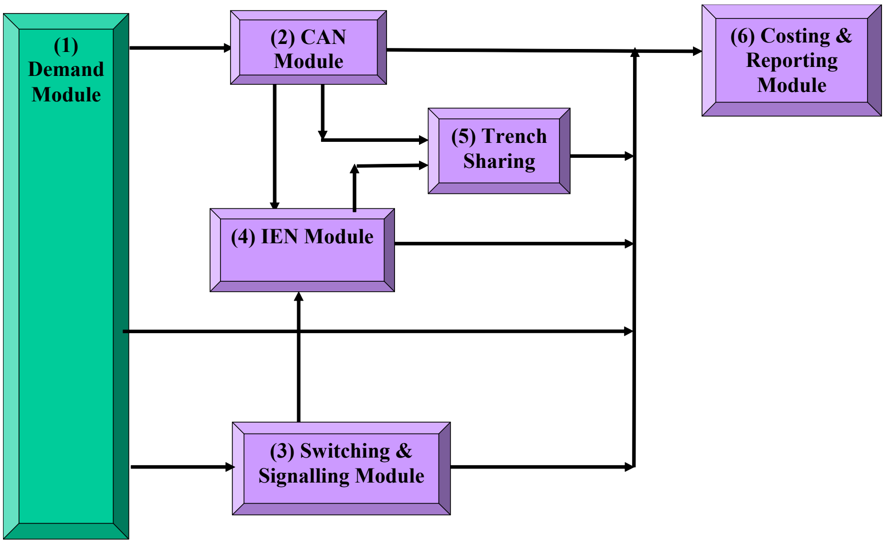
ANNEXURE B - DESCRIPTION OF PIE II MODEL

A MODEL STRUCTURE

1. The PIE II model is made up of several individual modules. The data flow across each of these modules is depicted in the following diagram:



2. Below is a description of each module.

3. All of the variables in the model can be changed by the user. The description of the modules set out below also refers to the variables used by Telstra in the model.

B DEMAND MODULE

4. The Demand Module distributes the demand for each of the products to each exchange service area ("**ESA**"). There are 5,030 ESAs with Retail PSTN Services in Australia. Each ESA is classified as being in a defined geographic area. The geographic areas used in the PIE II model are CBD, Metropolitan, Provincial and Rural.

B1 Principles Employed

5. The model automatically distributes the forecast services in operation ("**SIOs**") according to the distribution of the current SIOs by ESA.

6. To determine the distribution of call traffic, a ratio of calls per SIO for each of the 66 interconnect call charging areas ("**ICCA**") is calculated using the current SIOs and current traffic volumes generated in the ICCA. The reason why ICCAs are used is

because traffic information is available on a per ICCA basis. All ESAs are mapped to ICCAs (with each ESA only being mapped to one ICCA). Thus a ratio of calls per SIO for each ESA is calculated. Forecast traffic is distributed to each ESA equi-proportionally in accordance with this ratio.

B2 Products

7. Calling products included in the model are:

Product Description
[c-i-c]
[c-i-c]
[c-i-c]
[c-i-c]
[c-i-c]
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[c-i-c]
[c-i-c]
[c-i-c]
[c-i-c]
[c-i-c]

8. The access products included within the model are:

Product Description
[c-i-c]
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[c-i-c]

9. Local calls in the PIE II model are decomposed into voice local calls and internet local calls as follows:

ESA Category	Internet Calls as a % of Local Calls	Average Internet Call Holding Time
CBD	[c-i-c]	[c-i-c]
Metro	[c-i-c]	[c-i-c]
Prov	[c-i-c]	[c-i-c]
Rural	[c-i-c]	[c-i-c]

This decomposition is undertaken because internet calls have different routing factors to voice local calls. The introduction of Telstra's Dial IP platform and its Megapop product was designed to ensure that a large proportion of the long held internet calls exit the PSTN at the first local access switch. In order to identify the internet calls as a percentage of local calls and their average call holding time, in June 2002 Telstra conducted a traffic study of calls terminating on its Dial IP platform. For the purposes of the model it has been assumed that 55% of internet calls will use the Dial IP platform.

