

# Guidelines

## On Connection Charges For Sabah Electricity Sdn. Bhd.(SESB)

**ELECTRICITY SUPPLY ACT 1990**

**[Act 447]**

**GUIDELINES ON CONNECTION CHARGES FOR  
SABAH ELECTRICITY SDN BHD**

**GP/ST/No.11/2017**

IN exercise of the power conferred by Section 27 and 50C of the Electricity Supply Act 1990 [Act 447], the Commission issues the following Guidelines:

**Citation and Commencement**

1. These Guidelines may be cited as the "Guidelines on Consumer Connection Charges for Sabah Electricity Sdn. Bhd.".
2. These Guidelines shall come into operation on the date of registration.

**Objectives**

3. These Guidelines describe the principles and methodologies for determining the charges to be paid by a consumer as part of the capital contribution to Sabah Electricity Sdn. Bhd. (SESB), for providing the necessary supply lines, electrical plants or equipment to connect the electricity supply to the consumer's premises, where such reasonable incurred expenses are not recovered as part of the tariff levied by SESB for the supply. This is in line with Electricity Supply Act 1990 (Act 447), Section 27 (2) entitled Power to recover expenses, as follows:

27(2) *The expenses reasonably incurred in providing any supply line or electrical plant or equipment under subsection (1) include the capitalized value of any expenses likely to be so incurred in maintaining it, if such expenses cannot be recovered by the licensee as part of the tariffs levied by him for the supply.*

4. The details of the principles and methodologies for determining the connection charges are as stipulated in **ANNEX 1**.

#### **Application of these Guidelines**

5. These Guidelines shall apply to any person or company, who applies to be connected to SESB's supply system. In determining the connection charge to be paid, the consumer will be categorised based on the incoming supply voltage to be connected, as follows;
  - Category 1 – Supply metered at 33kV and above
  - Category 2 – Supply metered at 11 kV
  - Category 3 – Supply metered at low voltage

#### **Obligation of SESB**

6. SESB shall publish and ensure adequate publicity on the principles and methodologies of the new connection charges. For any amendments or changes to the connection charges, it shall be approved by Suruhanjaya Tenaga.

#### **Dispute Resolution**

7. Any dispute in relation to the implementation of these Guidelines shall be resolved in accordance with the dispute resolution process and procedures as set out by the Act.

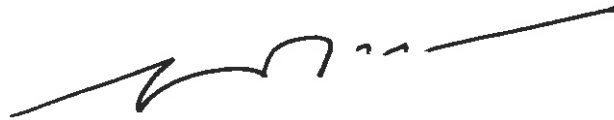
#### **Notice by the Commission**

8. The Commission may issue written notices from time to time in relation to these Guidelines.

## **Amendment and Variation**

9. The Commission may at any time amend, modify, vary or revoke these Guidelines.

**Dated: 19 April 2017**



**DATUK IR. AHMAD FAUZI BIN HASAN**  
Chief Executive Officer  
for Energy Commission

**PRINCIPLES AND METHODOLOGIES IN DETERMINING  
THE CONNECTION CHARGES FOR CONNECTION TO  
SESB'S SYSTEM**

## Contents

1	INTRODUCTION .....	6
2	PRINCIPLES ADOPTED FOR DETERMINING CONSUMER CONNECTION CHARGES .....	6
3	CATEGORISATION OF CONSUMERS BY VOLTAGE LEVEL .....	8
4	CCC ARRANGEMENTS FOR EACH VOLTAGE LEVEL .....	9
4.1	Types of charges for connection at Low voltage .....	9
4.2	Types of charges for connection at Medium Voltage 11kV .....	10
4.3	Types of charges for connection at Medium Voltage 33kV and High Voltage Charges .....	11
5	CHARGING OF CCC BY CONSUMER CATEGORY .....	11
5.1	Charging of CCC for Category 3(a) Consumers – Individual Applications Connecting at Low Voltage .....	11
5.2	Charging of CCC for Category 3(b) Consumers – Group Applications Metered at Low Voltage .....	13
5.3	Charging of CCC for Category 2 Consumers .....	13
5.4	Charging of CCC for Category 1 Consumers .....	14
5.5	Fixed Charge for Applications with Maximum Demand of 5 MVA or above .....	15
6	FIXED RATES FOR CCC CALCULATION .....	15
7	TURNKEY ARRANGEMENTS .....	15
8	HORIZONTAL DIRECTIONAL DRILLING (HDD) .....	17
9	TEMPORARY SUPPLY AND OTHER TYPES OF CONSUMERS .....	17
10	SUBSTATION LAND AND BUILDING .....	17
11	ASSIGNED LOADS AND DIVERSITY FACTORS FOR CCC CALCULATION .....	17
12	EXAMPLES OF CHARGING CCC .....	19
	APPENDIX A - FLOWCHART 1 HORIZONTAL DIRECTIONAL DRILLING (HDD) .....	22
	- FLOWCHART 2 HORIZONTAL DIRECTIONAL DRILLING (HDD) .....	23
	APPENDIX B - EXAMPLES OF CALCULATION OF LENGTH FOR 11KV MAINS .....	24
	APPENDIX C - PICTURE ILLUSTRATION FOR POLE SPAN .....	26

## 1 INTRODUCTION

The Consumer Connection Charges (CCC) Guidelines is to provide definitions of basic terminologies used in connection charges, provide explanation on what are the connection charges, define the connection charges methodologies and the principles used for allocating the costs by Sabah Electricity Sdn. Bhd. (SESB).

## 2 PRINCIPLES ADOPTED FOR DETERMINING CONSUMER CONNECTION CHARGES

The economic framework used to derive the consumer connection charges (CCC) are based on three components to economic efficiency which are:

### a) Productive efficiency

Tariffs should be set at levels that recover efficient costs (i.e., the least-cost mix of capital and labour required to deliver certain outputs demanded by consumers)

### b) Allocative efficiency

Variable tariffs should reflect the marginal cost of supply; and revenue generated from a consumer/group of consumers should sit between their stand-alone and their avoidable cost of supply.

### c) Dynamic efficiency

Businesses should be provided with incentives to seek out efficiency gains over time, and to improve their performance where the benefits of the improvements exceed the costs required to make those improvements.

Of these, allocative efficiency is the most important for the development of efficient network prices and an efficient CCC. Variable network tariff should be set to reflect the marginal cost of supplying shared network services. If the variable (marginal) price deviates from the marginal cost of supply, consumer will consume either too much of the service attribute (relative to efficient levels) or not enough of the service attribute.

