

East Coast Rail Link (ECRL) Project

Section C2 (Gombak – Serendah – Port Klang)

Second Schedule Environmental Impact Assessment

EXECUTIVE SUMMARY

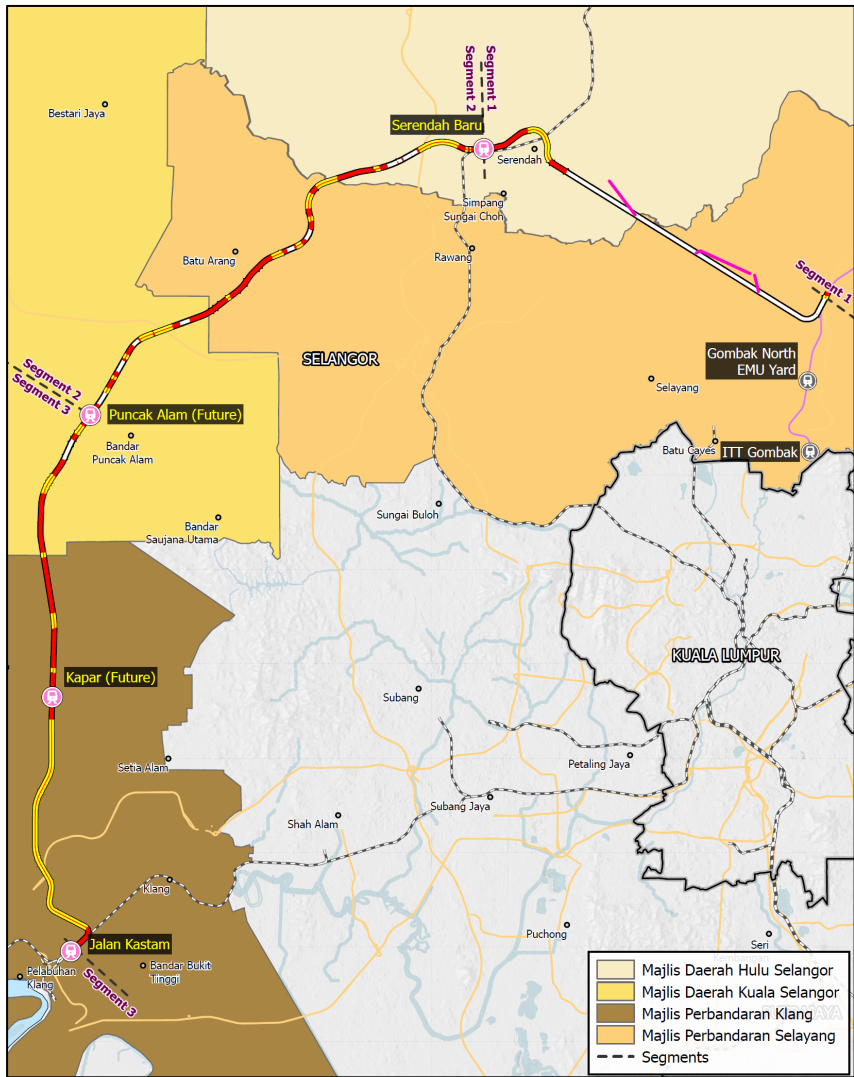
This EIA is prepared for the “East Coast Rail Link Section C2 (Gombak – Serendah – Port Klang)”, hereinafter referred to as “**ECRL Section C2**”.

The Section C2 is a 74 km alignment consist of at-grade embankments, viaducts, and tunnels. The alignment traverses through four districts in Selangor with four stations planned: Serendah Baru, Puncak Alam, Kapar, and Jalan Kastam stations.

East Coast Rail Link (ECRL)



ECRL SECTION C2



Project Proponent

Malaysia Rail Link Sdn Bhd

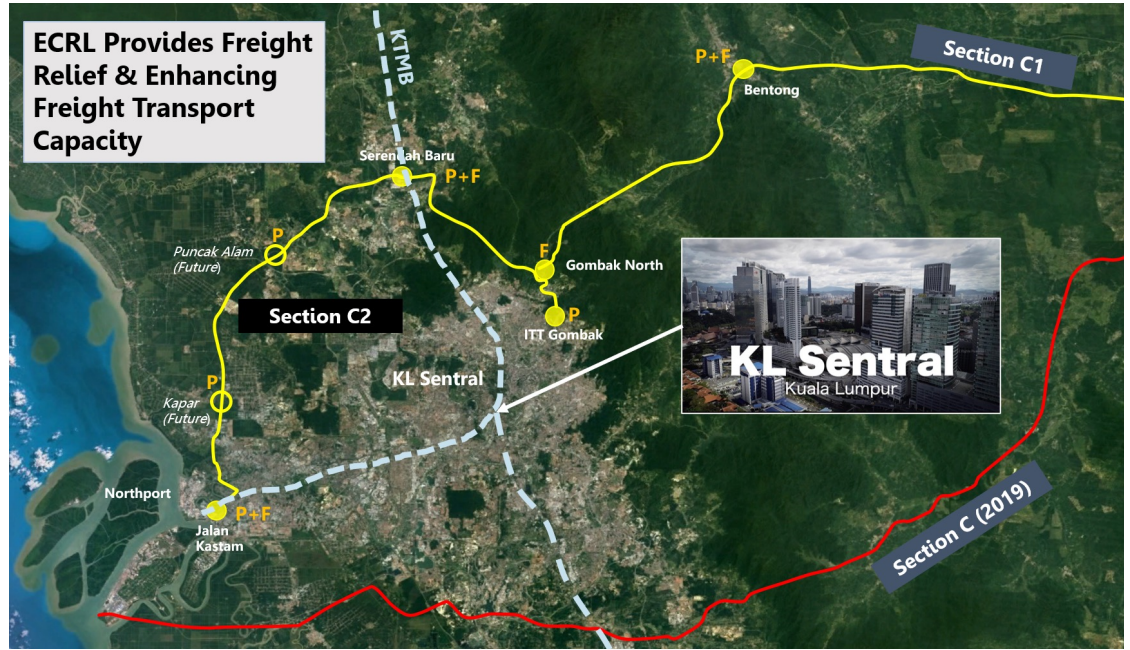
EIA Consultant

ere ERE
 (Member of Aurecon Group)

STATEMENT OF NEED

Freight Relief

- ECRL will provide a bypass route that avoids congesting KL Sentral – freight movements are slowed down by the short travelling window for freights through Klang Valley.
- The need for this bypass was also mentioned in the Selangor 2035 RSN to alleviate rail congestion in central Kuala Lumpur

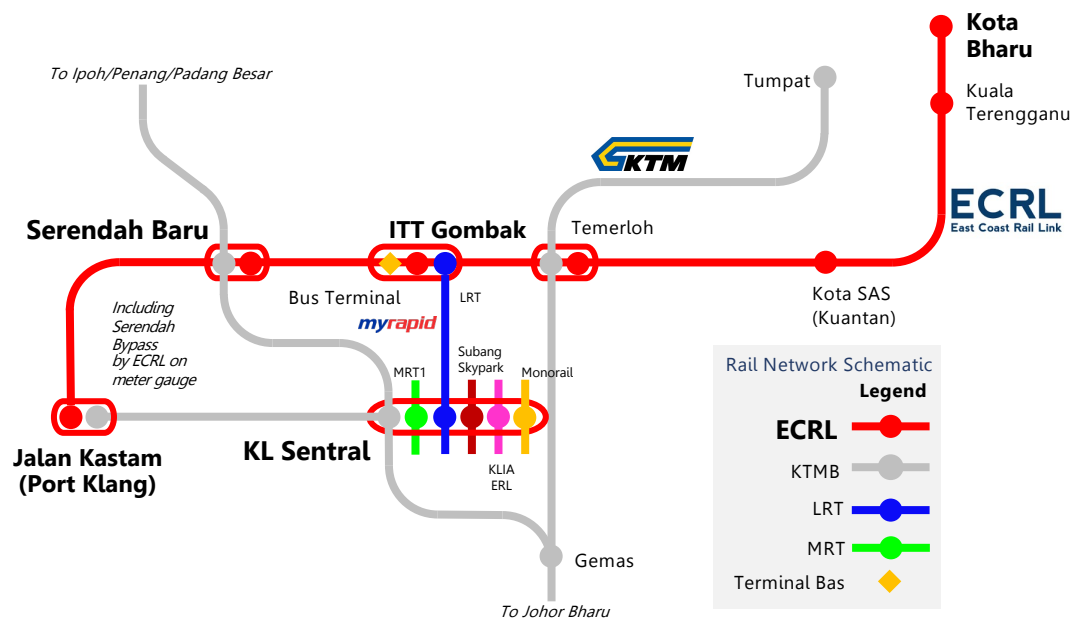


Serendah as Regional Cargo Hub

- The proposed Serendah Baru Station is strategically located – provides connection to northern and southern Peninsular through the north-south rail track, and to the east through the ECRL.
- This junction in Serendah is ideal to be developed as a regional cargo hub.

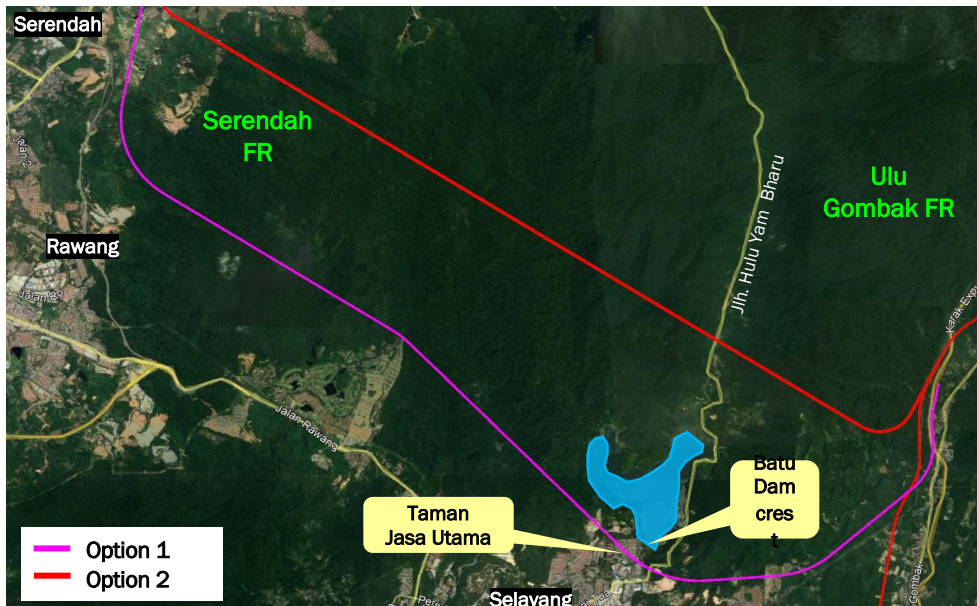
Maximises Connectivity

- The ECRL Section C2 provides an efficient way of transporting freights between Port Klang by the Straits of Malacca, to Kuantan Port by the South China Sea.
- The ECRL Section C2 that completes the ECRL will significantly augment public transit network and economic mobility between west and east coast Peninsular Malaysia via land.



PROJECT OPTIONS

Various alignment options were evaluated to select the optimum alignment for the Project. The options varied according to the physical characteristic, socio-economic constraints and transport network design requirements as well as feedback from the Federal and State Government agencies.



Batu Dam & Taman Jasa Utama

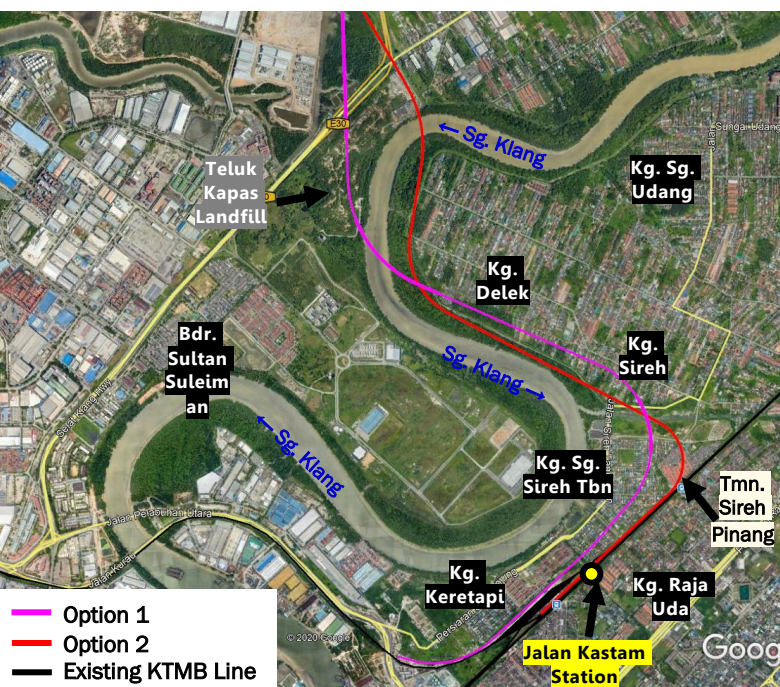
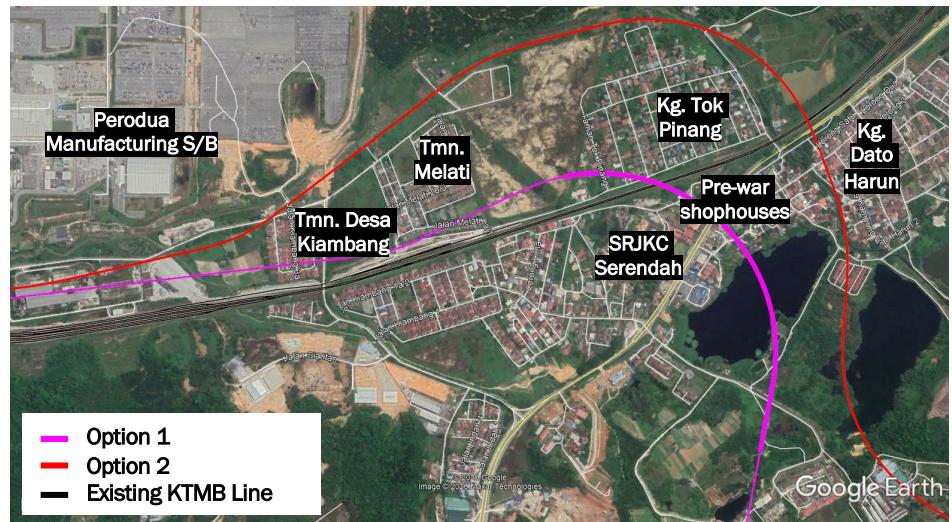
Option 1: Alignment bisects Tmn Jasa Utama (land acquisition, noise, vibration, traffic and public safety impacts) downstream of Batu Dam and near the dam crest.