C CAN MODULE

10. The CAN module determines the infrastructure requirements for the Customer Access Network ("**CAN**") using geo-coded addresses for customers and for Telstra equipment sites on an ESA basis.

C1 Principles Employed

11. Each ESA is divided by the PIE II model into discrete areas called distribution areas ("**DAs**"). To enable the construction of the DAs, the model is populated with the geo-coded address locations of allotments that as at October 2000 or prior to that had a Telstra access service. As not every one of the addresses will have a service (there being some addresses with no service), the number of SIOs for the ESA (which are calculated as set out in paragraph 5 above) are allocated to the address locations within the ESA.

12. The PIE II model divides each ESA into DAs ranging in size from 20.25 Km^2 (being the largest possible size DA) to 0.0625 Km^2 (being the smallest and most tele-dense DA). The size of the DA depends on the number of addresses and SIOs in the DA. Higher density DAs are referred to as Urban in this Annexure, and lower density DAs as Non-Urban. These terms do not necessarily reflect the actual physical location of the DA, but rather the characteristics of the DA from a network provisioning viewpoint.

13. Each of the urban DAs is then modelled using a reference DA to determine the distribution plant required. The specific parameters of each urban DA such as area and number of SIOs are applied to the reference DA to calculate the quantity of distribution plant required. Within the DA, customers can be connected using either a distribution cable and a pillar or a main cable (which is typical of multi-service premises). For DAs with a pillar, the pillar is attributed a physical location within the DA, usually at the centre of the DA.

14. In non-urban DAs, addresses are linked together using ploughed main cable.

15. Those DAs that have been identified as having very high tele-density are serviced using large size main cable feeds terminating at distribution frames within the customer premises.

16. DAs are linked together using main cable that terminates in a Remote Access Unit ("**RAU**"). The RAU can either be located in a Telstra building (often referred to as an exchange building) or located as street furniture. The PIE II model connects the DAs to the parent RAU using a minimum spanning tree algorithm.

C2 Assumptions

High Density Urban CAN Dimensioning

17. A high density urban DA is 250 metres x 250 metres in size and has an average of 5 SIOs per address.

General Rules

18. Copper cable reticulation is the appropriate best in use CAN technology for use in high density urban DAs.

Distribution Area Rules

19. All SIOs in high density urban DAs are served by main cable.

20. The standard sizes of main cable are 4,200, 2,400 and 1,200 pair main cable.

21. Conduits are laid in trenches.

Urban CAN Dimensioning

22. An Urban DA is between 250 metres x 500 metres and 1500 metres x 500 metres in size and contains between 65 and 250 SIOs.

General Rules

23. Copper cable reticulation is the most appropriate best in use CAN technology in urban DAs.

24. Customers are served by distribution cable if they have, on average, less than 5 SIOs. If they have more than 5 SIOs, they are served directly by main cable.

Distribution Area Rules

25. DAs are designed around the number and mix of Living Units (“**LUs**”) and Business Units (“**BUs**”) they include.

26. DA can have as many as 160 LUs or 80 BUs or a combination of the two; LUs and BUs are considered to be 'addresses' in the model.

27. Distribution cables are not tapered.

28. Main cable used to connect the pillar to the main distribution frame (“**MDF**”) at the RAU is tapered.

29. All distribution cable is trenched.

30. A service access module (“**SAM**”) is deployed for every 8 addresses served.

31. The standard size of cable connected to the network side of the SAM is a 100 pair cable. The last SAM is connected via a 50 pair cable.

Pillar Rules

32. The pillar size used is a 900 pair pillar.

33. A maximum of 300 main cable pairs run from the pillar to the RAU. A maximum of 500 distribution cable pairs run from the pillar into the DA.

34. Pillars are located in the approximate centre of DAs.

Non-Urban CAN Dimensioning

35. A Non-Urban DA is a DA which is not an Urban or a High Density Urban DA.

General Rules

36. Copper cable reticulation is the most appropriate best in use technology for the non-urban CAN except where the proposed cable run would exceed 6 km. If the proposed

cable run would exceed 6kms, the PIE II model analyses and selects alternate access technologies on a least cost basis (see below).