Any CCC should reflect the marginal cost of supplying connection services. This is by definition, is a prerequisite to the achievement of allocative efficiency, and therefore, overall economic efficiency. This would require that the CCC signals the forward looking costs that the new connecting consumer can influence at the time of their connection decision and that cannot be influenced by existing consumers changing their consumption/behaviour. This will in almost all cases lead to the following costs being included in an efficient CCC:

- Future costs that are driven by the connecting consumer's connection size; and
- Future costs that are driven by the connecting consumer's connection location (in particular distance from the existing grid)

To achieve an economically efficient consumer connection charges policy, four key components have been identified. These principles, and the rationale for adopting these principles can be summarised as follows:-

**Table 1: Principles for developing an economically efficient CCC**

Principle	Meaning	Rationale
Dedicated assets	The cost of assets that are built up-front and are dedicated to an individual consumer/developer should be charged to the connecting consumer	<ul style="list-style-type: none"> <li>• Only the connecting consumer can influence the cost of a dedicated asset</li> <li>• Existing consumers cannot affect the up-front cost of a dedicated asset – therefore, there is no economic benefit in signalling this cost to them via the network tariff</li> </ul>
Most efficient solution in the short- and long-terms	The CCC arrangements should incentivise the construction of the supply option that will result in the least cost in both the short- and long-term	<ul style="list-style-type: none"> <li>• The CCC and associated policies should incentivise the construction of the most efficient network solution; that is, the solution whose timing, size and configuration will entail the lowest cost in both the short and longer term.</li> <li>• This will promote facilitating dynamic efficiency.</li> </ul>
Out-of-sequence development	Consumers should bear the costs of bringing forward the construction of shared network assets if they require these assets to be built 'out-of-sequence'	<ul style="list-style-type: none"> <li>• construction of certain assets relative to their efficient sequence of development.</li> <li>• The developer's decision is self-funding and does not impose any additional cost on either existing consumers or SESB.</li> </ul>
Shared network costs	The variable network tariff should be used to signal the marginal cost of the shared network.	<ul style="list-style-type: none"> <li>• Both existing and future consumers can influence future shared network costs by changing their consumption or investment behaviour.</li> </ul>

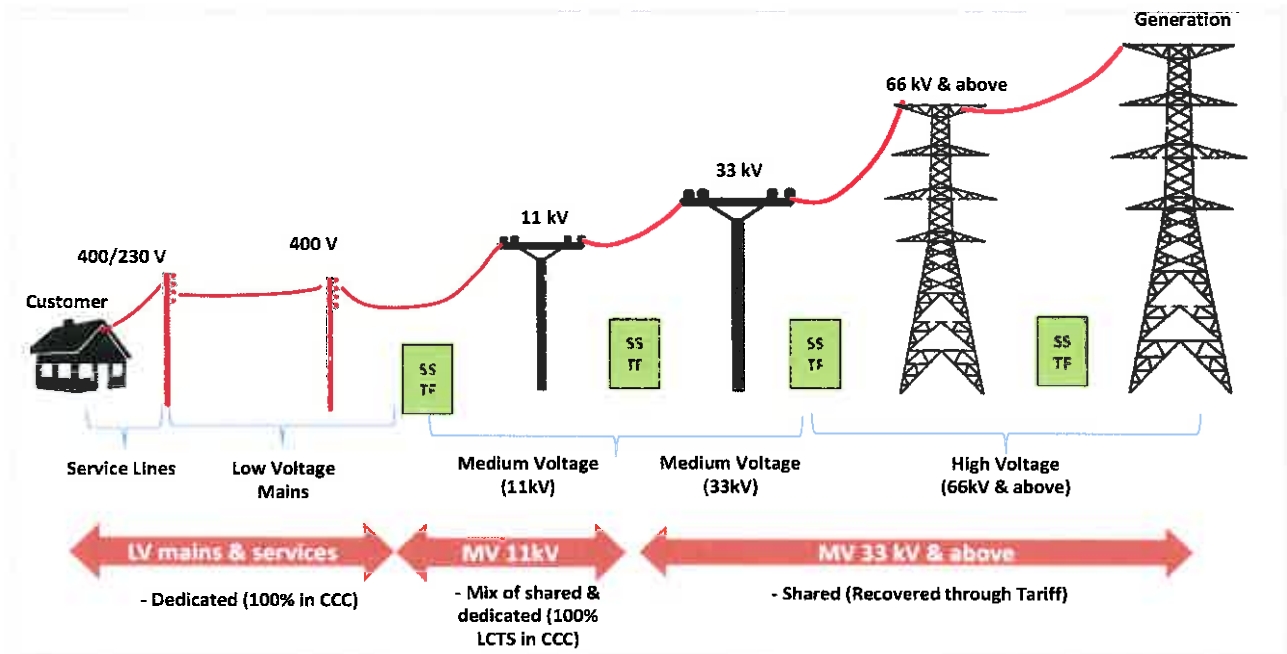
In addition, this new methodology aims to achieve important objectives which address the concern of various stakeholders regarding: -



- Fairness, transparency and predictability (and simplicity to the degree possible), and
- Being consistent with and supporting Government policy (e.g., subsidy rationalisation).

The following figure shows the practical applications of the principles with regard to the recovery of the costs imposed on connecting consumers at each level of the network of SESB.

**Figure 1 : Network Coverage of Consumers Connection Charge**



Note: LCTS - least cost technical solutions, SS – substation, TF - transformer

### 3 CATEGORISATION OF CONSUMERS BY VOLTAGE LEVEL

The consumers are categorised based on the metering point, as follows: -

- Category 1 - metered at 33kV and above
- Category 2 - metered at 11kV
- Category 3 - metered at Low Voltage (LV)
  - LV Individual Applications:
    - (i) Maximum Demand < 50kVA (New Service Connections, NSC)
    - (ii) Maximum Demand ≥ 50Kva
  - LV Group Applications (housing, shop houses, industrial lots etc.)

## 4 CCC ARRANGEMENTS FOR EACH VOLTAGE LEVEL

### 4.1 Types of charges for connection at Low voltage

Based on the pricing principles above, each new connecting consumer at LV is required to pay the full costs for new LV network or on a shared basis for connecting to an existing LV network. The following table outlines the approach to and rationale for charging for low voltage assets. The consumer also pays the charges for medium voltage assets (which are covered in the next section).

#### Exception for Individual Domestic Low Voltage Applications (< 50 kVA)

The 50% discount for connection charges will be maintained for these applications (capped for consumer premises within 1,000m distance from the nearest source).

**Table 2: Approach to and rationale for charges for low voltage assets**

Charge	Description	Rationale
100% of the forecast costs of any LV extension	The connecting consumer is charged 100% of the cost estimates of extending the LV network to service the consumer's development. This forecast cost would be based on the <i>least-cost technical solution</i> that could be implemented to service the supply needs of that consumer.	<ul style="list-style-type: none"> <li>Where the LV network is required to be extended to service a new consumer, that consumer should pay for the least-cost technical solution required to service their development, as this is equivalent to a dedicated asset. SESB would be free to build whatever asset size/configuration it considers is most efficient in the long-term.</li> <li>Analysis indicates that the range of actual costs, if unitised to a per KW or per consumer, is highly variable for group applications/large consumers, with the variability a function of the specific LV scheme adopted. To limit cross subsidies, group applications or large consumers will be based on cost estimates.</li> </ul>
Fixed rate (RM/KW) in certain other cases	<p>A fixed fee (RM/KW) to new connecting consumers who:</p> <ul style="list-style-type: none"> <li>utilize existing LV assets to service their development, or</li> <li>require existing LV assets to be upgraded to service their development.</li> </ul> <p>This may be levied in conjunction with the charge mentioned above, if the connection of the consumer also necessitated the extension of the LV network.</p>	<ul style="list-style-type: none"> <li>Charging a fixed fee to new connecting consumers who utilise existing LV assets overcomes an inherent unfairness that would occur if these new consumers were otherwise able to obtain access to the LV network for free, yet other connecting consumers are required to pay for that access and connecting their load is likely to bring forward the need to upgrade the LV network.</li> <li>Charging a fixed fee to new connecting consumers who require existing LV assets to be upgraded to service their development <ul style="list-style-type: none"> <li>overcomes the issue that the last connecting consumer has to pay for the full costs of upgrading a system that will likely provide benefits (e.g., better voltage) to both existing and new consumers; and</li> <li>getting a fair contribution from these consumers to the LV network.</li> </ul> </li> </ul>
Fixed rates (per pole span and per service lines)	For individual consumers with loads <50kVA and up to 5 pole spans <sup>1</sup> (Overhead lines)	<ul style="list-style-type: none"> <li>This is done for simplicity and transparency.</li> <li>Consumers requiring more than 5 pole spans will be based on cost estimates.</li> <li>Consumers connecting using U/G cable will be based on cost estimates at site.</li> </ul>