Option 2 (preferred): Alignment tunnels upstream of Batu Dam and avoids bisecting Taman Jasa Utama

Serendah

Option 1: Alignment travels through middle of Serendah town - potential impacts on land acquisition (78 houses), noise, vibration, traffic and public safety to nearby communities.

Option 2 (preferred): Alignment skirts around Serendah town therefore reduces land acquisition (20 houses) and environmental impacts.



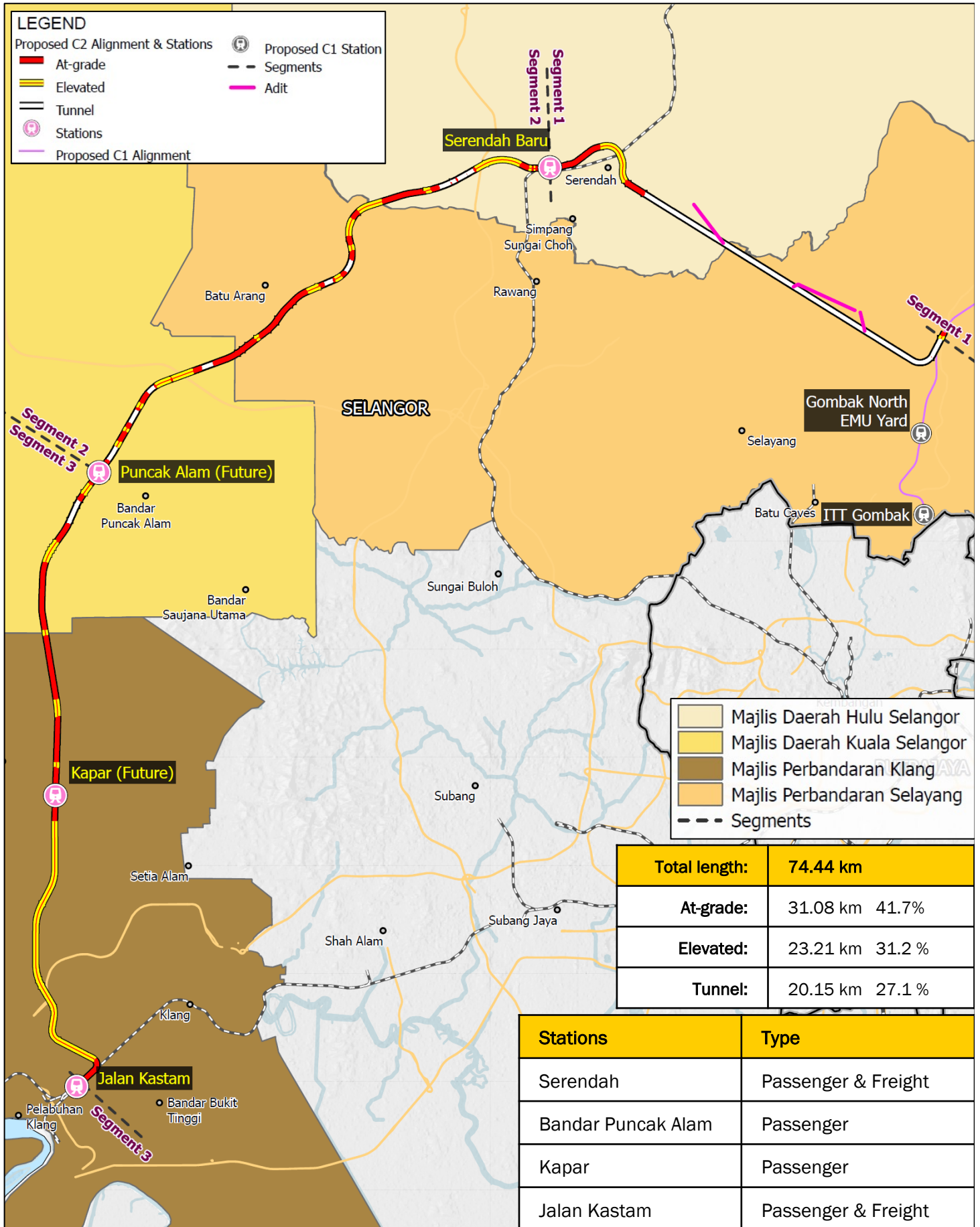
Port Klang

Option 1: Alignment passes through Kg. Delek and Kg. Sireh Tambahan (land acquisition up to 310 houses). Potential impacts from noise, vibration and safety risks to nearby. Alignment passes through the Pulau Kapas Landfill.

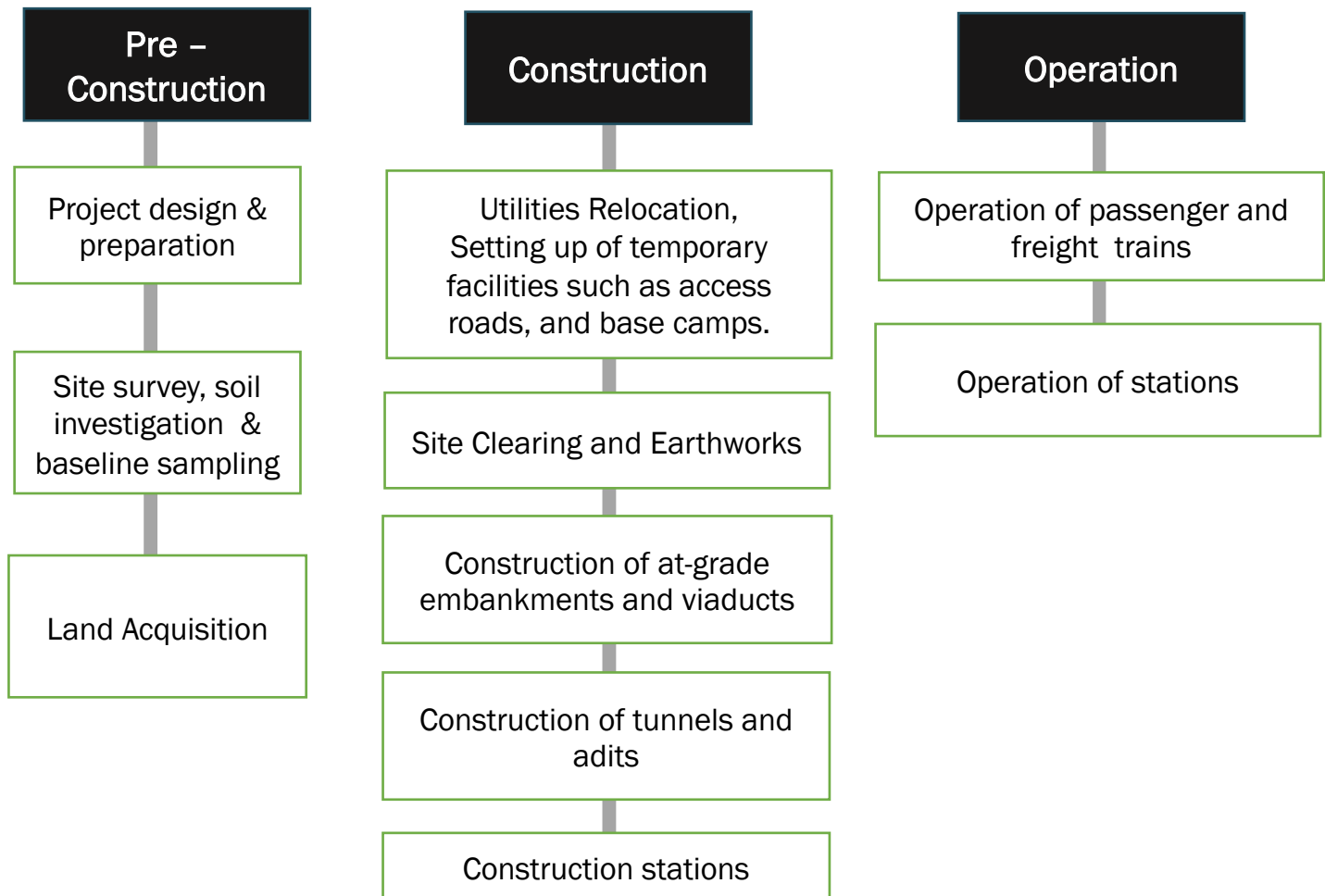
Option 2 (preferred): Alignment skirts the edges of Kg. Delek and Kg. Sireh Tambahan but passes through Taman Sireh Pinang (acquisition reduced to 89 houses). Reduced impacts from noise, vibration and safety risks to nearby communities. Alignment avoids the Pulau Kapas Landfill.

PROJECT DESCRIPTION

The Section C2 alignment starts from Gombak and traverses through Serendah, Bandar Puncak Alam, Kapar and ends at Port Klang.



PRINCIPAL PROJECT ACTIVITIES



PROJECT TIMELINE



PHYSICAL ENVIRONMENT

TOPOGRAPHY

Elevation

Hilly terrain and high elevations (120 m – 550 m) are found along Gombak to Serendah (Segment I).

Mainly flat terrain with low elevations from Serendah to Port Klang (10 m – 50 m).





Slopes




The alignment mostly on Class I & II slopes.

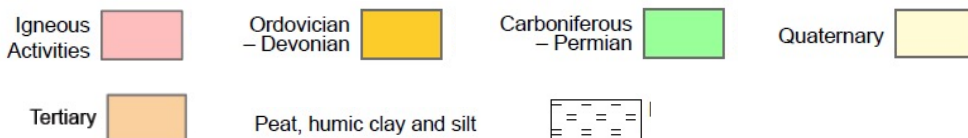
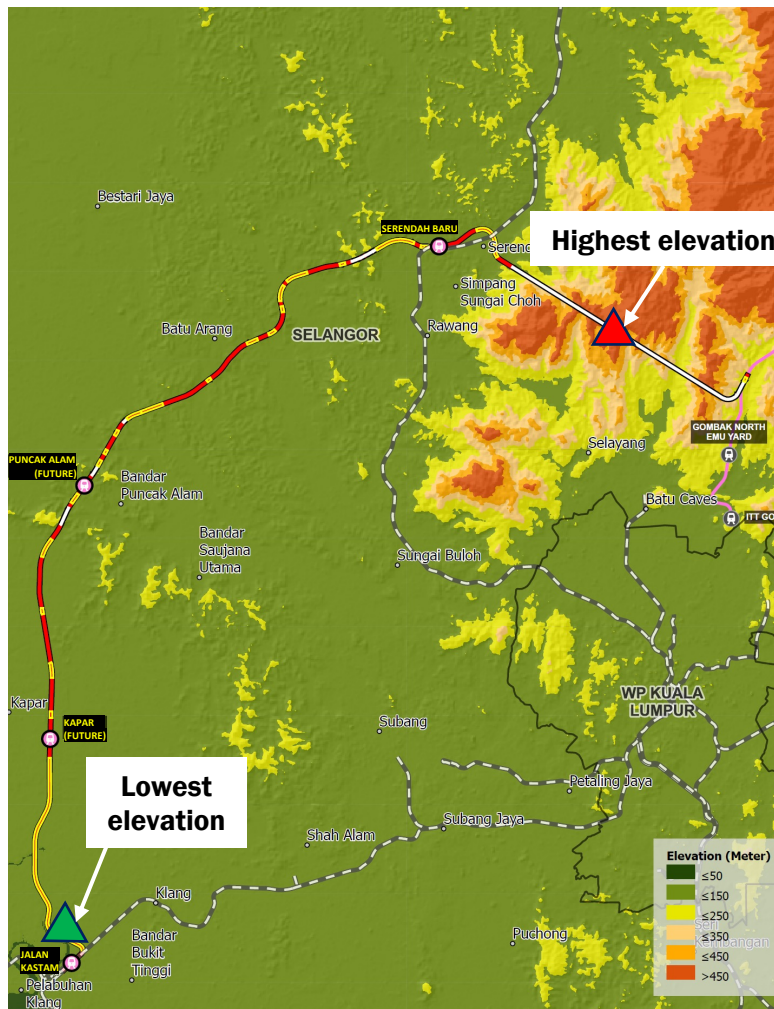
Class III slopes found intermittently from Gombak – Serendah (Segment I)

LEGEND

C2 Alignment

-  Proposed Alignment (Elevated)
-  Proposed Alignment (Tunnel)
-  Proposed Alignment (At-grade)
-  Proposed C2 Stations

-  Proposed C1 Alignment
-  Proposed C1 Stations
-  Existing Rail Line



GEOLOGY

Subsurface Geology

- Triassic **granitic rocks** along tunnel from Gombak to Serendah
- Ordovician and Carboniferous schist, phyllite and slate from Serendah to Puncak Alam
- Quaternary alluvium from Puncak Alam to Port Klang (pockets of peat near Kapar)
- Serendah Tunnel does not cross fault lines and only runs parallel to lineaments