37. Customers that are served with copper cable are served directly by main cable.

Distribution Area Rules

38. The PIE II model connects all addresses with SIOs within each Non-Urban DA to the RAU using a minimum spanning tree algorithm. It connects DAs to the RAU using a minimum spanning tree algorithm.

39. Main cables are not tapered.

40. The standard size of main cable is a 100 pair cable.

41. All Non-Urban main cable is direct buried (it is not laid in a conduit).

Alternate Access Technology Selection

42. All ESAs with less than or equal to 15 SIOs are served by satellite.

43. All DAs that are less than 6km from the nearest RAU are connected to the nearest RAU using copper main cable with enough spare capacity.

44. All other DAs are serviced by one of:

    (a) Small Capacity Distributed System ("SCADS");

    (b) Single/Dual Channel Access Radio ("SCAR/DCAR"); or

    (c) High Capacity Radio Concentrators ("**HCRC**").

    The technology chosen will be the one that provides the lowest estimated cost of servicing the DA. For DAs with less than or equal to 10 SIOs, the comparison is made between SCADS and SCAR/DCAR. For DAs with more than 10 SIOs, the comparison is made between SCADS and HCRC.

45. If an ESA has at least one DA serviced by HCRC, then all DAs in that ESA serviced by radio are serviced by HCRC.

RAU Dimensioning

Dimensioning Rules

46. The following rules have been adopted in dimensioning the RAUs:

(a) All RAUs use CMUX technology (which is the best in use technology).

(b) Three types of CMUX are used: network units ("**NU**s"), above ground housings ("**AGH**s") and underground housings ("**UGH**s"). NUs are deployed in exchange buildings whilst AGHs and UGHs are deployed remotely.

(c) More than one NU can be located in the same building.

(d) NUs generally serve all SIOs that are connected to a pillar and the pillar is located within 4km of the NU. All other SIOs are served by remote CMUXs.

(e) Each remote CMUX needs to be sub-tended (supported) by a NU. A sub-tend card must be fitted into the NU for each remote CMUX subtended.

(f) Each remote CMUX is connected to its parent NU by optical fibre.

Dimensioning Variables

47. The variables are as follows:

Description	Value
The maximum capacity to which an RAU unit may be filled (as a proportion of the total slots available).	80%
The maximum number of SIOs that can be provisioned from a single CMUX POTS card.	30
The maximum number of SIOs that can be provisioned from a single CMUX ISDN card.	16
The maximum number of SIOs that can be provisioned from a single CMUX PRA card.	1
Number of shelf 1 slots available on a CMUX for POTS cards or sub-tending cards.	12
Of the total number of CMUX NU slots available for sub-tending, the number of slots needed to remain unused.	2
Absolute capacity of Under Ground Housing CMUX unit (in cards).	7
Absolute capacity of Above Ground Housing CMUX unit (in cards).	22
Maximum number of shelves per NU CMUX.	3
Maximum number of POTS cards on a CMUX shelf.	14
Minimum number of SIOs required within an ESA to provision a NU CMUX.	1,200
Maximum practical capacity of a PSTN Line Card.	95%

Description	Value
Maximum practical capacity of an ISDN Line Card.	95%

D SWITCHING & SIGNALLING MODULE

48. The Switching and Signalling Module determines the switching equipment needed for the PSTN on an ESA basis.

D1 Principles Employed

49. The following rules have been adopted in dimensioning the network elements to build the Local Access Switches ("**LAS**"), Signalling Transfer Points ("**STP**") and Transit Network Switches ("**TNS**"):

(a) Each ESA is served by a single LAS for carriage of all call types and traffic generated by the SIOs within it.

(b) LASs are classified into two categories:

(i) Type A LAS which serves CBD and Metro ESAs only;

(ii) Type B LAS which serves all other types of ESAs (i.e the ESAs served by the LAS include at least one provincial or rural ESA).