<sup>1</sup> A pole span consists of 2 poles, with 1 span of conductor being strung from an existing pole to a new pole. 5 pole spans consists of 6 poles, with 5 spans of conductor being strung from one existing pole to 5 new poles. Refer to Appendix C for picture illustration of pole span.

#### 4.2 Types of charges for connection at Medium Voltage 11kV

Consumers who connect into the existing 11kV MV network, or who require the construction of new 11kV MV assets to service their development will be charged the 11kV MV charges for substation and mains. In principle, consumers connecting at LV will also be required to pay 11kV MV charges for the use of 11kV MV assets on shared basis. The table below highlights the approach for the charge components and the rationale for adopting that approach.

**Table 3: Approach to and rationale for charges for medium voltage assets**

Principle	Description	Rationale
RM/kW charge for substations	This charge is applicable to any consumer who utilises an existing distribution substation, or who requires a new substation to meet their requirements. This charge is based on the average cost of purchasing and installing a distribution substation divided by its usable capacity	<ul style="list-style-type: none"> <li>A fixed fee arrangement means that all consumers that utilise SESB's 11kV network on an in-sequence basis contribute fairly to the development of the 11kV network, as all such consumers pay exactly the same RM/kW charge.</li> <li>A fixed fee arrangement is predictable, transparent and consistent</li> </ul>
RM/kW charge for MV 11kV mains	This charge is applicable to any consumer who connects into an existing MV 11kV mains, or who requires the construction of a new (or upgraded) MV 11kV mains for circuit length up to 1 km.	<ul style="list-style-type: none"> <li>As above</li> <li>Only 1 rate will be used for both overhead or underground mains</li> <li>This covers open trenching only, and excludes horizontal direct drilling (HDD). A rebate will be given (RM/m) for the length using HDD.</li> </ul>
RM/m rate (for length >1km)	A per meter rate would be charged to any connection for total cable length in excess of 1 km. This would be in addition to the per KW (substation and mains) charges discussed above.	<ul style="list-style-type: none"> <li>A per meter rate for connections that exceed 1km signals that the fixed fee does not cover the costs of development beyond this threshold distance; it provides an incentive for consumers to develop in-sequence, which should lead to more economically efficient outcomes, because it fairly allocates the costs of servicing development that is out-of-sequence to those connecting consumers that impose those costs on the system</li> <li>A rebate will be given (RM/m) for the length using HDD</li> </ul>

#### 4.3 Types of charges for connection at Medium Voltage 33kV and High Voltage Charges

The costs of constructing the shared network – being assets 33kV and above should be recovered via tariffs, but with some exceptions. This will be covered in more detail in paragraph 5.4.

## 5 CHARGING OF CCC BY CONSUMER CATEGORY

### 5.1 Charging of CCC for Category 3(a) Consumers – Individual Applications Connecting at Low Voltage

Category 3(a) is for individual application, i.e. for supply to individual consumers. The connection charges are shown in the following tables, where Table 4-1 is for applications not requiring Medium Voltage infrastructure, and Table 4-2 requires MV infrastructure:-

**Table 4-1: Charging of CCC for Category 3(a) Low Voltage Individual Applications (without MV (11kV) works)**

Consumer Category	MV 11kV			LV		
	RM/kW for distribution substations	RM/kW for MV mains	RM/m > 1km	RM/kW – existing LV assets / LV upgrades	RM per pole span & service	Actual Cost LV
	(a)	(b)	(c)	(d)	(e)	(f)
<b>Category 3</b>	<i>either (e) or (f)*</i>					
<b>i) Individual Small Consumer (&lt; 50kVA)</b>						
Domestic	No	No	NA	Yes, if upgrading of existing assets required	Yes 50%	Yes 50% (up to 1,000m)
Non Domestic	Yes 100%	Yes 100%	NA	Yes, if upgrading is required or no LV extension	Yes 100%	Yes 100%
<b>ii) Individual Consumer (50kVA &amp; above)</b>	Yes 100%	Yes 100%	NA	Yes	Yes 100%	Yes 100%

*Note: \*The fixed rates in (e) LV RM per pole span and service lines are for installations involving up to 5 pole spans only. Where there are more than 5 pole spans or the LV connection is using underground cable/service, the LV component of the CCC will be based on (f) cost estimate at site. (Pole span is illustrated in Appendix C). 1<sup>st</sup> house for Domestic applications which require only single phase service lines connection will be free of charge.*

N/A – Not Applicable

**Table 4-2: Charging of CCC for Category 3(a) Low Voltage Individual Applications (involving MV (11kV) works (shared asset))**

Consumer Category	MV 11kV			LV		
	RM/kW for distribution substations	RM/kW for MV mains	RM/m > 1km	RM/kW – existing LV assets / LV upgrades	RM per pole span & service	Actual Cost LV
	(a)	(b)	(c)	(d)	(e)	(f)
<b>Category 3</b>					<i>either (e) or (f)</i>	
<b>i) Individual Small Consumer (&lt; 50kVA)</b>						
Domestic	Yes 100%	Yes 100%	Yes, if required*	Yes, if upgrading of existing assets required	Yes 50%	Yes 50% (up to 1,000m)
Non Domestic	Yes 100%	Yes 100%	Yes, if required*	Yes, if upgrading is required or no LV extension	Yes 100%	Yes 100%
<b>ii) Individual Consumer (50kVA &amp; above)</b>	Yes 100%	Yes 100%	Yes, if required*	Yes	Yes 100%	Yes 100%

*Note: \*This is only applicable for projects requiring more than 1km of 11kV mains, and would be based on multiplying the per meter rate to the portion of cable length in excess of 1km*

If the MV (11kV) works is for the dedicated use of the consumer, for instance at remote areas where there are no other consumers expected within the next 5 years, the consumer will be required to pay the full cost based on cost estimate. The CCC charging of the LV component will remain the same as above.