Soil Investigation

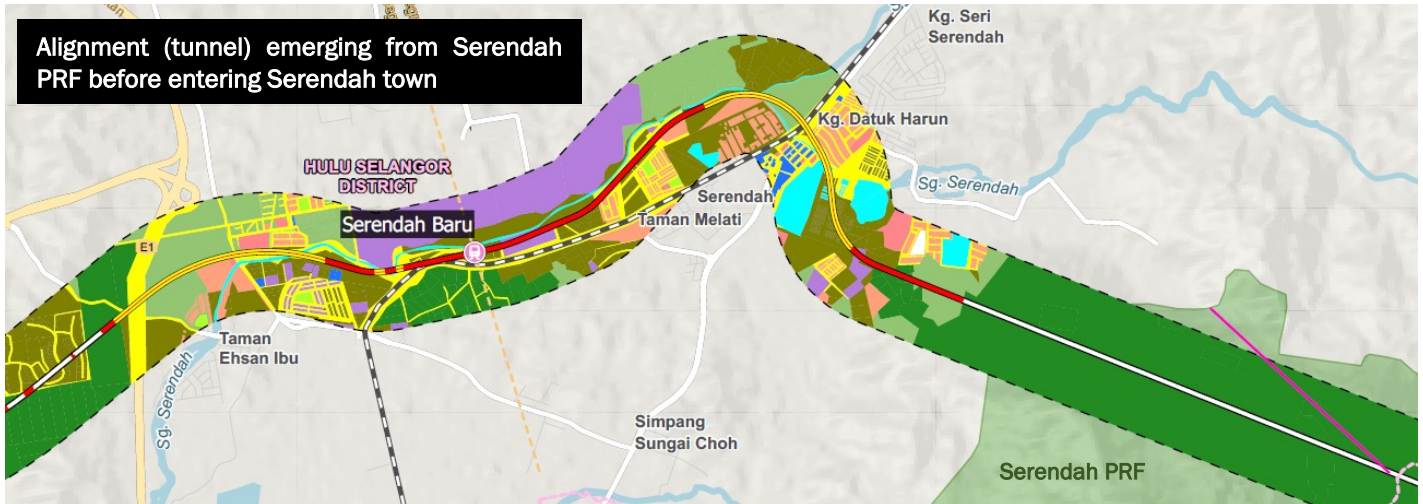
- 19** boreholes from preliminary SI:
- Varied geological formation including granites, schists, to young alluvium
 - Granite bedrock reached at 3.5 m and 7.5 m depth at Ulu Gombak PRF (Serendah Tunnel)
 - Soft and young alluvium in Klang and Kapar with SPT N-value <9.

LAND USE (within 500 m from the alignment)

Segment 1 (Gombak to Serendah)

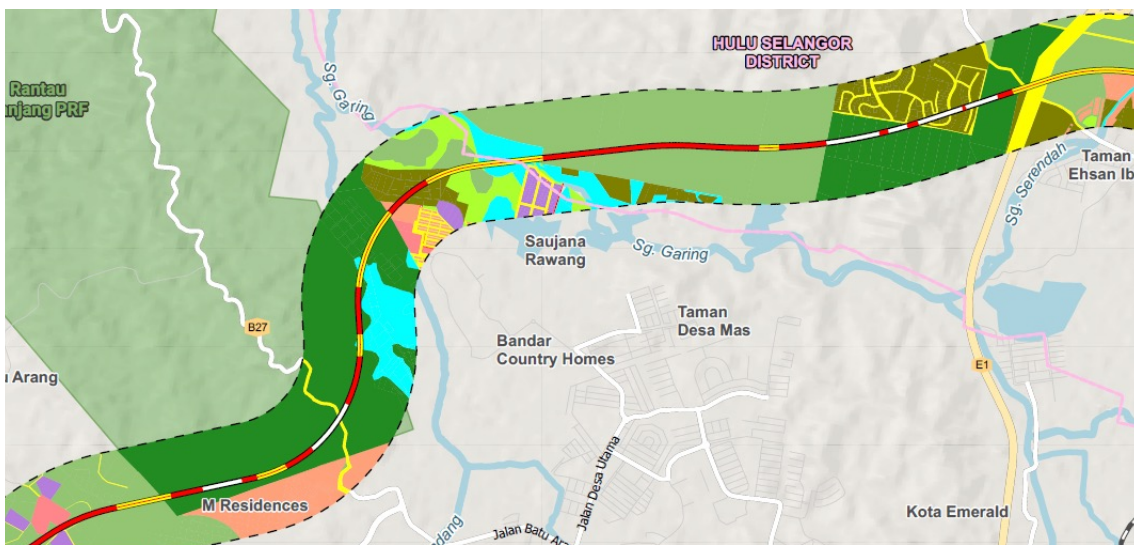
Mainly forests (Ulu Gombak & Serendah PRF) on hilly, steep terrain (Serendah Tunnel) with some built up areas (residential, commercial etc.) at both ends of the segment in Gombak and Serendah.

Alignment (tunnel) emerging from Serendah PRF before entering Serendah town



Segment 2 (Serendah to Puncak Alam)

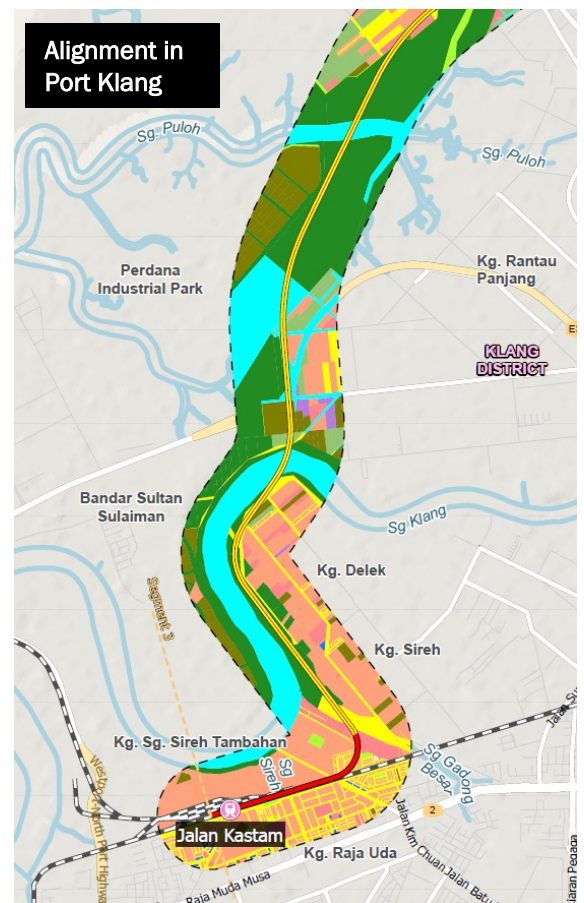
Built up areas interspersed with agricultural land and forest reserve along this segment as alignment passes Serendah, Bandar Baru Sg. Buaya, Saujana Rawang, Batu Arang, Bandar Tasik Puteri and Bandar Puncak Alam.



Segment 3 (Puncak Alam to Port Klang)

Mainly oil palm estates interspersed with industrial areas from Bandar Puncak Alam to Kapar. Alignment will pass through mangrove forests along Sg. Puloh and finally reaching built up areas (residential areas such as Kg. Delek, Kg. Sireh etc.) in Port Klang before ending at the Jalan Kastam Station

Alignment in Port Klang



LEGEND

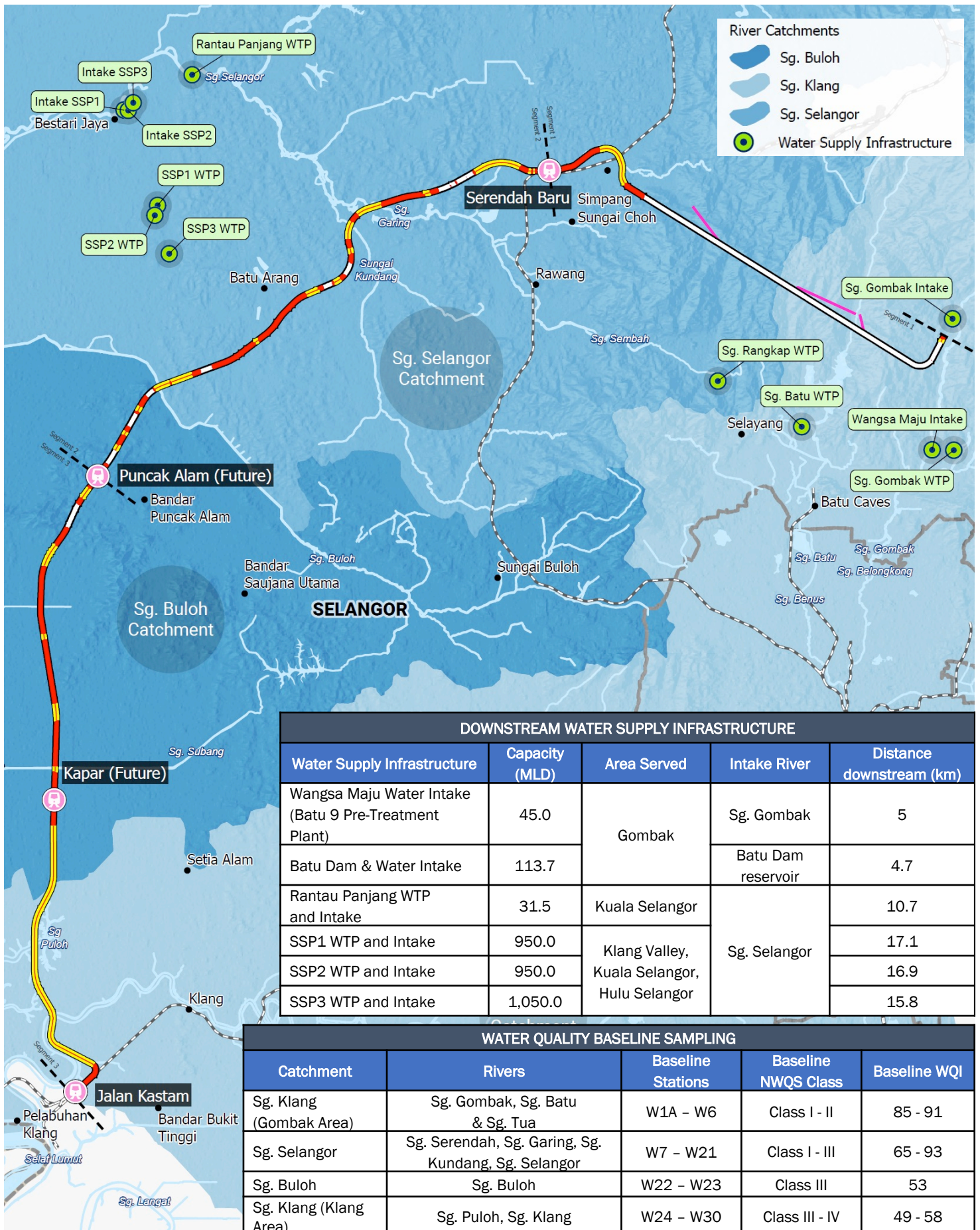
Proposed C2 Alignment & Stations	Adit	Rivers
At-grade	Existing Rail Line	Permanent Forest Reserves
Elevated	Highway	500m Buffer around Proposed Alignment
Tunnel	Major Road	District Boundary
Stations	Minor Road	

Existing Land Use

Residential	Agriculture
Commercial	Forest
Industry	Water Bodies
Institutional and Public Amenities	
Open Space and Recreational	
Vacant Land	
Transportation	
Infrastructure and Utilities	

20 River crossings across three catchments Sg. Klang, Sg. Selangor & Sg. Buloh

7 Water Supply Infrastructures located 4.7 km – 17 km downstream





3 Permanent Forest Reserves involved

19 flora, 13 wildlife survey plots
5 camera traps deployed (April - July 2021)

Flora

179 species

2 RET species listed

Fauna

136 mammals and birds

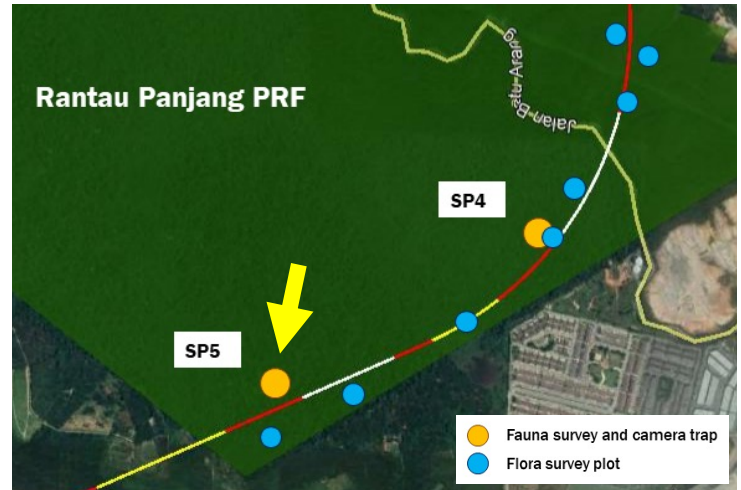
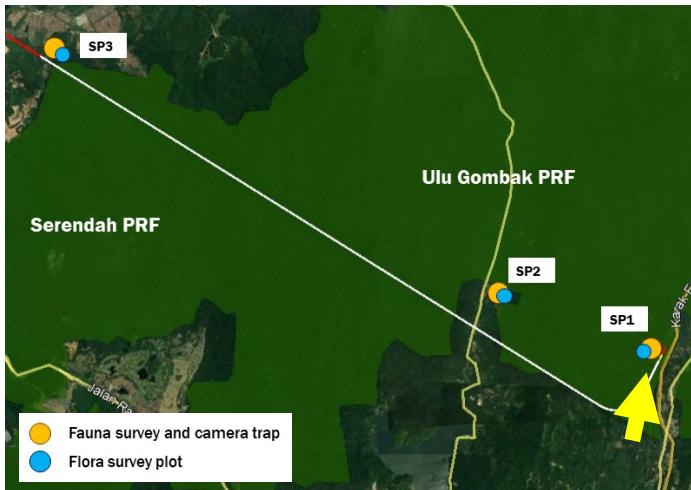
24 RET species listed

Survey summary

The Project will traverse through part of the **Selangor State Park** (ulu Gombak and Serendah PRFs) via the 14 km Serendah tunnel, with tunnel and adit portals designed at the PRF edges except one portal located within Ulu Gombak PRFs. **At Rantau Panjang PRF**, the Project follows the south-eastern border of the PRF, with a mixture of at-grade, elevated, and tunnel structures along the PRF boundary. Survey stations were determined

Overall habitat quality

The forest in Ulu Gombak and Serendah PRFs are generally pristine hill dipterocarp forest. However, the PRFs are surrounded by developments on the western, southern, and eastern borders buffered by regenerative vegetations along the borders. Rantau Panjang PRF is a gazetted production forest with primary vegetations at areas nearer to the core of the PRF. The forest along the PRF boundary experience some form of degradation pressured by agriculture.