(c) For dual ended calls, originating traffic at the LAS is assumed to be equal to the terminating traffic at that LAS.

(d) All LASs and STPs are Ericsson AXE and all TNSs are Alcatel System 12s.

(e) No direct customer connections are supported at the TNS layer.

(f) Each LAS is assumed to be STP capable (i.e it is attached to the SS7 signalling network).

(g) The interconnect gateway, mobile gateway, intelligent network platform and international gateways are assumed to be outside the PSTN and are not included in the PIE II model.

(h) The inter-exchange traffic is balanced between the direct path (LAS to LAS) and the overflow route (via the TNS) during the busy hour.

(i) All LASs and TNSs are appropriately dimensioned to cater for traffic on the basis of routing factors. The routing factors specify the usage of network elements by each call type based on the path traversed by a call between its source and its destination.

(j) Routing factors are different for Type A and Type B LASs, based on the call type.

D2 Variables

50. The following call parameters have been used:

Description	Value
Unsuccessful calls as ratio of total calls	33%
Ratio of terminating to originating calls	1
Busy days per year	250
Busy hours per day	10
Average answered call setup time in seconds	10
Average unanswered call duration in seconds	28

51. The following variables have been used in dimensioning the network elements:

Description	Value
Number of 64Kbps VF channels per 2Mbps transmission link	28
Maximum number of GSS ports in a LAS	90,000
Erlang per GSS port	0.60
Erlang per TNS port	0.70

E IEN MODULE

52. The IEN module determines the transmission equipment needed for the PSTN on an ESA basis.

E1 Principles Employed

53. The cost of transmission links for connections between RAUs and LASs in Metropolitan and/or CBD ESAs, between LASs and between LASs and TNSs are inputs to the model.

54. In respect of transmission links between non-metro RAUs and LASs the architecture used is such that a number of RAUs are connected to a Point of Confluence ("**PoC**"), which is located on an SDH transmission ring with a number of other PoCs. This

provides a balance between ensuring redundancy of traffic flows (given by the SDH rings) and the cost of providing redundancy for every RAU.

RAU to LAS Transmission in rural and provincial ESAs

55. The principles employed are as follows:

(a) Any RAU located within an exchange building that serves more than 800 SIOs can be a PoC.

(b) Every LAS is a PoC.

(c) RAUs, with the same LAS parent, are linked together using the minimum spanning tree algorithm.

(d) Each spanning tree contains one PoC.

(e) The number of RAUs connected to a PoC is limited to 16. This reflects the objective that no more than 3,000 customers should be isolated by a single cable cut.

(f) PoCs are joined in optimised rings, containing no more than 8 PoCs to their parent LAS.

(g) ESAs are connected by radio if they are so connected in the Telstra network. These ESAs are connected via radio to other ESAs.

(h) 12 fibre optical fibre cable is used for all RAU to RAU and RAU to PoC cable connections.

(i) 18 fibre optical fibre cable is used for all PoC to PoC and PoC to LAS cable connections.

(j) When cable is in a ploughed trench, no conduit is used.

(k) A regenerator is needed to regenerate the signal on an optical fibre cable every 90 kms.

(l) Every cable requires a sheath end termination at each end.

(m) One add and drop multiplexer (“**ADM**”) is required at each PoC on a ring.

(n) Where the traffic on a ring exceeds 840 2 Mbit/s streams, extra ADMs are added to each PoC to carry the extra load.

Radio Transmission Network

56. The following principles have been adopted in constructing the radio transmission network for the model:

(a) RAUs are nominated as being radio PoCs if they exist on an island, are an NU and service the largest number of customers of all the NUs on the island.

(b) All RAUs within radio ESAs are connected via radio, instead of cable, to a PoC.

(c) All radio PoCs are joined via radio, instead of cable, to other PoCs within a ring. On an island, radio PoCs are joined by cable to RAUs on the same island.

(d) Each radio link consists of a mast attached to the RAU or PoC at each end, towers at no greater than 50 km apart and radio equipment and multiplex equipment for each mast and tower.