## 5.2 Charging of CCC for Connection Charges for Category 3(b) Consumers – Group Applications Metered at Low Voltage

For Category 3(b) Low Voltage Group Applications, the connection charges are as follows: -

**Table 5: Charging of CCC for Category 3(b) Low Voltage Group Applications**

Consumer Category	MV 11kV			LV		
	RM/kW for distribution substations	RM/kW for MV mains	RM/m > 1km	RM/kW – existing LV assets / LV upgrades	RM per pole span & service	Actual Cost LV
	(a)	(b)	(c)	(d)	(e)	(f)
<b>Category 3</b>						
Group Development	Yes	Yes	Yes*			Yes

*Note: \*This is only applicable for projects requiring more than 1km of 11kV mains, and would be based on multiplying the per meter rate to the portion of cable length in excess of 1km*

## 5.3 Charging of CCC for Connection Charges for Category 2 Consumers

For Category 2 consumer which will be taking bulk 11kV supply (metered at 11kV), the connecting charges are as follows;

**Table 6: Charging of CCC for Category 2 Consumers Connecting at 11kV**

Consumer Category	MV 11kV			LV		
	RM/kW for distribution substations	RM/kW for MV mains	RM/m > 1km	RM/kW – existing LV assets / LV upgrades	RM per pole span & service	Actual Cost LV
	(a)	(b)	(c)	(d)	(e)	(f)
<b>Category 2</b>						
Consumer connecting at 11kV	By cost estimate, (if needed)	Yes	Yes	Internal - done by consumer at own costs		

#### 5.4 Charging of CCC for Connection Charges for Category 1 Consumers

The costs of constructing the shared network – being assets 33kV and above should be recovered via tariff, but with two exceptions. These exceptions are outlined in the table below:-

**Table 7: Exception to the recovery of shared network assets from network tariff for Category 1 (33kV and above) Consumers**

Principle	Dedicated Assets	Shared Assets
<b>In-sequence development</b>	Where a 33kV (or above) asset was planned for, and is expected to be only used for the sole purpose of providing services to an individual consumer, the connecting consumer would be required to pay for own HV and LV; consumer billed a tariff that excludes recovery of HV and LV assets, option for bank guarantee to provide security around tariff recovery over bring forward period.	
<b>Out-of-sequence development</b>	Where a 33kV (or above) asset was never planned for, and is expected to be only used for the sole purpose of providing services to an individual consumer, the connecting consumer would be required to pay the full costs of those assets up-front (which should be the least-cost technical solution for the consumer).	If SESB has to bring forward the construction of one or more 33kV (or above) assets, relative to when it expected those assets to be constructed under normal planning circumstances, then the net present value (NPV) of bringing forward the expenditure for those assets will be charged to the consumer as a CCC.

For Category 1 consumer who is charged for dedicated assets, they would:

- pay the full cost of the least-cost technical solution as part of the CCC and
- be levied a network tariff that excludes the cost of the voltage levels that they have funded up-front.

For Category 1 consumer who is deemed to have brought forward the construction of 33kV (or above) assets, SESB would;

- charge the difference in the NPV of constructing those assets now, versus the NPV of constructing those assets when originally planned. The original timing would be based on SESB's shared network (132kV/33kV etc.) development – with this based on either
  - the specific year that those assets were expected to be built (if this is outlined in the network development plan); or
  - the midway point in the 5-year period in which those assets were likely to be built (e.g. 1-5 years, 6-10 years; 11-15 years).

- reserve the right to seek a 'bank guarantee' from the connecting consumer for the expected revenue forecast to be received from the connecting consumer over the period which the asset is brought forward, which in turn can be drawn upon if there is a revenue shortfall from that consumer relative to the original forecast of revenue over that period (based on the expected loadings at the time the connection was assessed). This is to ensure that the revenue generated via usage charges over the brought-forward period covers a reasonable portion of the costs of constructing the consumer's portion of the solution.

## 5.5 Fixed Charge for Applications with maximum demand of 5 MVA or above

A fixed charge for 33kV development costs is applicable for consumers with maximum demand of 5MVA or more: -

**Table 8: Fixed Charge for 33kV Development Costs**

Points of Connection	CCC
33kV and below	Consumers will be required to pay a fixed charge (RM/kW) for 33kV cost component due to the present inadequate tariff to recover 33kV costs. The fixed rate is as per Schedule 1.

## 6 FIXED RATES FOR CCC CALCULATION

The table below presents SESB fixed rates, and the terms that are applicable for each category of CCC component.

**SCHEDULE 1: FIXED RATES FOR CCC CALCULATION**

No.	CCC Component	Rates (RM)		Terms
		Domestic	Non-Domestic	
1.	<b>Low Voltage Components</b>			For Low Voltage Individual applications with overhead lines/service Applicable up to 5 pole spans only. Applications with more than 5 pole spans or using U/G cable will be based on cost estimate at site. 1 <sup>st</sup> house for Domestic applications which require only single phase service lines connection will be free of charge
	(a) RM/pole span <sup>2</sup>			
	Single Phase	709	1,418	
	Three phase	958	1,915	
	(b) RM/Service Lines			
	Single Phase	153	305	
Three phase	333	665		

<sup>2</sup> A pole span consists of 2 poles, with 1 span of conductor being strung from an existing pole to a new pole. Illustration of pole span is shown in Appendix C.



## SCHEDULE 1: FIXED RATES FOR CCC CALCULATION (CONT.)

No.	CCC Component	Rates (RM)	Terms
	(c) RM/kW contribution to existing low voltage assets/LV upgrades	150	Applicable for Domestic applications if upgrading of existing assets required. Applicable for non-domestic applications if upgrading is required or no LV extension
<b>2.</b>	<b>MV 11kV Components</b>		
	(a) MV 11kV Distribution substation (11kV/400V) RM/kW	281	This rate does not include substation building, where developer will provide the substation building following SESB's standard requirement.
	(b) MV 11kV Mains RM/kW	141	This rate covers cable length up to 1km only.
	<b>Total (a) + (b)</b>	<b>422</b>	
	(c) MV 11kV Mains RM/meter:		
	(i) 150/240 mm <sup>2</sup> mains	130	Applicable for total cable length in excess of 1km
	(ii) 70 mm <sup>2</sup> mains	93	
	(d) RM/metre reimbursement where HDD required	21	Reimbursement for open trenching which was covered in the fixed rate in 2(b)
<b>3.</b>	<b>MV 33kV Components</b>		
	33kV Substation & lines RM/kW	540	Zone charge for 33kV works required upstream
<b>4.</b>	<b>Processing Fee</b>	100	For applications > 50kVA

*Note: The above rates are subject to revision every 3 years or as and when necessary to cater for costs increase or policy changes and subject to approval by Suruhanjaya Tenaga.*

## 7 TURNKEY ARRANGEMENTS

Turnkey application for medium and low voltage installation approval will be based on SESB's prevailing turnkey policy, with consideration of 3 criteria of timeline, material availability and manpower. For projects that are approved to be undertaken using turnkey arrangements:

- SESB will require that the turnkey provider construct the scheme of supply that represents the most efficient long-term solution – which may not necessarily be the one that is the cheapest for the individual development;
- However, SESB will also produce and cost a scheme of supply that represents the lowest cost technical solution for the connecting consumer's project, and reimburse the costs of the efficient long-term solution that exceed the costs of the lowest cost technical solution to the developer; and

- SESB will not charge the developer the RM/kW rate for substations and cables, as they will have been provided by the developer under the turnkey arrangement.