Segment 1

Ulu Gombak and Serendah PRF Part of the Selangor State Park

18 mammal and **98** bird species

Notable findings from survey:

Sunda pangolin (CR, IUCN), (TP, WCA2010)
Gonystylus affinis & *Shorea hopeifolia*

Segment 2

Rantau Panjang PRF

7 mammal and **65** bird species

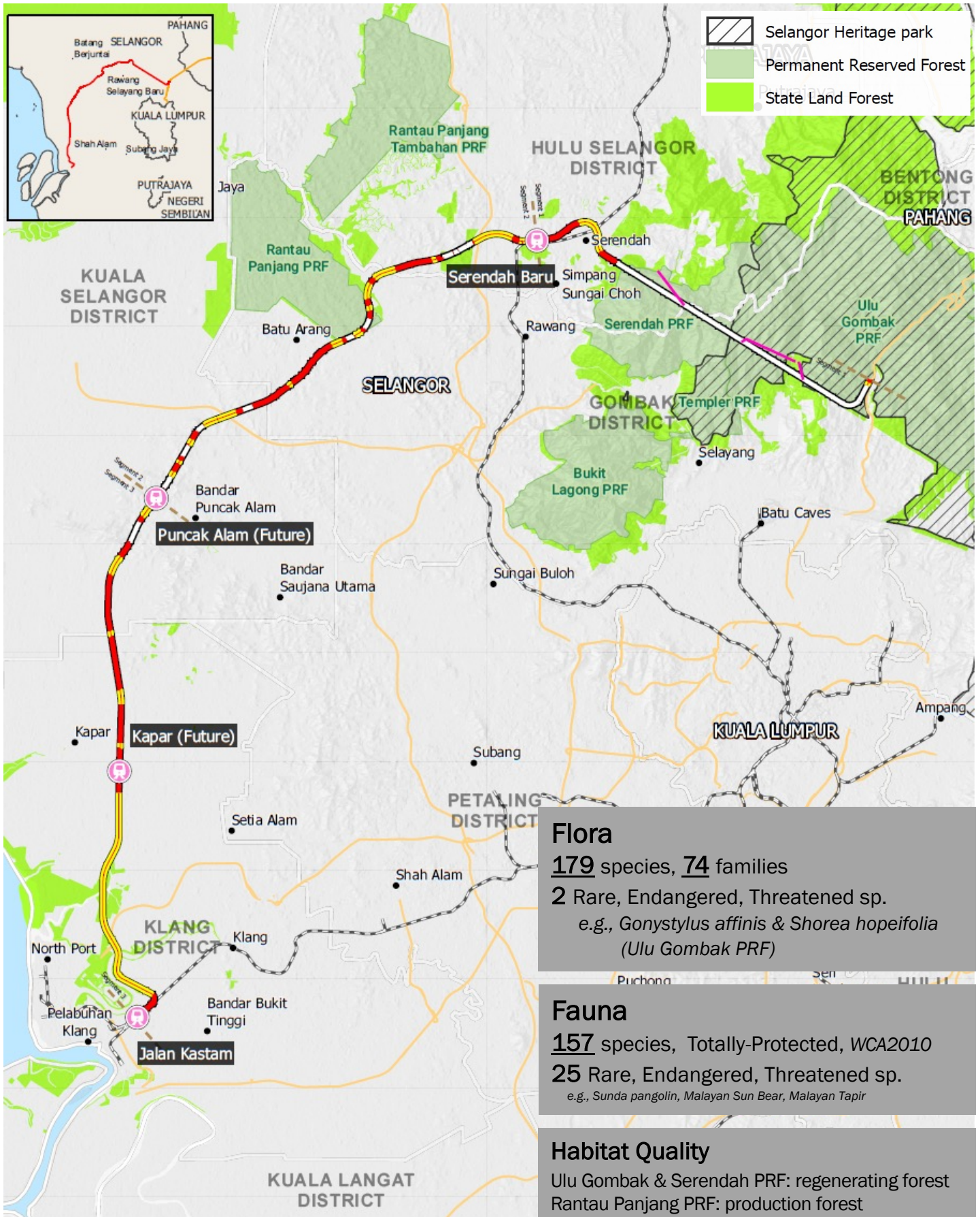
Notable findings from survey:

Malayan tapir (EN, IUCN), (TP, WCA2010)
Buff-vented Bulbul (NT, IUCN)





3 Permanent Forest Reserves traversed
 Ulu Gombak, Serendah & Rantau Panjang PRF
 5 Camera traps deployed from April - July 2021



Flora
179 species, 74 families
 2 Rare, Endangered, Threatened sp.
 e.g., *Gonystylus affinis* & *Shorea hopeifolia*
 (Ulu Gombak PRF)

Fauna
157 species, Totally-Protected, WCA2010
 25 Rare, Endangered, Threatened sp.
 e.g., *Sunda pangolin*, *Malayan Sun Bear*, *Malayan Tapir*

Habitat Quality
 Ulu Gombak & Serendah PRF: regenerating forest
 Rantau Panjang PRF: production forest

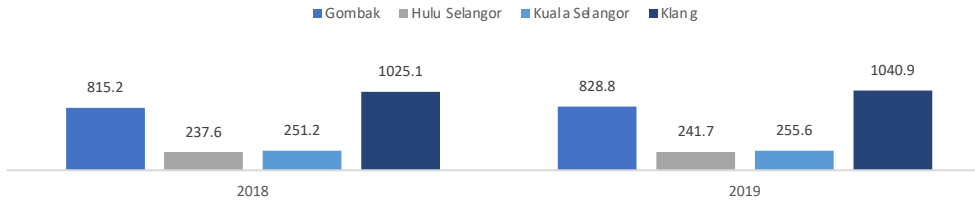
Population

Main Economic Activity

Highest population:	Klang (1 million residents)
	Gombak (more than 800,000)
Highest B40 group:	Hulu Selangor and Kuala Selangor districts
Highest mean monthly income:	Gombak (RM11,536/month)
Highest mean CAGR:	Hulu Selangor (7.10%)



Agriculture
Commercial
Manufacturing



Stakeholder Engagements

Social Perception towards Project

Public Perception Survey

- 1,200 households & commercials respondents
- Commenced in August 2021

Focus Group Discussions (FGD)

- 25 FGD sessions involving state agencies and private entities planned

- Freight industry players support the idea of using Serendah as cargo hub
- Land developers support the alignment considering the economic potentials from stations near their respective townships.
- Plantation owners are generally concern about land acquisition and severance of their plantation lands.

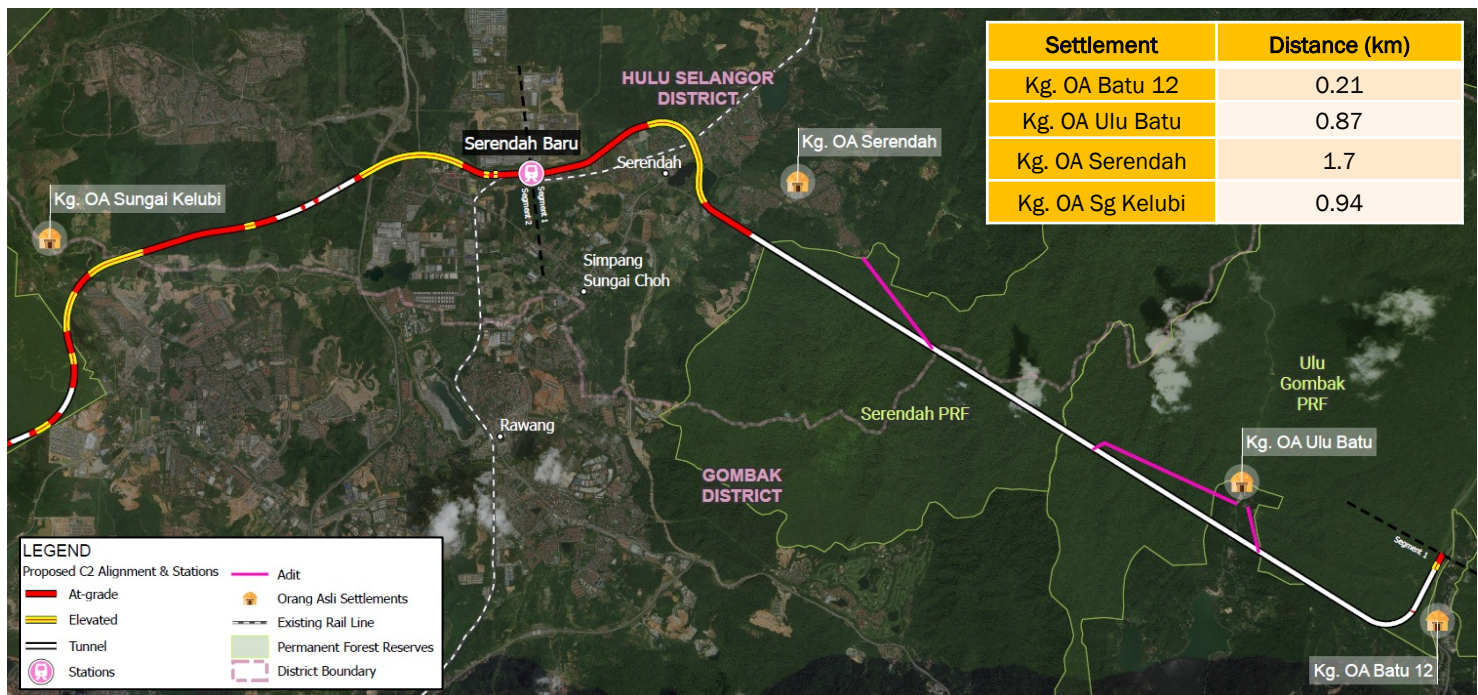
Nearby Settlements along the Alignment

Residential areas within 100m of the alignment are mainly found at the areas below:

- **Serendah:** Kg. Dato Harun, Kg. Tok Pinang, Tmn Melati, Tmn Desa Kiambang
- **Bandar Puncak Alam:** Tierra Alam Suria & Bayu Suria
- **Kapar:** Taman Jaya & Taman Kapar Setia
- **Port Klang:** Taman Sireh Pinang, Kg. Delek, Kg. Sireh, Kg. Sireh Tambahan

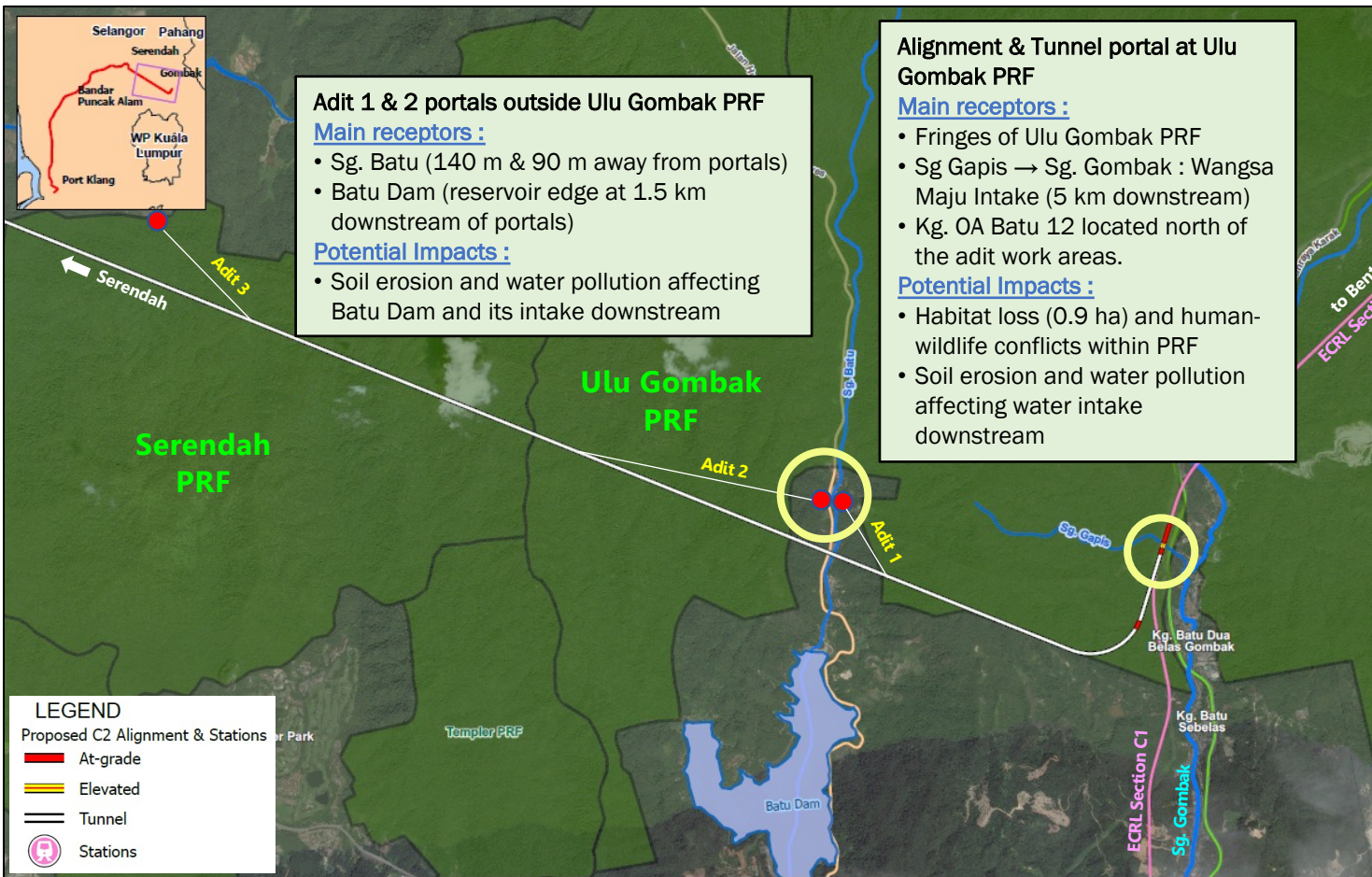
Nearby Orang Asli Settlements

No orang asli settlements **directly affected** by the Project. 4 settlements are identified within 2km of the alignment.