(e) SDH transmission is preferred to PDH transmission due to capacity and technology advantages but 55% of radio links are assumed to be PDH. This reflects the fact that it is not always possible to install SDH due to transmission spectrum availability.

(f) The cost of a PDH link is 35% of an SDH link.[1]

F TRENCH SHARING MODULE

57. The PIE II model takes account of 2 types of trench sharing:

(a) sharing with third parties; and

[1] Whilst the SDH link is approximately 3 times the cost of the PDH link, it provides 4 times the traffic capacity.

(b) sharing between network elements.

The trench sharing module deals with sharing between network elements. Trench sharing with outside parties is dealt with in the Costing and Reporting Module.

F1 Principles Employed

58. The following principles have been adopted in establishing the level of trench sharing between the RAU to LAS transmission network and the CAN:

(a) Trench sharing is only possible where cables are installed in ducts.

(b) The total length of main cable trench that may be shared in an ESA between distribution cable and main cable is 98% of the main cable trench.

(c) If the amount of main cable trench in the ESA is smaller than 1,000 metres then no IEN trenching is shared.

(d) If there is no ploughed main cable then all unshared IEN is trenched.

(e) If there is some ploughed main cable in rural or provincial ESAs then all unshared IEN is ploughed.

(f) The open trenches which are available for sharing with others at the time the best-in-use network is built constitute 1% of the total distribution trench. This includes trenches in new estates that are built at the same time as the network.

G COSTING & REPORTING MODULE

59. The Costing and Reporting Module determines the cost of a particular service.

60. To do this it calculates the annual capital cost associated with building the PSTN as well as the annual expenses such as operational and maintenance ("**O&M**") and network planning costs. These annual costs are summed and then used to calculate the unit costs of the various network elements that deliver the PSTN traffic.

G1 Calculation of Annual Capital Charge

61. The cost of the equipment required in building the PSTN is determined on an item by item basis within each ESA. It is the product of volume of equipment required times the unit price. The costs associated with each item are then aggregated by network element classification (which may be divided into a number of asset classes).

62. The annual capital cost for each asset class is determined by the following formula:

$$\text{Capital Cost} = C * (\sigma - (1/L+DR*IR)*TR*(1-\gamma)) / (1-TR*(1-\gamma))$$

Where:

C = total cost of asset

$$\sigma = \frac{(1 + R)^L * (R - \text{PriceTrend})}{(1 + R)^L - (1 + \text{PriceTrend})^L}$$

R=WACC * (1+ Option Value)

L = life time of the asset.

DR = debt ratio set out in Section F8 of Submission.

IR = interest rate set out in Section F8 of Submission.

TR = tax rate set out in Section F8 of Submission.

γ = imputation gamma set out in Section F8 of Submission.

WACC = Weighted Average Cost of Capital which is set out in Section F8 of the Submission

Options Value = 0% for the reasons described in Section F9 of the Submission

G2 Calculation of Annual Expenses

63. Annual expenses comprise:

(a) direct O&Mcosts - these are direct expenses incurred in the operation and maintenance of the identified network assets;

(b) indirect O&M costs - these are attributable corporate costs such as cost of accounting and employee relations;

(c) annual capital cost of indirect assets - indirect assets include assets such as corporate buildings and information technology assets;

(d) network planning expense - this is the expense incurred in the planning, implementation and roll out of the PSTN;

(e) network land & buildings costs - these are expenses incurred that are directly attributable to properties used exclusively for the purpose of housing PSTN equipment.

64. The direct O&M costs are determined by multiplying the capital build cost by the appropriate O&M percentage. This calculation is performed for each asset class.

65. The indirect O&M costs are determined by multiplying the direct O&M costs by the appropriate indirect O&M percentage. This again is performed for each asset class.

66. The annual capital cost for indirect assets is determined by first multiplying the capital build cost by the appropriate indirect asset percentage to derive the level of indirect asset capital. The indirect asset capital cost is then annualised using the same annualisation formula as is described in section G.1 above.