## 8 HORIZONTAL DIRECTIONAL DRILLING (HDD)

HDD is not a cost of connection that is required or determined by SESB. The need for HDD as part of a consumer connection is determined by the relevant Government authority. Therefore, Horizontal Directional Drilling (HDD) cost will be separated from CCC and will be treated similarly to projects carried out based on a turnkey basis. The applicant will be able to appoint its own contractor to carry out the HDD works, with coordination with SESB's personnel and/or contractors. Refer to **Appendix A - Flowchart 1** (where the requirement of HDD is identified before CCC is issued) and **Flowchart 2** (where wayleave approval is obtained after CCC is paid by applicant).

## 9 TEMPORARY SUPPLY AND OTHER TYPES OF CONSUMERS

Temporary supply application is defined based on the type of usage:

- (i) Site office or
- (ii) Others – showroom, temporary exhibition room, temporary stalls.

The temporary supply period is usually between six (6) months to one (1) year where extension of time is considered based on case to case basis. For temporary supply, the developer/consumer is required to pay full infrastructure costs upfront based on cost estimate which includes the dismantling cost.

Other types of consumers that are required to pay full infrastructure costs based on cost estimate are Co-generators and Independent Distributor Licensees.

## 10 SUBSTATION LAND AND BUILDING

Developers of development areas, depending on the estimated demand may be required to allocate land for any or a combination of substations type, wayleave or right of way for electrical lines and cables. These requirements will be specified by SESB upon submission of tentative layout plans and load estimates for the whole development area.

If SESB requires any land for a Distribution Main Intake to meet the supply requested, then the land for the Distribution Main Intake will be provided by the developer.

The fixed rate for MV 11kV Distribution Substation (11kV/400V) in **Schedule 1** above does not include substation building, and developer is required to provide the substation building following SESB's standard requirement.

## 11 ASSIGNED LOADS AND DIVERSITY FACTORS FOR CCC CALCULATION

CCC for fixed rates components (RM/kW) will be based on SESB's assigned loads for the various premises types or the applied maximum demand, whichever is higher. The assigned loads will be

subject to review in SESB's Electricity Supply Application Handbook (ESAH). The assigned loads for the various types of premises are shown in **Schedule 2** below:

**SCHEDULE 2: ASSIGNED LOAD FOR TYPE OF PREMISES FOR CCC CHARGING**

Type of Premises	Rural (kW)	Suburban (kW)	Urban (kW)
<b>Housing Premises</b>			
<b>Low cost flats, single storey terrace, studio apartment &lt;600 sqft</b>	1.5	2	3
<b>Double storey terrace/apartment</b>	3	4	5
<b>Single storey, semi-detached</b>	3	5	7
<b>Double storey, semi-detached</b>	5	7	10
<b>Single storey bungalow &amp; three room condominium</b>	5	7	10
<b>Double storey bungalow &amp; luxury condominium</b>	8	12	15
<b>Shop Houses</b>			
<b>Single storey shop houses</b>	5	10	15
<b>Double storey shop houses</b>	15	20	25
<b>Three storey shop houses</b>	20	30	35
<b>Four storey shop houses</b>	25	35	45
<b>Five storey shop houses</b>	30	40	55

*Note: The application of the categories 'Rural', 'Suburban' and 'Urban' will be based on the location of the development, the size of the premises (m<sup>2</sup>) and the type of development (such as high end or affordable). A summary is as follows:-*

Category	Where applicable
Urban	<ul style="list-style-type: none"> <li>Central Business Districts (CBD) or city/town centres in SESB Sector 1 Areas; i.e. Kota Kinabalu, Sandakan, Tawau and F.T. Labuan</li> <li>High end/prestigious developments (including for SESB Sectors 2 &amp; 3)</li> </ul>
Suburban	<ul style="list-style-type: none"> <li>Outside of the Central Business Districts (CBD) or city/town centre of SESB Sector 1 Areas (Kota Kinabalu, Sandakan, Tawau and F.T. Labuan).</li> <li>Town centres of all SESB Sector 2 areas:- Lahad Datu, Tuaran, Ranau, Beaufort, Papar, Keningau, Kota Belud, Kudat, Kota Marudu, Semporna</li> </ul>
Rural	<ul style="list-style-type: none"> <li>All SESB Sector 3 Areas:- Sipitang, Kuala Penyu, Tambunan, Tenom, Pitas, Kunak, Beluran, Kota Kinabatangan, Telupid</li> <li>Outside of the boundary of the developed areas in SESB Sector 2 Areas</li> </ul>

For applications in a shared network or system, the diversity factor applicable are as shown in **Schedule 3** below:

**SCHEDULE 3: DIVERSITY FACTORS**

Purpose	Number of Units	Diversity Factor
For use in calculating the MV & LV fixed rates cost components	Up to 300 units	0.75
	301 – 750 units	0.60
	751 & above	Diversity Factor will be based on discussion between SESB & M&E Consultant in view of the huge size of the development
For the calculation of Interim Charge (for 33kV cost component as in No. 5.5)	Domestic development at 33kV busbar (apply to diversified MD at 11kV)	0.6
	Mixed or Commercial development at 33kV busbar (apply to diversified MD at 11kV)	0.75

## 12 EXAMPLES OF CCC CALCULATION

The CCC will be calculated based on the charge components in **Schedule 1**. Approved assigned load or the applied maximum demand, whichever is higher will be applied to the fixed rates (RM/kW).

- (a) Example of CCC for Category 3(a)(i) for non-domestic individual applications (>50kVA) connecting to existing substation

For a workshop cum office for storage of scrap metal (with applied Maximum Demand 71kW). The diversity factor of 0.75 is applied as the consumer is connecting to existing substation which is a shared asset.

$$\text{CCC} = \text{MV 11kV fixed charges} + \text{LV cost, where LV estimated cost} = \text{RM24,652}$$

$$\text{CCC} = 71\text{kW} \times 0.75 \times \text{RM422} + \text{RM24,652} = \underline{\underline{\text{RM47,123.50}}}$$

- (b) Example of CCC for Category 3(a)(i) for non-domestic individual applications (>50kVA) requiring a dedicated substation

For a Tapioca Starch Factory for KP Division, Tawau (Declared Maximum Demand : 508 kW). No diversity factor is applied as this is a dedicated substation for the consumer's use

CCC = MV 11kV fixed charges + LV cost, where LV estimated cost = RM10,000  
CCC = 508kW x RM422 + RM10,000 = **RM224,376**

- (c) Examples of CCC for Category 3(a)(ii) for domestic individual applications (<50kVA), with applied load of 1.5kW, requiring 1 pole span and service lines. The MV fixed charge is not applicable, the discounted LV pole span and service line fixed rate are used.

CCC = 1 Pole span + Service Line (with discount)  
= RM709 x 1 span + RM153 = **RM 862.00**

- (d) Examples of CCC for Category 3(a)(ii) for non-domestic individual applications (<50kVA), with applied load of 1.5kW, requiring 1 pole span and service lines. As the consumer is connecting to shared network, the 0.75 diversity factor is applied to the assigned load.