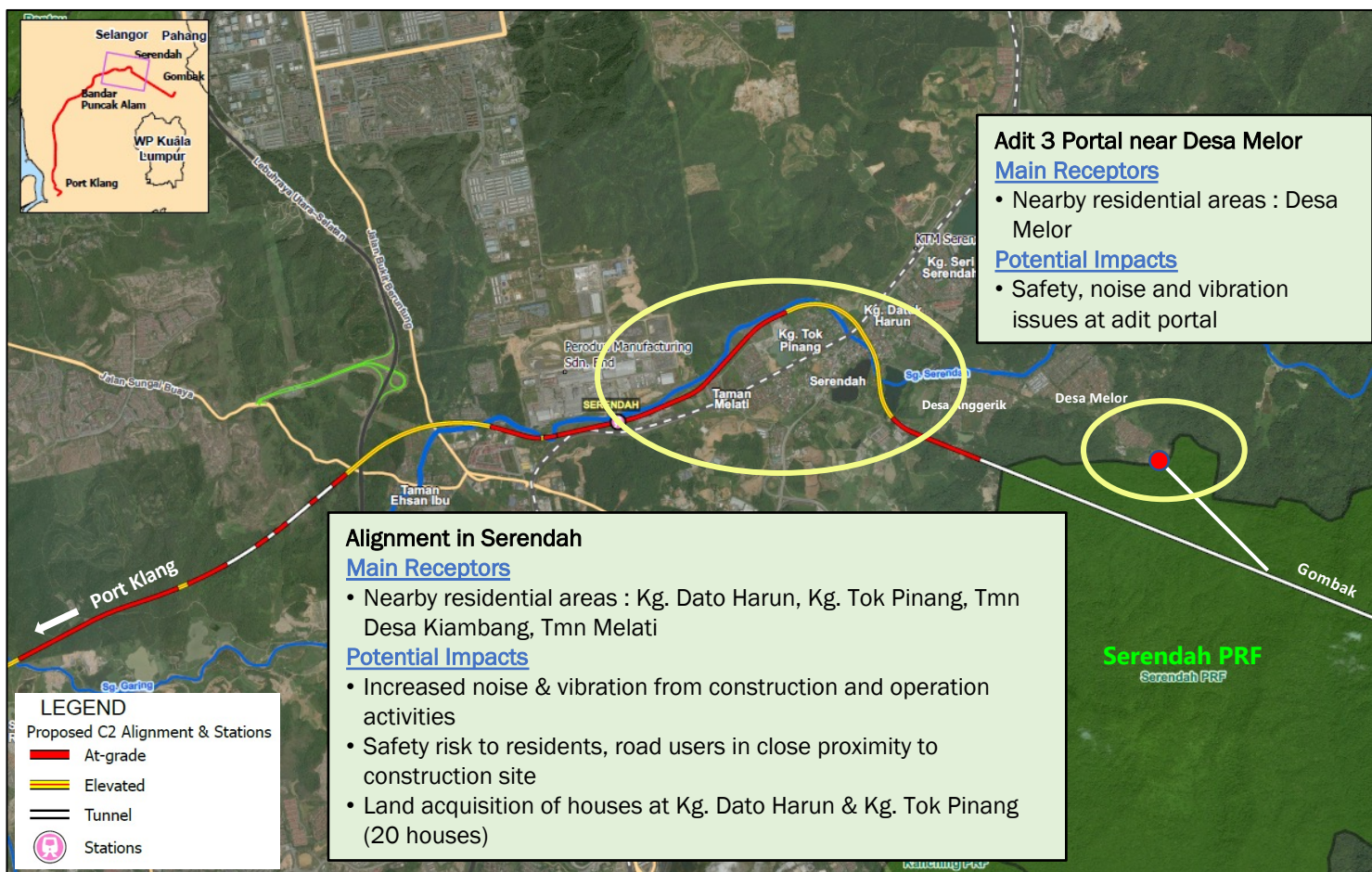


KEY IMPACTS AND SENSITIVE RECEPTORS

SEGMENT 1 : SERENDAH TUNNEL AND ADITS



SEGMENT 1 : SERENDAH TOWN



KEY IMPACTS AND SENSITIVE RECEPTORS

SEGMENT 2: SERENDAH – PUNCAK ALAM

Alignment within Rantau Panjang PRF

Main Receptors

- Rantau Panjang PRF (2.8 km in production forest)

Potential Impacts

- Loss of habitat (9 ha to be cleared)
- Impacts to biodiversity less significant as 1 km of alignment passes through plantation forest.
- Fragmentation is not significant as tunnels are provided to maintain connectivity
- Potential human-wildlife conflicts (M Residences)

Alignment Crossing at Sg. Garing & Sg. Kundang

Main Receptors

- Sg. Kundang & Sg. Garing that flows into Sg. Selangor
- Rantau Panjang, SSP1,2&3 intakes located 11-17 km downstream

Potential Impacts

- Impacts on water quality less significant because intake points are located far downstream

LEGEND

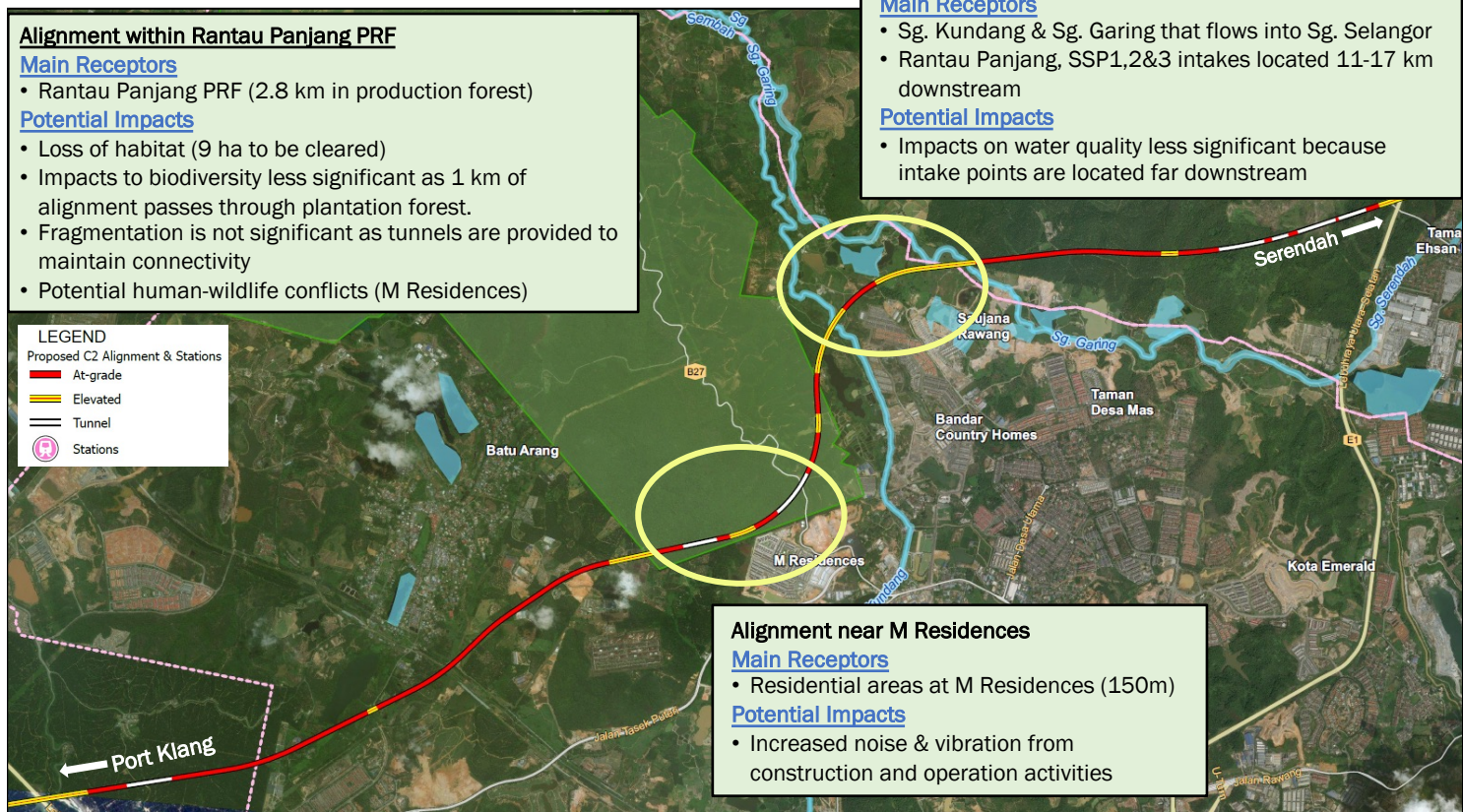
Proposed C2 Alignment & Stations

At-grade

Elevated

Tunnel

Stations



Alignment near M Residences

Main Receptors

- Residential areas at M Residences (150m)

Potential Impacts

- Increased noise & vibration from construction and operation activities

SEGMENT 3: BANDAR PUNCAK ALAM

Alignment near Bandar Puncak Alam

Main Receptors

- Nearby residential areas : Tierra Alam Suria & Bayu Suria (50m – 70m)

Potential Impacts

- Increased noise & vibration from construction and operation activities
- Safety risk to residents, road users in close proximity to construction site

LEGEND

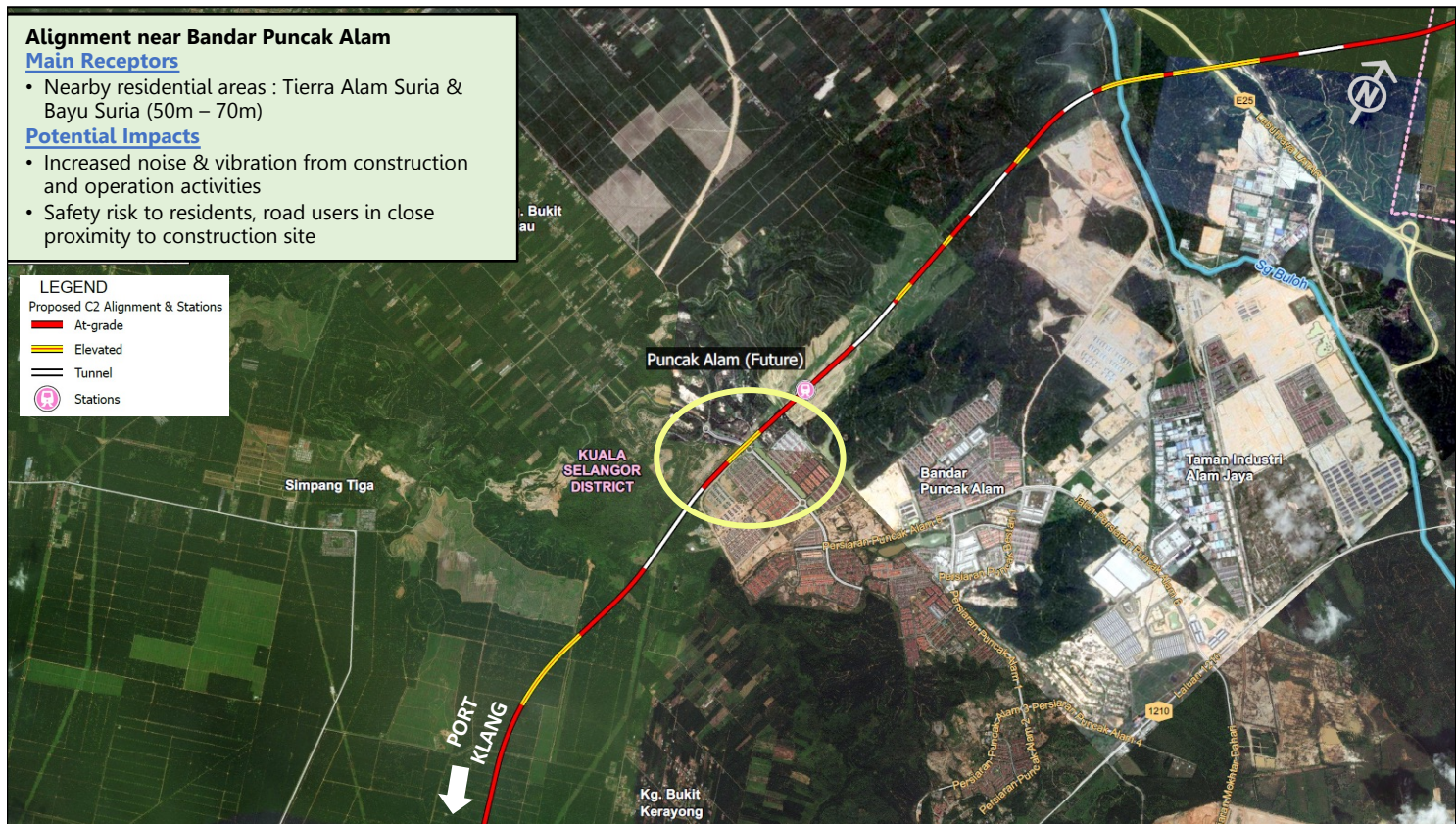
Proposed C2 Alignment & Stations

At-grade

Elevated

Tunnel

Stations



KEY IMPACTS AND SENSITIVE RECEPTORS

SEGMENT 3: KAPAR



SEGMENT 3: PORT KLANG



CONSTRUCTION

ACTIVITIES : Site Clearing, Earthworks & Construction of Access Road, Embankments, Viaducts, Tunnels, Adits, Stations

RECEPTORS : Waterbodies : Sg. Gombak, Sg. Batu, Batu Dam, Sg. Selangor, Sg. Buloh, Sg. Klang
Water intakes: Wangsa Maju, Batu, Rantau Panjang, SSP1,2&3

Impacts



Land clearing and earthwork **increases soil erosion risk** along the alignment which will increase **suspended solids** in the receiving rivers.