67. The network planning expense costs are determined by multiplying the direct O&M costs by the appropriate network planning percentage set. Once again, this is performed for each asset class.

68. The network land & buildings costs consist of:

(a) an annual capital cost calculated using the annualisation formula set out in section G1 above and a network land and building cost of [c-i-c], being Telstra's estimate of the current market value of these assets; and

(b) an expense calculated by multiplying the capital cost by the relevant O&M factor.

These amounts are then allocated to the network element categories using the network land & buildings allocators used in the regulatory reporting framework. These allocators are as follows:

Network Category	Allocator
Access	[c-i-c]
LAS	[c-i-c]
Non PSTN assets	[c-i-c]
RAU to LAS	[c-i-c]
RAU	[c-i-c]
STP	[c-i-c]
TNS	[c-i-c]

G3 Calculation of IEN Element Unit Costs

69. For the purposes of determining product costs, the IEN has been segmented into 7 separate network elements cost pools in each ESA as follows:

(a) RAU;

(b) LAS;

(c) TNS;

(d) RAU to LAS transmission;

(e) LAS to LAS transmission;

(f) LAS to TNS transmission;

(g) TNS to TNS transmission.

70. The asset cost pools are aggregated into these network elements cost pools.

71. Then, the network element cost pool = annual capital cost

+ direct O&M

+ indirect O&M

+ indirect annual capital cost

+ network planning expense

+ allocation of network land & building costs for each network element.

72. The usage of the network elements is calculated by the application of the routing factor tables. The total usage of each of the network elements is then calculated as follows:

$$\text{Usage Minutes}_k = \sum_{p=1}^{n} \text{Forecasted Minutes of Use}_p * \text{Routing Factor}_{p,k}$$

$$\text{Usage Calls}_k = \sum_{p=1}^{n} \text{Forecasted Calls}_p * \text{Routing Factor}_{p,k}$$

where:

k is the k^{th} network element being considered and;

p is one of the n different products that uses the network element.

ULLS

73. The cost pool that is used to derive the ULLS network costs is the total PSTN CAN cost pool, excluding the cost of PSTN line cards and excluding the costs of radio access technologies. As RSS technology is not used within the model, it has been assumed that services connected to the Network Unit provide the best analogue.

74. The average unit cost of providing a ULLS connection to a Network Unit is calculated for each ESA as follows:

(a) costs associated with distribution cable and distribution ducts and conduits are allocated between all copper based services within the ESA to determine the "copper cost" per service;

(b) costs associated with pillars are allocated between two cost pools, one associated with services connected to Network Units and the other associated with services connected to remote CMUX Units only;

(c) costs associated with main cable and main cable ducts and conduits are allocated to the cost pool associated with services connected to Network Units only;

(d) costs allocated to services connected to Network Units (distribution cable, distribution ducts and conduits, pillars, main cable and main cable ducts and conduits) are totalled and divided by the number of services connected to the Network Units in the ESA.

75. Dividing the total costs by the total SIOs gives the average annual cost for ULLS which is then converted to a monthly charge by dividing by 12.

Glossary of Terms and Abbreviations used in this Annexure

A

Address generally, the location of a customer that has or has once had a PSTN service.

ADM Add and Drop Multiplexer. This is a piece of equipment required for transmission.

AGH Above Ground Housing - a medium size variant of CMUX located on street corners, remotely fed from Network Units in exchange buildings.

B

BU Business Unit. Customer's premises that have one or more business SIOs.

C

CAN Customer Access Network. That part of the network that extends from the customer side of the Main Distribution Frame (MDF) to the first socket in the customer's premises (ie is comprised of the Access Network and the Lead-In).

Card a network card that is located within a CMUX.

CBD Central Business District. A category of ESA. It refers to high density urban areas containing high-rise buildings but also can include surrounding areas of medium or even low density.

CMUX Customer Mux. Modern type of RAU replacing IRIM, RSS and RSU types of RAU.

Conduit a hard tube that is buried in trench. It is designed to protect cable.

D

DA Distribution Area. Contiguous area of SIOs serviced by one pillar for urban areas or one cable tree in non-urban areas. Distribution areas vary in size and SIO density and are generally the lowest level building block of the CAN.

