignment such that it is away from their homes which would remove the need to acquire some of their homes and possibly cause an entire community to seriously fragment until it is not possible for them all to be together
- They do not want their neighborhood to be disrupted and as far as possible, keep them all together

- A discussion jointly with PBT and local JPS where technical matters over noise, floods and road congestion are discussed with the aim to resolve these for the sake of the people.
- They want the PBT to look into the alignment and assure them that it does not contradict the corridor for the railway in the Local Plan.
- To be informed on the commencement of the Railway Scheme as they want to know how they could raise their views on the alignment so the authorities could look into this.
- Want information on the railway schedule during operations i.e. its frequency so that they could gauge the noise impact on them; potential noise emitted from the trains during operations in terms of decibels.

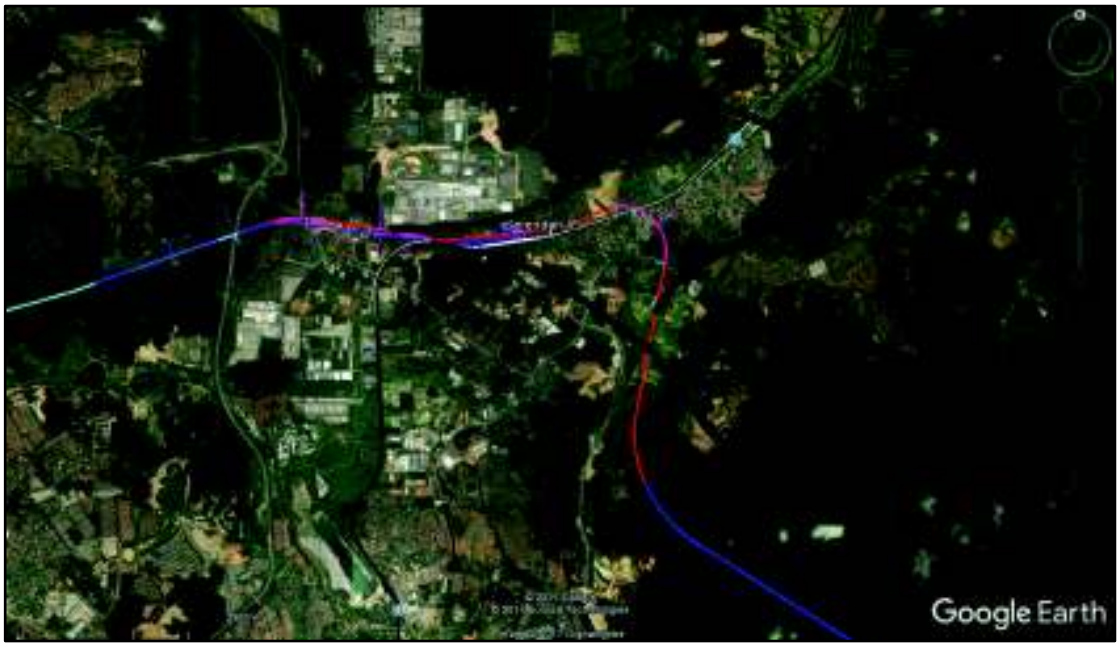

Figure 1: The Proposed Alignments (black)

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FGD S05: Penghulu Mukim Rantau Panjang

Date: 19 September 2017

Time: 2.45 pm – 4.10 pm

Venue: Balai Penghulu Mukim Rantau Panjang

Present:

1. Hj Mohd Samsidi Sudri	Ketua Kg Batu 4, Jln Kapar
2. Hj Abd Halim Hj Ka'aad	Ketua Kg Rantau Panjang
3. Hj Mohd Darin Samajo	Ketua Kg Batu 3
4. Zurmin bin Mohaini	Penghulu
5. Mat Ellah Md Nor	Ketua Kg Sementa
6. Razali Rahmat	Ketua Kg Perepat
7. Norashikin Mohd Shari	Peg Tadbir Pejabat Daerah Klang

Social Profile

Kg Rantau Panjang
Population here is estimated at 38,000. Majority are Malays (90%) and 10% (Chinese and Indians). People work mostly in private sector. There are 7 fish landing stations here due to proximity to North Port. There is a fishing community here – about 200 fishermen.

Kg Sementa
This village is no longer a traditional village. Only a small part of it remains traditional village; much of it has been turned into residential estates. There are 8 sections here. Estimated population is about 20,000. Most people work in private sector. There is a relatively high proportion of pensioners living here.

Kg Batu Tiga
Village is near to the town of Klang. Estimated population is about 10,000. Nearer to the town, the population is dominated by Chinese and the Malays are found mainly in the rural parts. Most work in the industrial sector. There are limited jobs in the village. People who own land mostly rent them out.

Kg Batu 4, Jalan Kapar
Population here is about 2,800. It was previously an estate. It is less of a traditional village as most of it has been developed into housing estates. The ethnic mix is about 50% Malays and 50% Chinese and Indians . There are fishermen here due to presence of small rivers. Fishermen use these rivers to reach to the sea at North Port to fish.

Kg Perepat
Population is about 8,000. Dominant ethnic group is Malays. People work mostly in industrial sector.

Map Viewing

The nearest place is Kg Sementa. No land acquisition is observed. The ketua kampong of Kg Sementa lives beside the road near to the alignment. When asked about proximity, he finds this acceptable.

Key Perceived Social Impacts from ECRL

Planning and Design Stage

1. Potential Land Acquisition

No land acquisition is likely to occur here. Participants enquire about compensation in the event that there is acquisition especially if the alignment shifts.

Query on whether they could use the land below the railway structure if it is elevated. Information on acquisition of land for the ROW was provided to the group to inform that the ROW will be acquired and fenced up for safety reasons and to prevent untoward accidents.