Base camps : Untreated **sewage** and **sullage** discharge from portable toilets or individual septic tanks will increase levels of DO, BOD, COD & NH₃-N in the receiving rivers.



Improper **discharge** or **spillage** at construction sites leading to river water & soil contamination *e.g., grease, diesel, etc.*

Pollution Prevention & Mitigation Measures

- Proper design and implementation of **LD-P2M2** :
 - *Erosion control* : Concrete pavement, erosion control blanket, turfing
 - *Surface runoff control* : temporary drains, check dams, sumps
 - *Sedimentation control* : Silt trap, sediment basin, active treatment system (when required)
- Emergency Response Plan and contingency plans for TSS exceedance

Sewage Management

- Temporary toilets to be connected to septic tank or portable sewerage system.
- All discharge treated to Standard A (areas upstream of intakes) and Standard B of Environmental Quality (Sewage) Regulations 2009

Fuel, Oil and Lubricant Spillage Management

- Provision of skid tanks, oil spill kits, containment bunds and implementation of SW management in accordance with Environmental Quality (Scheduled Wastes) Regulation 2005
- Emergency Response Plan (ERP) and contingency plans for accidental spill incidents

OPERATION

ACTIVITIES : Operation of the ECRL and Stations

RECEPTORS : Waterbodies: Sg. Selangor, Sg. Buloh, Sg. Klang
Water intakes: Rantau Panjang, SSP1,2&3

Impacts



Sewage generated at stations if not managed properly will increase levels of DO, BOD, COD & NH₃-N in the receiving rivers.



Accidental cargo spills and leakages from cargo hauls along the alignment leading to river water & soil contamination *e.g., grease, diesel, etc.*

Pollution Prevention & Mitigation Measures

Sewage Treatment

- Use of small sewage treatment system at stations
- Regular desludging of sewage holding tanks
- Sewage discharge shall comply with Standard A of the Environmental Quality (Sewage) Regulations 2009.

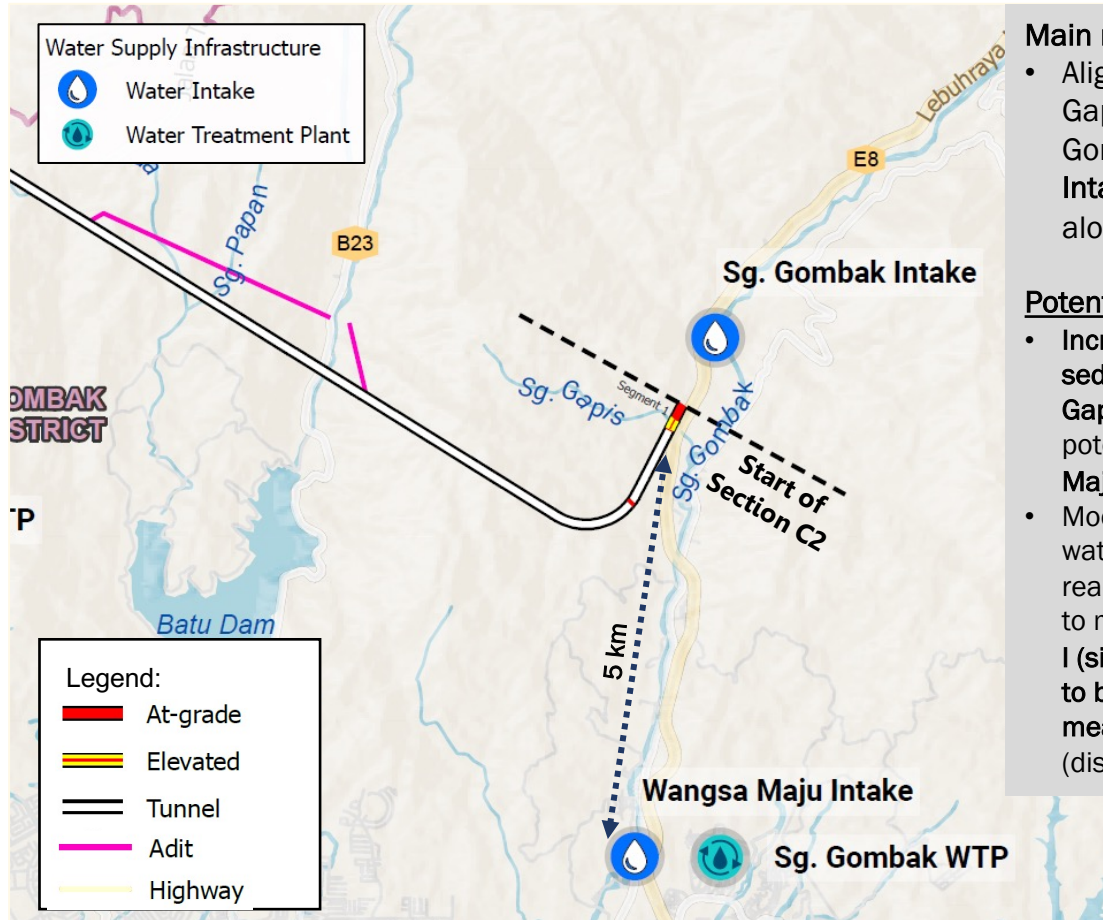
- Emergency Response Plan and contingency plans for accidental spill incidents
- Provision of spill kits at stations and areas upstream of intakes to be ready for deployment during spills

IMPACTS TO WATER QUALITY – SG. GOMBAK

The alignment will travel upstream of the **one water intake** at the Sg. Gombak catchment as below:

Construction

ACTIVITIES : Construction of embankment, viaduct and tunnel portals upstream of receptors



Main receptors:

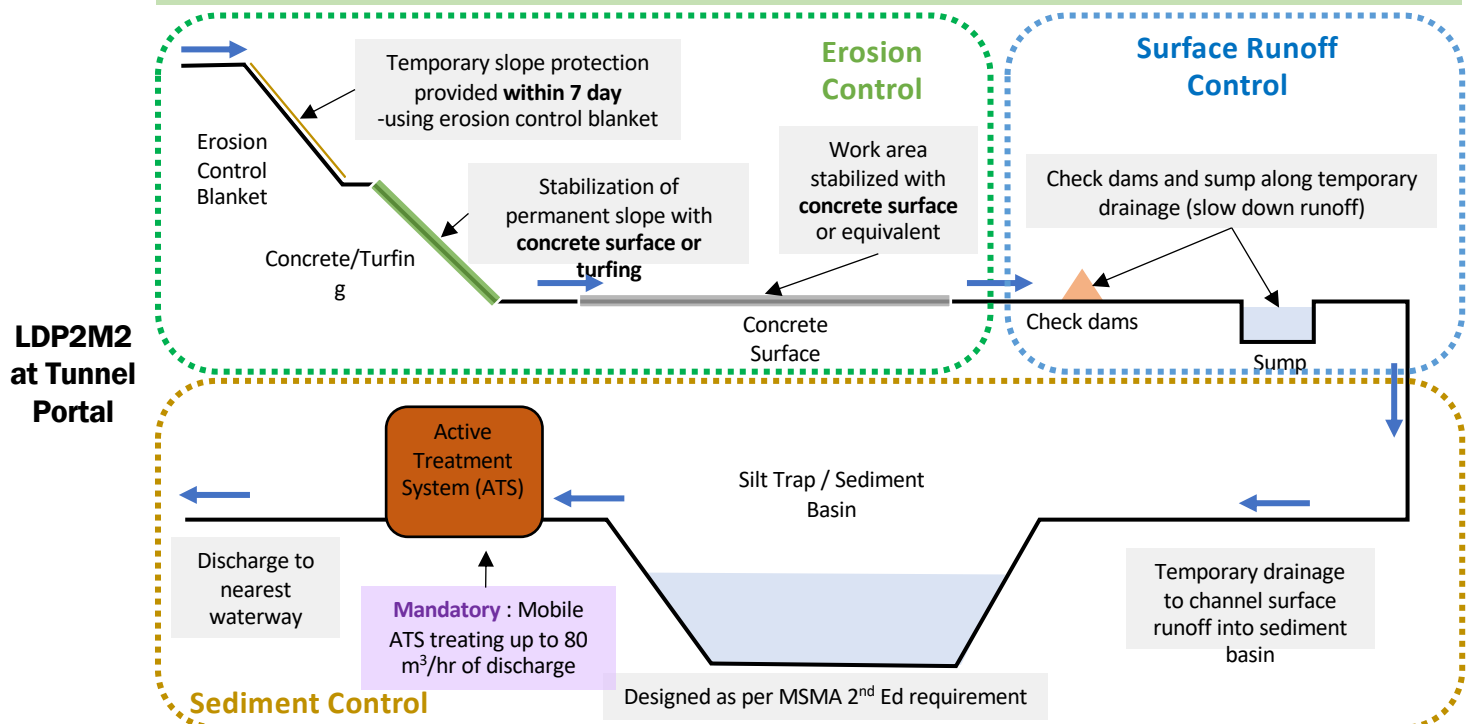
- Alignment crosses Sg. Gapis → flows into Sg. Gombak → **Wangsa Maju Intake** (5 km downstream along Sg. Gombak)

Potential Impacts:

- Increased soil erosion and sedimentation risk in Sg. Gapis & Sg. Gombak → potentially affecting Wangsa Maju Intake downstream
- Modelled TSS levels for waters from tunnel work area reaching intake downstream to maintain **within Class I** (similar to baseline) if mitigation measures are implemented (discharge within 50mg/L)

Mitigation measures for Tunnel Portal work areas:

- **Erosion control** : Concrete pavement, erosion control blanket (after 7 day exposure), turfing,
- **Surface runoff control** : temporary drains, check dams, sumps
- **Sedimentation control** : Silt trap, sediment basin, active treatment system (ATS)
- Implement **Spill Response Plan** for potential spillages
- **Additional measure** : Install **ATS & early warning system** at final discharge point of work areas

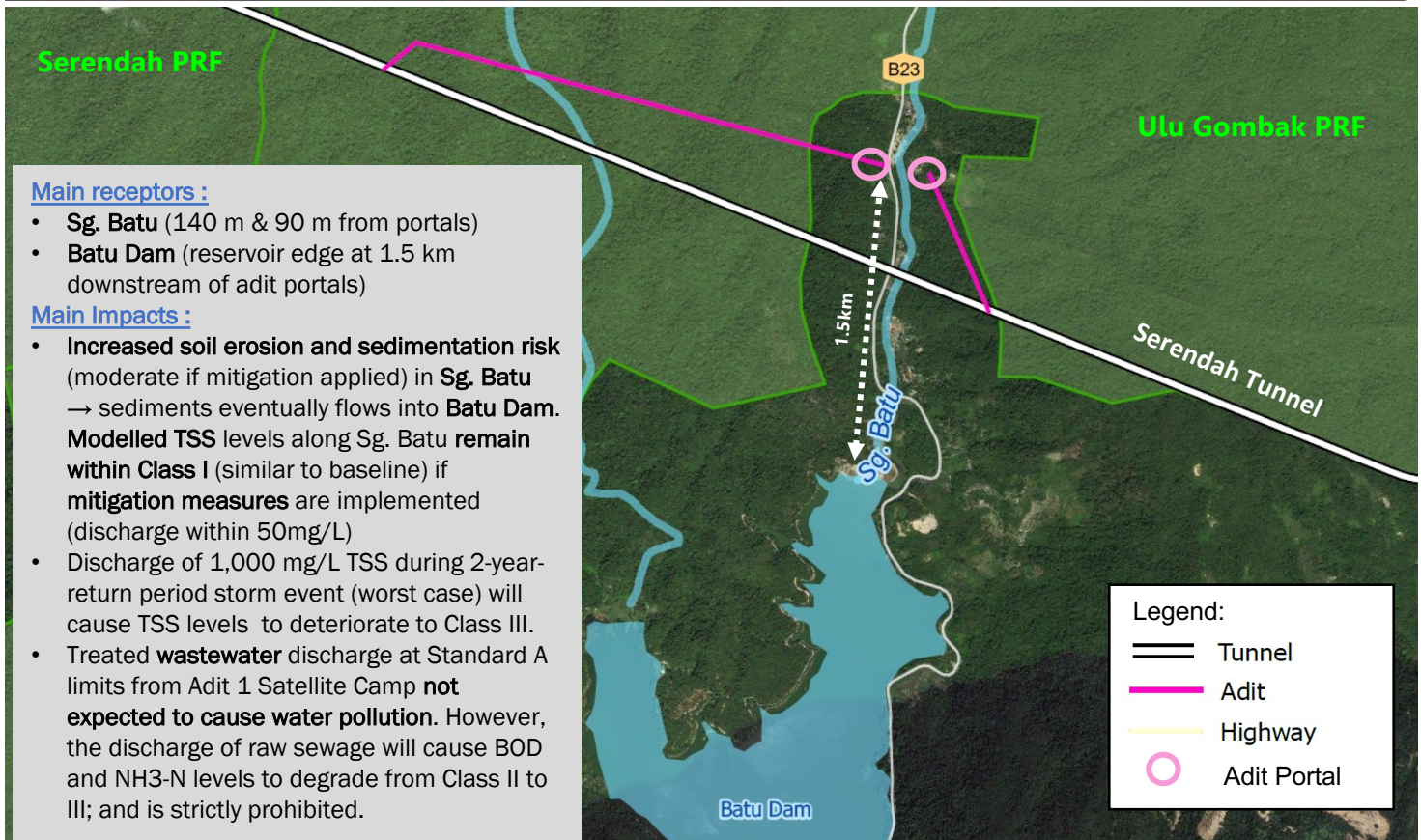


IMPACTS TO WATER QUALITY – SG. BATU

Adit Portals will be constructed near Sg. Batu that flows into Batu Dam.