CCC = MV 11kV fixed charges + LV charges  
= 1.5kW x 0.75 x RM422 + RM1,418 x 1 span + RM305 (1 phase service lines)  
= RM 474.75 + RM 1,418 + RM 305 = **RM 2,917.75**

- (e) Example of CCC for Category 3(b) group applications with diversified assigned load is as follows:

For a housing development of 63 units of 2 storey terrace houses in Keningau (applied Maximum Demand 147 kW)

The assigned load for 'Suburban' is used for most housing development and location not in town centre. For 2 storey terrace house, the assigned load for 'suburban' = 4 kW per unit

Diversified total load = 63 x 4 x 0.75 = 189 kW

CCC = MV 11kV fixed charges + LV cost, where estimated LV cost = RM66,319  
CCC = 189 x RM422 + RM66,319 = **RM146,077**

- (f) Example of calculation of fixed MV 33kV charge for applications with applied demand 5 MVA or above

For domestic development connecting at 11kV, a diversity factor of 0.6 is assumed. For mixed development or commercial, a diversity factor of 0.75 is assumed at the 33kV busbar.

33kV charge for a housing development of applied MD of 5MVA (4.25MW) = 4250kW x 0.60 x RM540 = **RM1.377 million**

(g) Example of CCC for HV consumer (out of sequence) application

In relation to the HV connection (out-of-sequence), consider an example where a large industrial park is being proposed, and SESB had reasonably forecast that under normal planning circumstances the network would only have been extended to that region in 2022. This means that those assets are being brought forward, as a result of this out-of-sequence development. More broadly, let's assume the following:

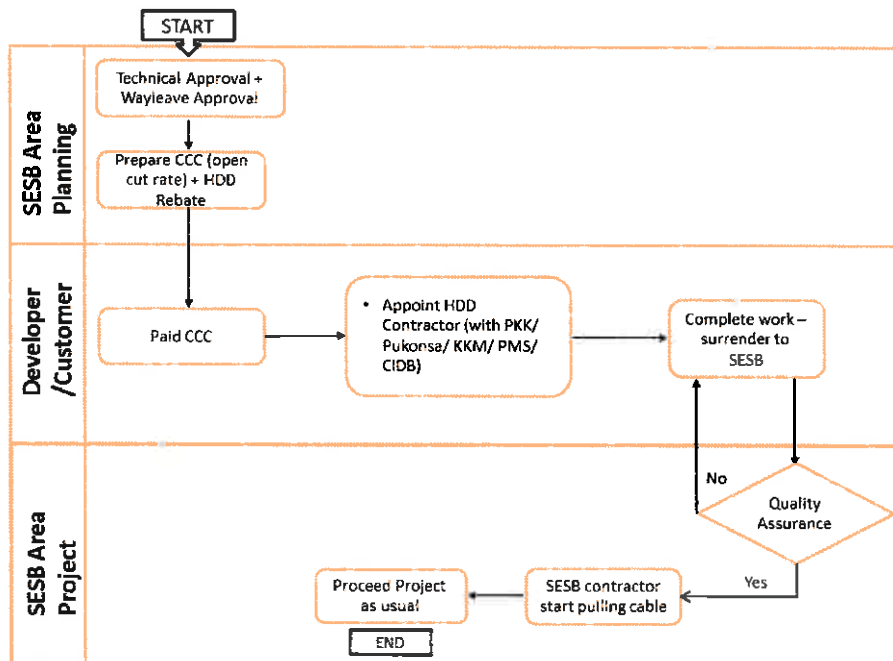
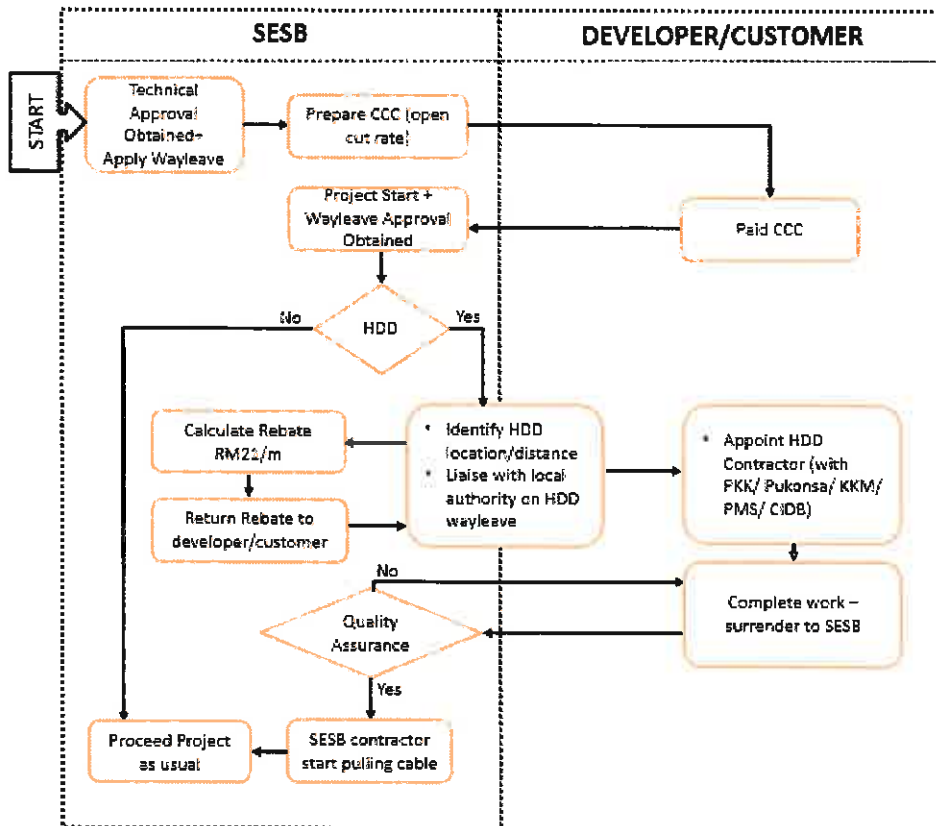
- Total cost of the shared network included in the extension of service = RM300 million
  - WACC = 7.5% (or the allowed WACC)
  - Year of construction if planned sequence of development were to eventuate: 2022
  - Year of construction as a result of connecting the Industrial Park: 2017
- The following figure demonstrates how these assumptions would translate into a bring forward charge for this out-of-sequence HV consumer.