2. Potential Disruptions to the Living Environment

Kg Sementa is the nearest to the alignment but no concerns were raised over potential disruptions.

3. Potential Aggravation of Floods

Flooding is not a main issue here. Flooding occurs in Jalan Meru and Klang Utama but not in their place.

Construction Stage

Concerns were raised on the following:

- As alignment crosses the main river, fishermen using it will be affected during construction. They may not be able to use river to go to sea to fish so their income could be affected. They want to know what actions could be taken during construction to mitigate this potential problem.
- Pollution of river during construction could also cause problem for fishermen. This could result in pollution of river mouth and to sea.
- Foreign workers are not a major problem here. Although they acknowledge there could be some social problems and conflicts as well as health risks, they believe this would be managed. There are foreign workers in most of their villages and they have live with this. However, they would like to see some precautionary measures taken to ensure the risks do not exacerbate during construction.
- On noise during construction, there was no negative feedback. They have no complaints over any noise issue with the construction of WCE and do not expect any with the ECRL construction.

- On possible traffic congestion, they did not think there could be traffic congestion during construction.

During Operations

They cannot envisage any problem during operations. However, they would like to have a station nearby. The idea of a provision station near to Taman Perindustrian Meru will be good for the villagers as they would have an alternative mode of public transport.

Level of Support for ECRL

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Interview the Managing Director, Allied Warehouses (M) Sdn Bhd; IDC Global Logistics Sdn Bhd and Deputy President, Klang Chamber of Commerce and Industry

Date: 22nd September 2017
Venue: Hotel Premier, Jalan Langat, Klang
Time: 10.00am – 11.40am

Present:
1. Mr. Khoo Liong Chuan, Managing Director, Allied Warehouses (M) Sdn Bhd/IDC Global Logistics Sdn Bhd
2. Dr Leong Kai Hin, Deputy President, Klang Chinese Chamber of Commerce and Industry

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The discussion centred on the freight industry and the benefit of ECRL, especially Phase 2 extension into Selangor and Port Klang.

Comments
1. Port Klang is Malaysia's premier port so connectivity to it will be good for Kuantan Port
2. Unsure whether the proposed stations along the route are beneficial to the freight industry
3. To note that a successful freight business/activity requires an inflow and an outflow of cargoes. In the case of rail, the coaches should be taking goods from East Coast to West Coast, i.e. Port Klang and able to return with loaded cargo to the East Coast to ensure a viable business. If this is not there, the business model will fail.
4. Personal experience with Thai-Malaysia Land Bridge met with failure. One among 4 operators that took up this challenge to use KTM rail to bring cargoes from Thailand for export but it returned with no goods, resulting in consistent losses and finally, a shutdown of business among the freight operators involved in the northern land bridge.
5. A cautionary note –that a 70% freight line could be extremely challenging due to low margins in freight businesses. If there are numerous handling points, industrialists will not subscribe.
6. The freight service earmarking for a long haul say from Kelantan to Port Klang and vice versa may be viable. The Kuantan-Port Klang route is still considered a medium haul
7. Short haul activities are not lucrative; users would opt to use trucks via roads even if it is expensive because of the lack of 2-way flow of cargoes. Not likely short haul business can be suitable for rail. It may result in many handling points. Industrialists do not like to have too many handling points as this raises their handling costs. Short haul using trucks allow pick-ups and drop off easily along the route; a railway cannot allow for this. It is less flexible.
8. East coast has less containerised cargoes so it will be tough for the railway especially in the short to medium term. Kuantan port is mostly into raw materials –rubber and minerals whereas in the Klang Valley, the market is manufactured goods.
9. It is better to look carefully into serving the industrial areas. Having links to large industrial areas that manufacture goods for exports and also areas with strong demand for exports facilitate the expansion of freight industry which is very competitive.

10. North Port is a good port for import-export. It makes money even if it is not as big and fanciful as West Port
11. West Port does mostly containerised business; it faces intense competition especially from Singapore.
12. Looks like freight stations along the route cater to local or domestic market which is small. If stop is in small industrial areas where industries cater to local market, there is no benefit for the rail. Industrialists are likely not to use it.
13. Suggest to look at freight stations that cater to huge industrial areas. Better for ECRL to go directly into North Port and West Port to set up terminals so that the large industrialists can make use of these terminals. They would save on handling cost, an important factor. In addition, these terminals do not have to invest in expensive equipment for handling cargoes; the Ports already have them.
14. If ECRL goes to Serendah, volume is important. It is unclear whether there is volume in Serendah. The automobile industry does not use rail to transport cars. Also, by going to KTM, station to link up, the question is will this encourage the manufacturers to use this terminal point. Would it be better to have the terminals where they are located, i.e. within the North Port where there is significant manufacturing activity (export-oriented) and in PKFZ in West Port.

Summary

1. The general view is scepticism that the freight service offer by the railway with stops in small minor industrial areas would be beneficial for ECRL.
2. For the freight service to be viable, it is better to consider long haul service that is able to cater for inflows and outflows of cargoes – a balance that would not leave coaches empty on the way back from destination, either Port Klang or Kuantan Port.
3. Port Klang –Kuantan Port is more of a medium haul route than a long-haul route so it may not be financially attractive to use rail versus trucks
4. To make the ECRL work, there has to be strong manufacturing bases in the East Coast, possibly in Kelantan to provide the impetus for a long-haul activity.
5. The rail line moving minerals west to Port Klang would have to consider what it can bring back to the East Coast or it would be empty –this is a crucial question
6. Consider whether proposed stations at Serendah and Jalan Kastam are really viable; why not consider shifting these into North Port and West Port to serve the manufacturers there. These two areas have viable strong manufacturing activities.

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