Construction

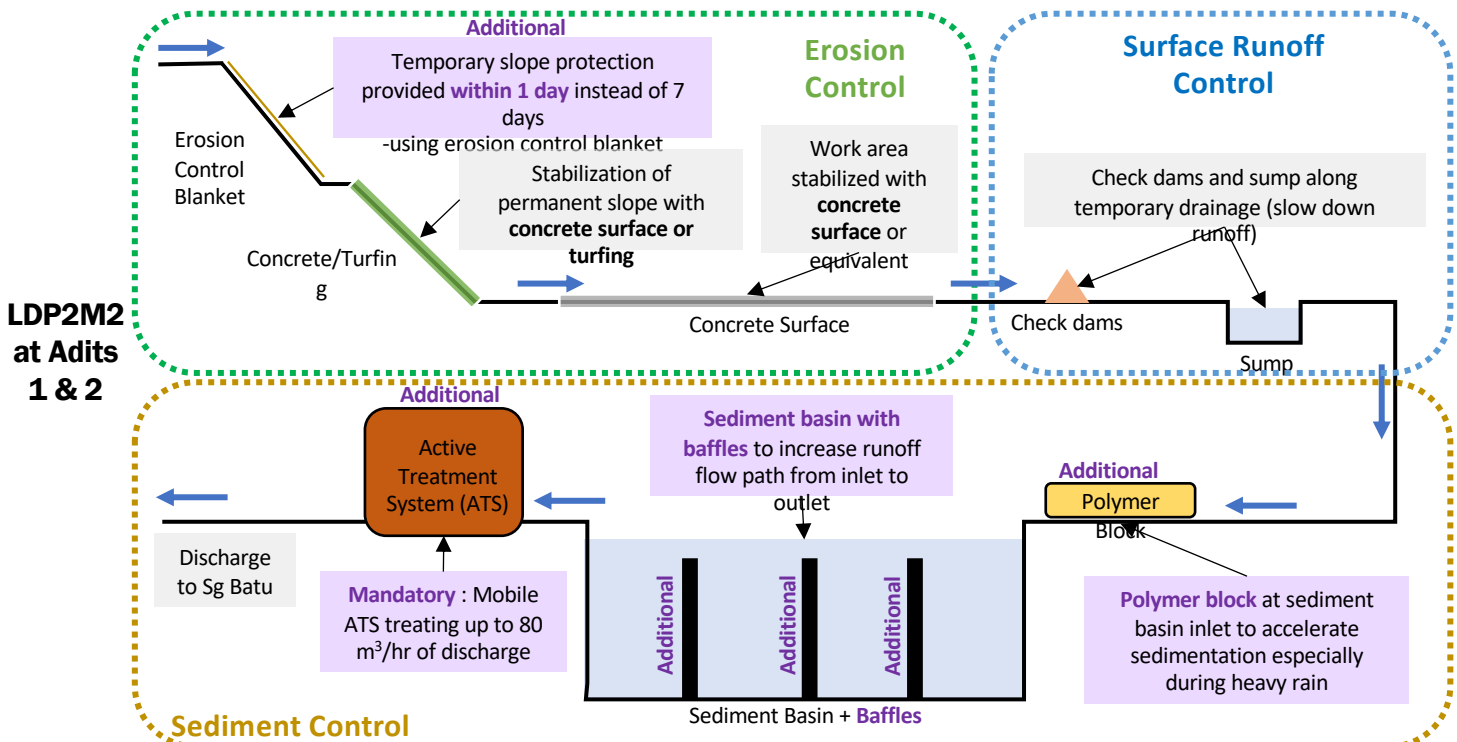
ACTIVITIES : Construction of Adit 1 & 2 portals upstream of receptors



Additional mitigation measures for Adit 1&2 Portal work areas:

Implement more BMPs in addition to standard measures as highlighted in purple:

- **Erosion control** : Concrete cover, erosion control blanket (**after 1 day exposure**), turfing
- **Surface runoff control** : temporary drains, check dams, sumps
- **Sedimentation control** : Silt trap, **sediment basin (with baffles)**, **polymer blocks**, **active treatment system (mandatory)**
- Install **early warning system** at final discharge point of work areas
- Implement **Spill Response Plan** for potential spillages

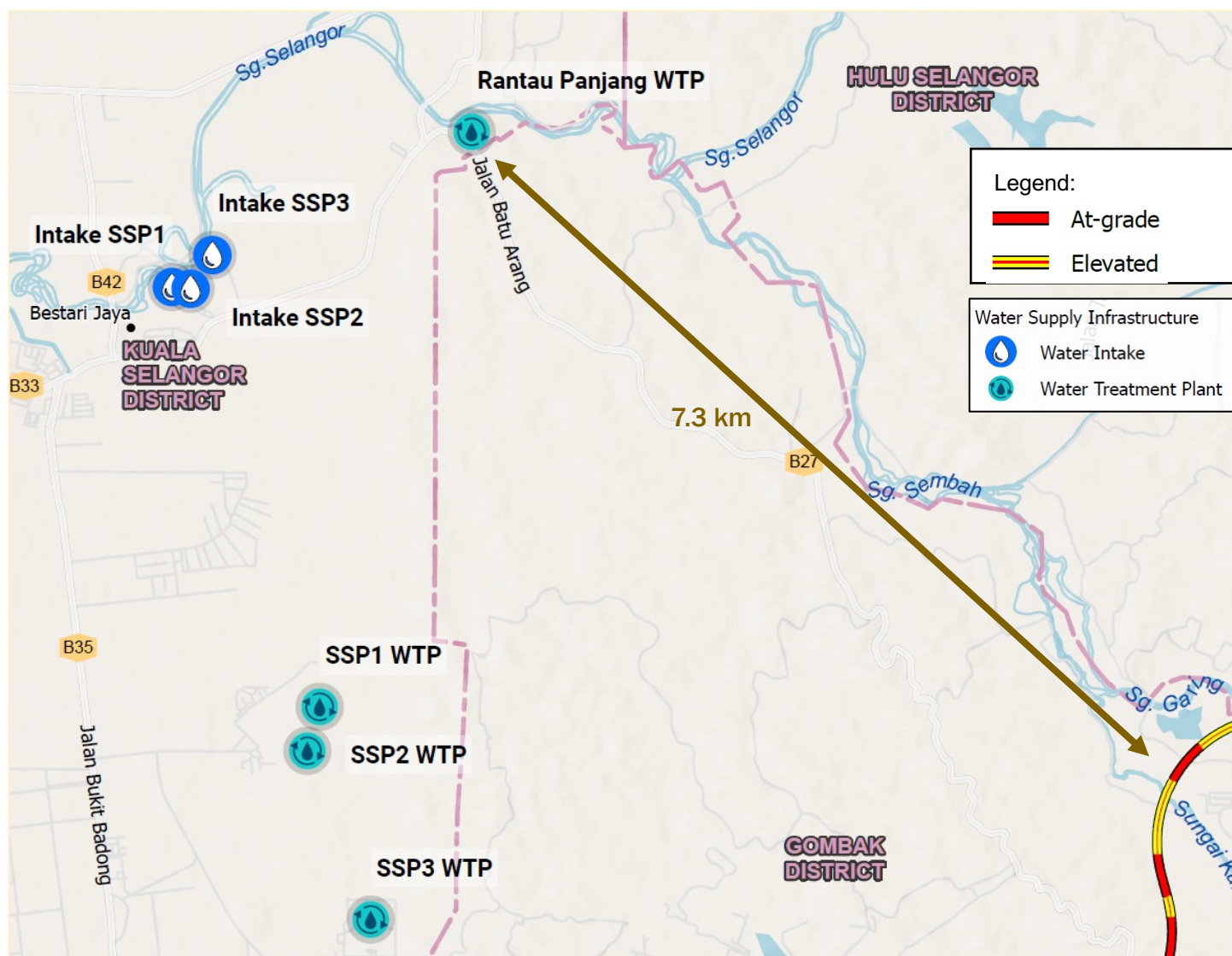


IMPACTS TO WATER QUALITY – SG. SELANGOR

The alignment will travel upstream of the 4 water intakes in the Sg. Selangor catchment.

Construction

ACTIVITIES : Construction of embankment & viaduct upstream of receptors



Main receptors:

- Alignment crosses Sg Kundang & Garing → flows into Sg. Selangor → Rantau Panjang, SSP1,2&3 intakes (11 -17 km downstream along Sg. Selangor)

Potential Impacts:

- Increased soil erosion and sedimentation risk (moderate if mitigation applied) in Sg. Selangor → potentially affecting water intakes
- QUAL2K Model for TSS : levels maintain within Class III (similar to baseline) if mitigation measures are implemented (discharge within 50mg/L)



Mitigation measures for river crossings upstream of water intakes:

- **Erosion control** : Erosion control blanket (after 7 day exposure), turfing, concrete cover
- **Surface runoff control** : temporary drains, check dams, sumps
- **Sedimentation control** : Silt trap, sediment basin, active treatment system (if required)
- Implement **Spill Response Plan** for potential spillages
- **Additional measure** : Install **early warning system** at final discharge point of work areas

MAIN IMPACTS FROM NOISE AND VIBRATIONS

CONSTRUCTION

ACTIVITIES : Site Clearing, Earthwork & Construction of Access Road, Embankments, Viaducts, Tunnels, Adits, Stations

RECEPTORS : Residential areas in Serendah, Rawang, Bandar Puncak Alam, Kapar and Port Klang

Impacts



Increased noise and vibration level from:

- *piling works*
- *civil and structural works*
- *platform preparation works*
- *heavy vehicle movements*
- *construction machinery*

Vibration from drill and blast works for tunnels and adits. Areas of concern:

- **Batu Dam** (1.2 km to reservoir edge, 3.6 km to dam crest): predicted vibrations less than 0.05mm/s (reservoir edge) and 0.02 mm/s (dam crest).
- **Taman Desa Melor** near adit 3 portal (250m): predicted vibration **within human response** limit of 0.8mm/s (Curve 8) for short term vibrations (also below JMG limits of 5 mm/s)
- **Bandar Puncak Alam** (50-70m): predicted vibration at 3.6 mm/s (**within JMG limit**) for blasting using 1 kg explosives of instantaneous charge/delay but **exceed human response** daytime limits of 0.8 mm/s to 1.6mm/s.



Pollution Prevention & Mitigation Measures

- Adopt **low impact piling** methods near receptors
- Carry out noisy construction activities during **daytime only**. Avoid heavy vehicle movement at night or weekends near residential areas.
- **Temporary noise barriers** and high perimeter **hoardings** near built up areas
- Use **diaphragm sheet piles** at sites with longer construction period (stations) to control vibration
- **Maintenance** of vehicles and machinery
- Continuous **monitoring** during piling works

- **Use smaller quantities (kg) of explosives** per charge hole
- **Avoid fly rock** : ensure design comply with best practice, move fragmented rock horizontally, use toe priming, use screen nets
- **Use alternative mechanical excavation** : road header, Penetrating Cone Fracture etc.
- Continuous **monitoring** during blasting works



Example of a road header as an alternative excavation method for tunnels

OPERATION

ACTIVITY : Operation of the ECRL

RECEPTORS : Residential areas in Serendah, Rawang, Bandar Puncak Alam, Kapar and Port Klang

Impacts



- Noise and vibration from passenger and freight trains passing through or near inhabited areas
- Residual noise impacts **generally “none” to “little”** at most receptors, with some receptors having “medium” impact due to low ambient noise levels especially at rural areas during night time.
- All sensitive receptors (residential land use including places of worship) are anticipated to be **within acceptance limits for trains pass by vibrations**, except limited locations where scattered dwellings are located within 25m.
- Receptors that may require mitigation for noise and vibration were identified in **Serendah, Rawang, Batu Arang, Puncak Alam, Kapar and Port Klang**.

Pollution Prevention & Mitigation Measures

- **32 noise barriers** are proposed where the alignment passes near receptors in Serendah, Rawang, Batu Arang, Puncak Alam, Kapar, and Klang.
- These locations are **subject to further refinement** during the detailed design stage.
- Generally no requirements for additional vibration mitigation more than the use of **ballast tracks** along the alignment
- Selections and extent of vibration mitigation are subject to design of trackwork during detailed design stage.

MAIN IMPACTS TO ECOLOGY

CONSTRUCTION

ACTIVITIES: Site Clearing, Earthwork

RECEPTOR: Ulu Gombak & Rantau Panjang PRF

Impacts



Loss of natural vegetation due to clearance of a total **11.5 ha** of Ulu Gombak and Rantau Panjang PRF along alignment

Felling of trees involve :

- Ulu Gombak PRF : forest trees 0.9 ha
- Rantau Panjang PRF : mixture of rubber (5 ha) and forest trees (10.6 ha)



No issue on habitat fragmentation in PRFs as tunnels and elevated alignment provided to maintain connectivity



Potential increase in **human-wildlife conflicts** due to human-induced disturbance from vegetation removal.

Areas of concern:

- Tunnel portals within Ulu Gombak PRF
- M Residences and Jalan Batu Arang near Rantau Panjang PRF



Increased **poaching activities** from illegal usage of access road into PRFs

Mitigation Measures

Phasing of vegetation clearance

- Assist wildlife to retreat into surrounding forested areas by clearing progressively in a single direction.

Drive Shooting

- Since land clearing shall be conducted in a phases, drive shooting should be conducted when clearing moves to a new and different area.