Figure 1: Example of calculation of bring-forward charge

Assumptions							
WACC	7.5%						
Asset Costs (RM/m)	RM300						
Component	NPV	2017	2018	2019	2020	2021	2022
New Schedule	RM279.07	RM300	-	-	-	-	-
Old Schedule	RM194.39	-	-	-	-	-	RM300
<b>Results (CCC)</b>	<b>RM84.68</b>						

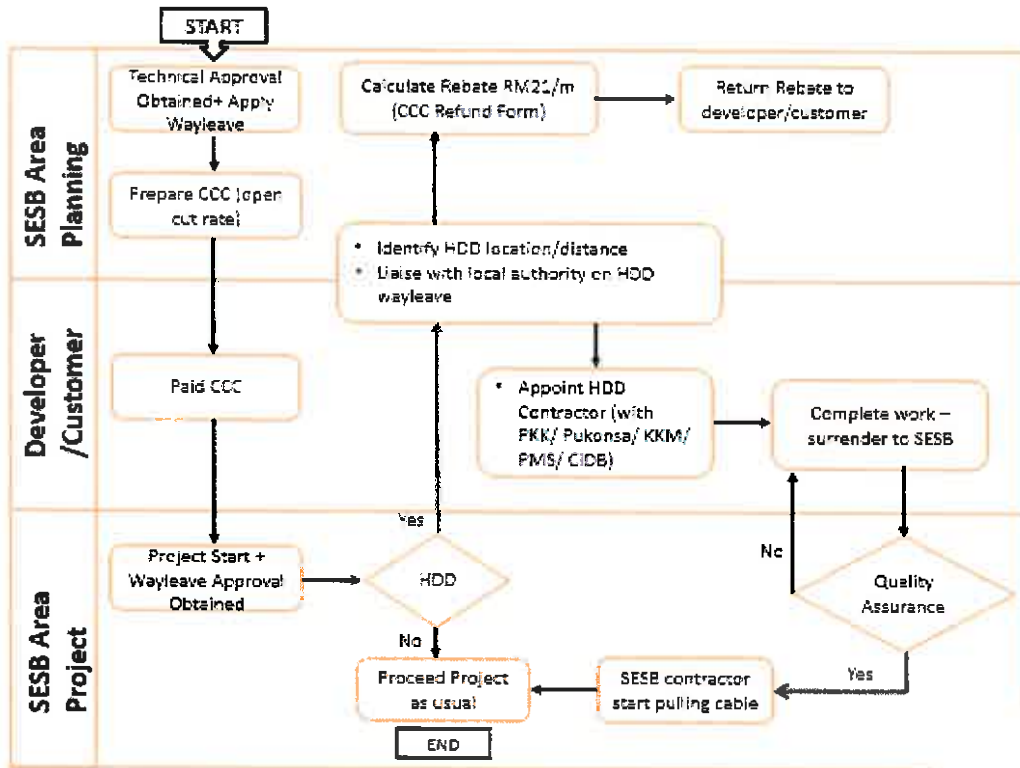
## APPENDIX A - FLOWCHART 1

Horizontal Directional Drilling (HDD) is identified before issuance of CCC



## APPENDIX A - FLOWCHART 2

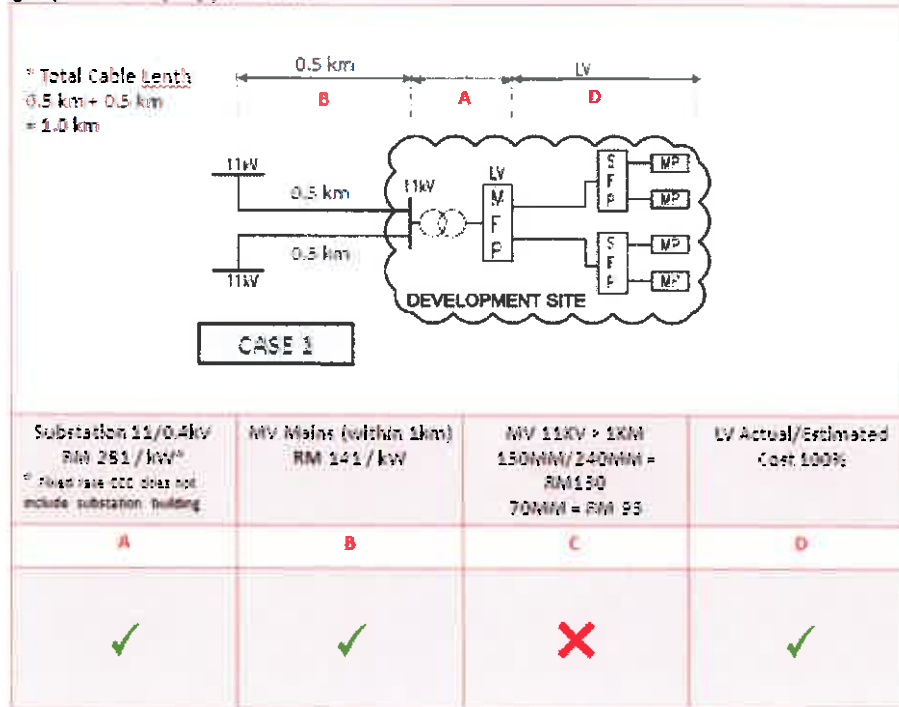
Wayleave approval obtained and Horizontal Directional Drilling (HDD) requirement made known after CCC is paid by applicant