Minimise excessive vegetation clearance

- Using existing access roads leading to Project site reduces need to clear more forest for new access roads

Temporary Barriers

- Install temporary fences along construction site boundaries near or within PRF. Also install fences along existing roads within Rantau Panjang PRF to prevent wildlife moving onto the roads from construction disturbance.

Implement good housekeeping practices

- Proper solid waste management to prevent wildlife scavenging at construction sites

Awareness raising and education

- Educate workers to manage encroaching wildlife

Monitor access roads and install barriers/gates

- Prevent trespassers from entering forest reserve without permits by the Forestry Department

OPERATION

ACTIVITY: Operation of the ECRL

RECEPTOR: Ulu Gombak & Rantau Panjang PRF

Impacts



Railway-related **limitations:**

- Minimal impacts from potential wildlife-train collisions as tunnels or elevated alignment was provided at PRFs
- Birds and arboreal mammals may encroach at-grade sections



Long-term **forest degradation** due to increased edge effects from cleared areas along alignment



Increased **human-wildlife conflicts** along railway corridor

Areas of concern:

- M Residences near Rantau Panjang PRF

Mitigation Measures

- Provision of **precast walls with fencing** especially along at-grade sections and tunnel portals to prevent wildlife encroachment

- Conduct **habitat enrichment activities** along forest edges to maintain habitat integrity

- Install wildlife **warning signs** at built-up areas
- Establish **public awareness** programmes with PERHILITAN
- **Monitoring** at areas with high wildlife movement with enforcement agencies

MAIN IMPACTS FROM WASTE GENERATION

CONSTRUCTION

ACTIVITIES : Site Clearing, Earthworks, Construction of alignment especially tunnels, and adits
RECEPTORS : Sg. Batu, Batu Dam, Sg. Selangor intakes, Rantau Panjang PRF, residential areas at Bandar Puncak Alam and Klang

Impacts

Pollution Prevention & Mitigation Measures



Generation of **biomass** from site clearing activities

- **Reuse and recycle:** mulched on site as LDP2M2, sell commercially valuable parts
- **Disposal** : excess to be disposed at **approved landfills** or private dumping grounds



Generation of **construction and demolition waste** from site clearing and construction activities

- Reuse & recycle: **segregate waste** onsite for **recycling** at other construction sites, sell valuable resources to recycling facilities
- Disposal : Unsuitable material to be disposed at **approved landfills**



Generation of **scheduled waste** from maintenance of machinery at and **domestic waste** at base camps

- Scheduled waste to be managed in accordance with the **EQ (Scheduled Waste) Regulations 2005**
- Domestic waste should be **recycled** (provision of recycle bins) where possible or disposed at **approved landfills**

Serendah Tunnel and Adits – Tunnel Spoil

Impacts

- Generation of large amounts of tunnel spoil material – **11 mil tonnes**
- Existing geology is **granite** – mainly rocks will be generated
- Construction period – **56 months**

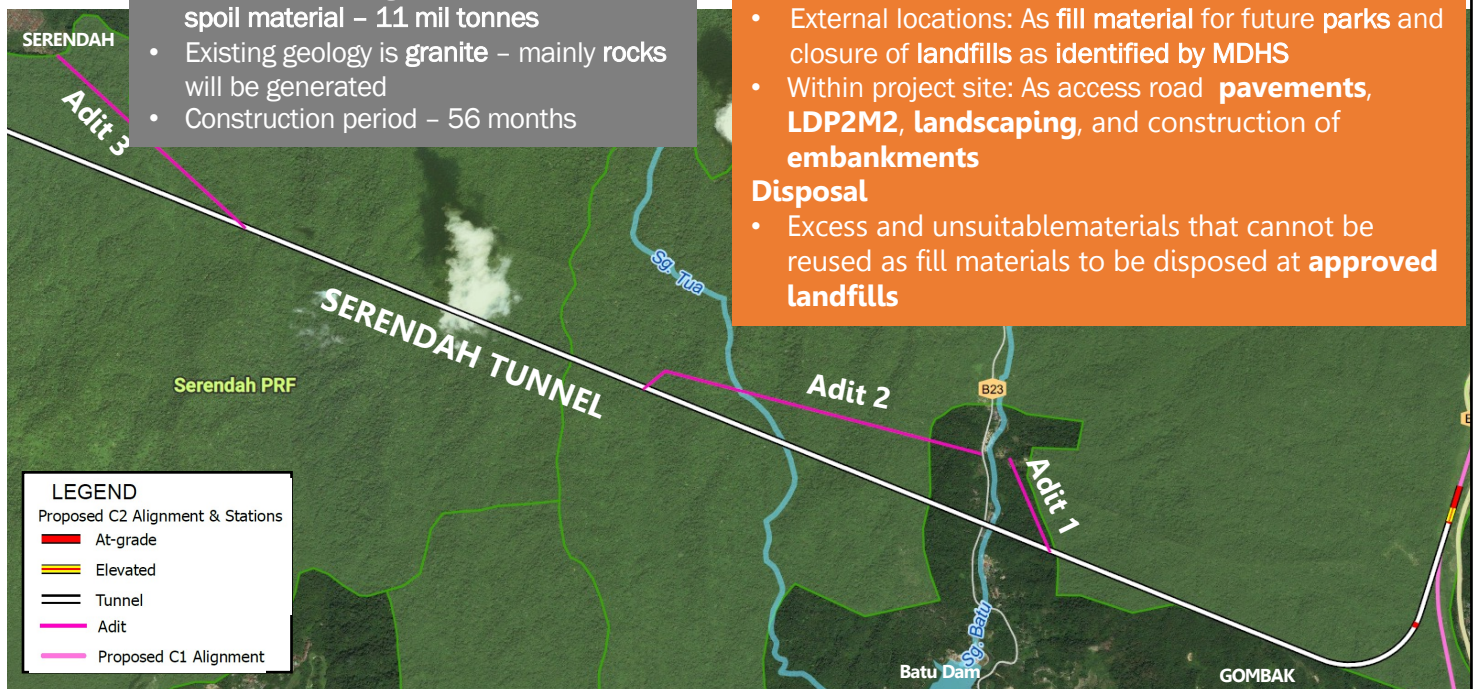
Mitigation Measures

Reuse and Recycle

- External locations: As fill **material** for future **parks** and closure of landfills as identified by MDHS
- Within project site: As access road **pavements**, **LDP2M2**, **landscaping**, and construction of **embankments**

Disposal

- Excess and unsuitable materials that cannot be reused as fill materials to be disposed at **approved landfills**



OPERATION

ACTIVITIES : Operation of Stations
RECEPTORS : Residential areas near stations in Serendah, Bandar Puncak Alam and Klang

Impacts

Pollution Prevention & Mitigation Measures



Generation of **domestic waste** at stations (minimal impacts - small amount of waste generation expected at 288 kg/day for each station)

- Domestic waste should be **recycled** (provision of recycle bins) where possible or disposed at **approved landfills**

MAIN IMPACTS TO SOCIO-ECONOMY

CONSTRUCTION

RECEPTORS: Residential areas, institutions, plantations, commercial and industrial properties along the alignment especially in Serendah and Port Klang

Impacts

Land and property acquisition issues:

- Potential delay in compensation
- Relocation/displacement
- Main areas of concern are at residential areas in **Serendah and Port Klang**



Acquisition at Kg. Tok Pinang & Kg. Dato Harun, Serendah (20 houses)



Mitigation Measures

- **Information and Engagement Programme** : continuous stakeholder engagement and communication with affected parties to address issues
- **Mutual agreements** as an alternative for acquisition
- **Compensation must be adequate** and to be given in a timely manner

Acquisition at Kg. Sireh & Tmn Sireh Pinang, Port Klang (89 lots)



Potential emergence of **vector-borne and communicable diseases** from poor housekeeping and management of worker quarters

- Implement **good housekeeping** at workers quarters and construction sites
- **Abide with SOPs** and requirements by MKN, CIDB OSHA 1994 etc.

Influx of **foreign workers** causing security and social concerns

- Provision of base camps and centralized labour quarters to minimize interaction with local communities
- Project proponent to monitor worker activities during off days and nights

Positive Impacts

- Stimulates **economy growth** at the national, regional and local levels
- Creation of **job opportunities**

- Prioritizing locals for employment and business opportunities.

OPERATION

Benefits



- Reducing train traffic from needing to pass through central Kuala Lumpur.
- Improved **transport connectivity** between West Coast and East Coast.
- **Reduced transit time** between East Coast and Greater Klang Valley
- Increased **accessibility and capacity**, and reduced cost of **freight transport** to East Coast ports
- Stimulation of **economic growth**
- Economic spinoff and multiplier effects in local area surrounding stations
- Increased competitiveness of business
- **Employment and business opportunities** at stations
- Demand for provision of support services for the ECRL operations
- Growth of Serendah as cargo hub.



MAIN IMPACTS TO AIR QUALITY

CONSTRUCTION

- ACTIVITIES** : Site clearing, earthwork & construction of access road, embankment, viaducts, tunnel & adit portals, stations
- RECEPTOR** : Kg OA Ulu Batu (adit 1 & 2 portals), Desa Anngerik (adit 3 portal), residential areas near Jalan Kastam Station

Impacts



- **Fugitive Dust** (PM₁₀) generation from earthworks & batching plants (low impacts due to distance)
- **Dust** and **gaseous** emissions from construction equipment & vehicles (PM₁₀, PM_{2.5}, CO, NO₂ and SO₂)

Pollution Prevention & Mitigation Measures

- Regular **water spraying** of construction sites, particularly along haul roads
- **Wheel washing facility** shall be provided
- Vehicles which carry particle-type materials shall be covered with **tarpaulin**
- Frequent **maintenance** of construction vehicles to minimize exhaust pollution

OPERATION

ACTIVITY: Operation of the ECRL

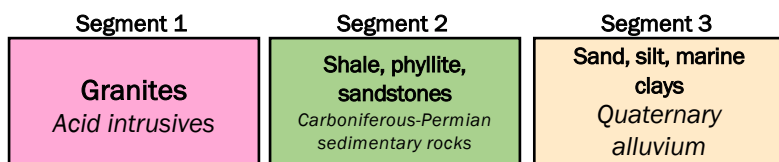
No air pollution expected as the trains are **electric-powered**

Reduced greenhouse gas emissions (positive impact) with transport modal shift from road and air to rail

CO ₂ e emissions avoided:	2025	2035	2045
	74,640 MT CO₂e/yr	128,61 MT CO₂e/yr	202,848 MT CO₂e/yr

MAIN IMPACTS TO GEOLOGY

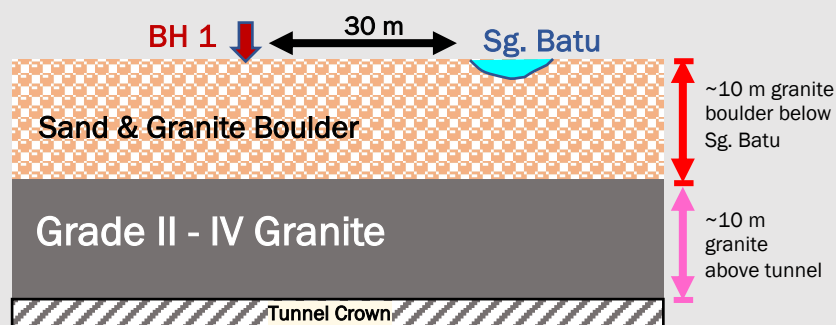
CONSTRUCTION



Colours are based on the General Geology Map of Peninsular Malaysia, JMG Malaysia, 9th edition, 2014

Serendah tunnel cross-section at Sg. Batu

*Based on preliminary site investigation at BH1 and preliminary design of the Serendah tunnel



Serendah Tunnel

Not to scale

Granite grade increase to Grade II-III at 16.5 m b.g.l, which has **less crack**, and **less water can percolate** to tunnel crown.

Geological Risks:

Tunnelling in Granites and Sedimentary Rocks (Serendah Tunnel and other smaller tunnels)

- Risk of encountering weak zones during tunnelling works
- Potential issues like rock falls (tunnel wall collapse), groundwater seepage into tunnels through joints or porous rocks.

Mitigations

- **Extensive grouting programme to increase watertightness** of tunnel, and further reinforce slopes
- Apply **tunnel linings** and **retaining walls** incorporating seismic designs to reinforce tunnels and slopes especially at weak zones
- Detailed geological studies e.g. geological modelling at detailed design stage to anticipate weak zones and planning for constructions

Soft Grounds (Quaternary Alluvium in Klang)





- Risk of ground settlements and structure slippages from compressibility and ductility of underlying soft grounds.

Mitigations

- Detailed geological studies e.g., detailed site investigations at detailed design stage to optimise foundation design and avoid ground compressions
- Continuous settlement monitoring during operations

PROPOSED ENVIRONMENTAL MONITORING PROGRAMME

CONSTRUCTION

   	Locations <ul style="list-style-type: none"> • 38 River Water Quality Sampling Stations • Sediment Basin Discharge Points 	Parameter <ul style="list-style-type: none"> • Temp., pH, DO, COD, BOD, TSS, Turbidity, O&G, NH₃-N & E.coli • TSS, Turbidity (Sediment Basins) 	Frequency <p>Monthly</p>
	<ul style="list-style-type: none"> • 13 Air Sampling Stations 	<ul style="list-style-type: none"> • PM₁₀, 24 hour 	<p>Quarterly</p>
	<ul style="list-style-type: none"> • 33 Noise and Vibration Sampling Stations 	<ul style="list-style-type: none"> • L_{aeq} & L_{max}, 24-hour • Peak Particle Velocity, on 1-hour monitorings 	<p>Quarterly</p>
	<ul style="list-style-type: none"> • Construction Audit 	<ul style="list-style-type: none"> • As per EIA Conditions of Approval 	<p>Once every 4 months</p>

PROPOSED ENVIRONMENTAL MANAGEMENT ORGANIZATIONAL STRUCTURE