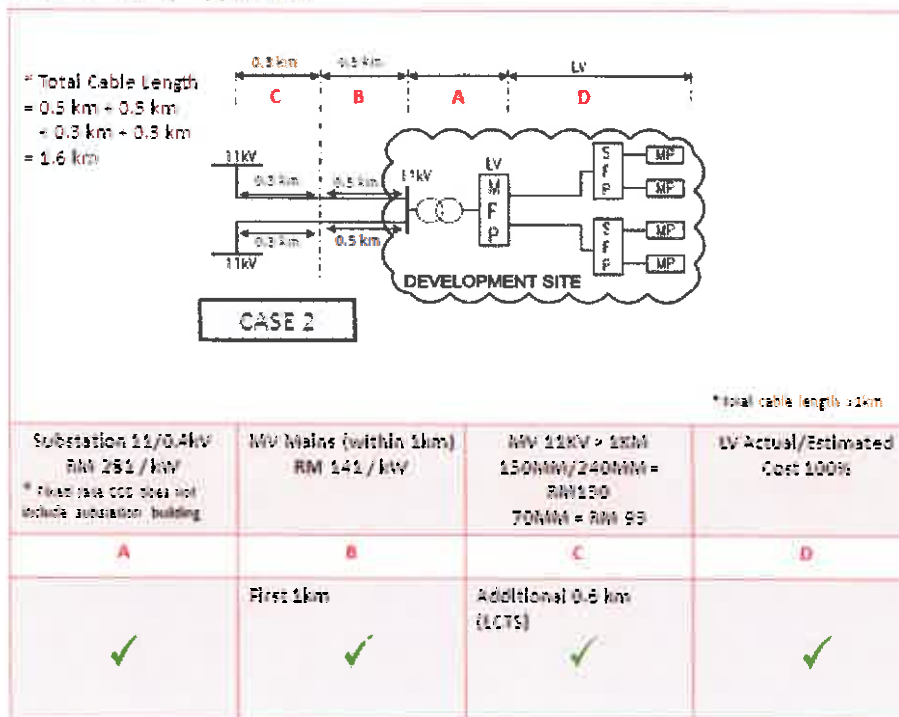


## APPENDIX B – EXAMPLES OF CALCULATION OF LENGTH FOR 11KV MAINS

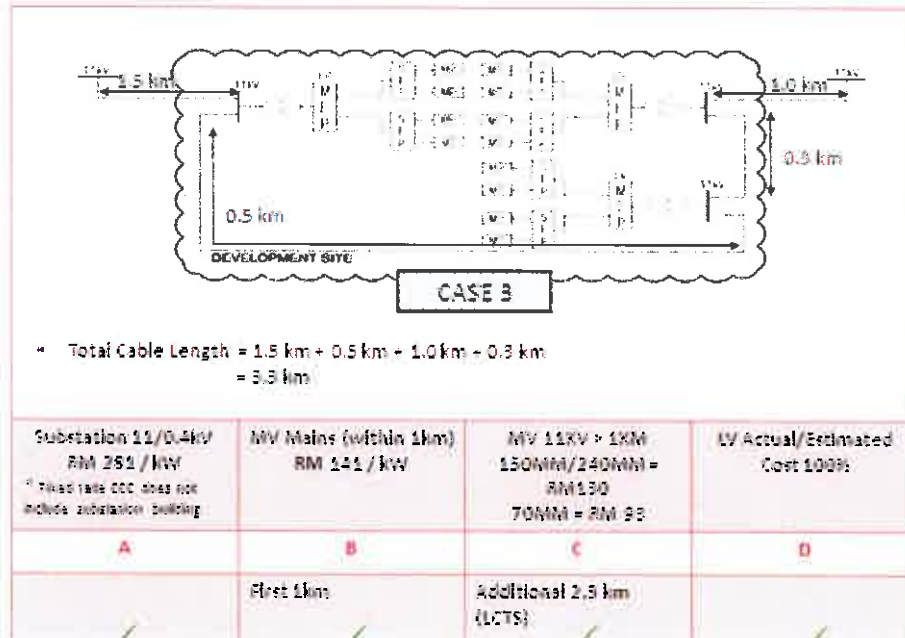
### Category 3 – Group Application



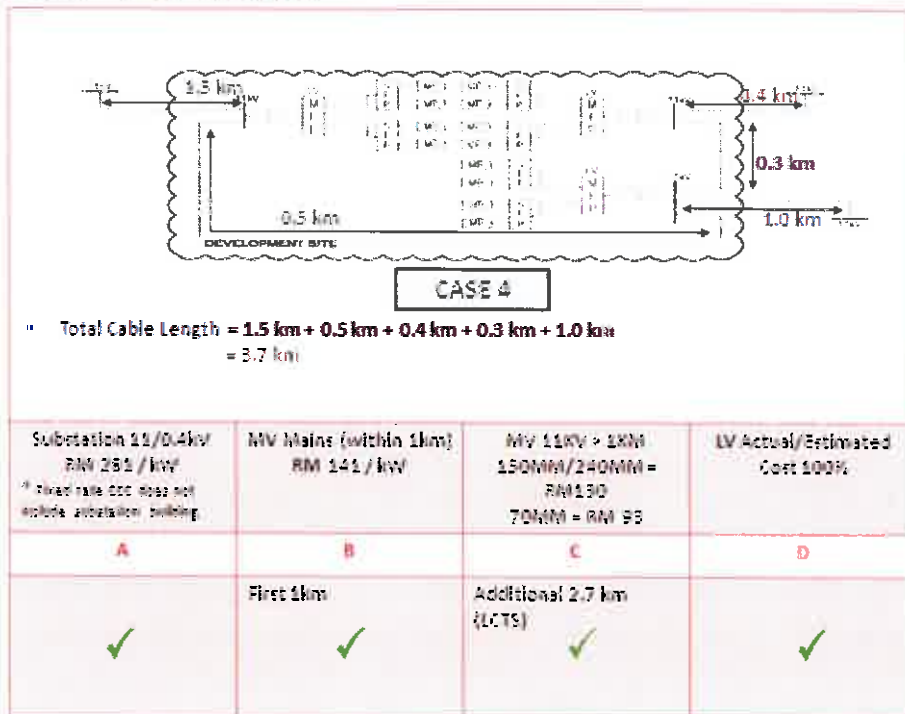
### Category 3 – Group Application



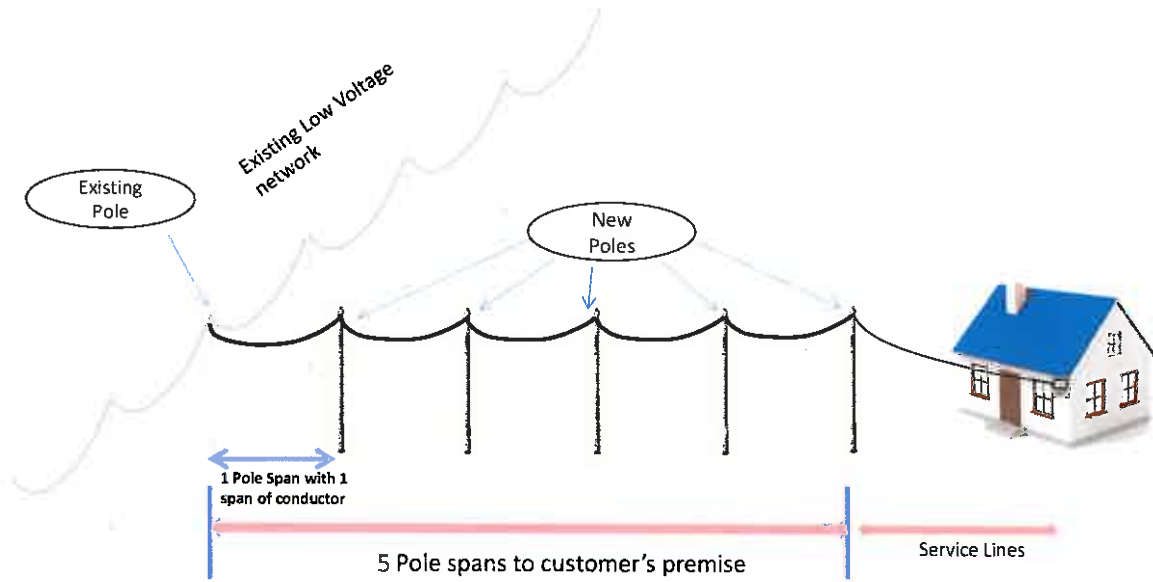
### Category 3 – Group Application



### Category 3 – Group Application



## APPENDIX C – PICTURE ILLUSTRATION FOR POLE SPAN





**IBU PEJABAT**  
No. 12, Jalan Tun Hussein  
Precinct 2  
62100 Putrajaya  
Tel : 03 8870 8500  
Fax : 03 8888 8637  
Web : [www.st.gov.my](http://www.st.gov.my)

**PEJABAT KAWASAN  
PANTAI BARAT SABAH**  
Tingkat 7, Wisma BSN Sabah  
Jalan Kemajuan, Karamunsing  
88000, Kota Kinabalu, Sabah  
Tel : 088 232 447  
Fax : 088 232 444

**PEJABAT KAWASAN  
PANTAI TIMUR SABAH**  
Tingkat 3, Wisma Saban  
Km 12, Jalan Tabuk, W.D.T  
No 25, 90500, Sandakan, Sabah  
Tel : 089 666 695  
Fax : 089 660 279