Distribution Cable a component of the access network that is used to connect the pillar to the Lead-In. Distribution Cable is located in conduits that are laid in a distribution trench.

Distribution Trench a trench that is primarily constructed to contain and protect distribution cable.

E

ESA Exchange Serving Area. This represents the area whose SIOs are serviced by a common Network Unit. Every customer location is uniquely assigned to one ESA.

G

GSS Group Switching Stage. This is a component of the LAS that plays a part in processing calls.

H

HCRC High Capacity Radio Concentrator - a point-to-multipoint radio system which is designed to provide service to isolated clusters of customers.

I

ICCA Interconnect Call Charge Area being a collection of ESAs.

IEN Inter Exchange Network. The transmission network connecting RAU to LAS, LAS to LAS, LAS to TNS and TNS to TNS.

ISDN Integrated Services Digital Network (CCITT) - an international telecommunications standard for transmitting voice, video and data over digital lines running at 64Kbps. Uses circuit switched bearer channels (B channels) to carry voice and data and uses a separate channel (D channel) for control signals via a packet switched network. ISDN Basic Rate Interface (BRI) provides 2B +D for a rate of 144Kbps. ISDN Primary Rate Interface (PRI) in Australia and Europe provides 30B + D which is equivalent to E1.

L

LAS Local Access Switch is the lowest level of call switching in the PSTN. Topographically, it connects the Remote Access Unit ("RAU") with the Transit Network Switch ("TNS").

LU Living Unit. Customer's premises that have a residential SIO.

M

Main Cable large diameter copper cable containing a large number of pairs that is used in a number of different ways in the PSTN. First, in Urban areas it is used to connect the pillar to the MDF. Secondly, it is used to connect Main Cable fed customers directly to the MDF. Lastly, it is used in Non-Urban areas to connect the Lead-Ins customers directly to the MDF.

Metro a category of ESA. It mainly consists of medium to moderately high density urban areas, but may also contain sparse areas (such as large parks and urban fringe areas).

N

Network Card a network card is a card located within a CMUX that has a specific PSTN function (such as a Sub-tend card, a POTS card, and an ISDN card). Network cards are seated in slots.

Non-Urban DA These are areas that are directly served by main cable.

NU Network Unit. Large variant of CMUX RAU. Network units subtend remote RAUs (AGHs and HUGs). Only NUs have the potential to be PoCs.

O

O&M Operational & Maintenance.

P

PDH	Plesiochronous Digital Hierarchy - transmission systems using conventional digital multiplexer equipment.
PIE	PSTN Ingress/Egress model.
Pillar	a piece of CAN equipment that aggregates distribution cable into main cable. The standard pillar used is the 900 pair pillar (with 300 pairs for main cable and 500 pairs for distribution cable).
PoC	Point of Confluence. Aggregation point for RAUs before connecting to a LAS.
POTS	Plain old telephone system.
Provincial	a category of ESA. Mainly covers moderately dense Urban areas outside of capital cities, but also includes rural areas surrounding regional centres.
PSTN	Public Switched Telephone Network. This is the fixed network by which most telephone calls are made, and includes all elements from the lead in through to the Transit Network Switch.

R

RAU	Remote Access Unit is an intermediate low-level switching element located between the LAS and the customer.
Regenerator	A term used for fibre optic systems which corresponds to 'Repeater' in electronic transmission systems. It picks up the weakening light pulse and sends an identical but stronger pulse along the next part of the communications system.
Repeater	A unit of voice frequency or carrier frequency equipment used to amplify and equalise an analogue communication signal that has been weakened and distorted through a long circuit. In digital systems, a Regenerator performs a similar task.
RSS	Remote Switching Stage. This is an element of Local Switching, and may exist within the LAS or remotely from it.
Rural	a category of ESA that mainly covers medium to small country towns and their surrounding areas, as well as remote areas.

S

SAM Service Access Module which is a distribution network cable fitting used to increase flexibility and reliability of the network.

SCADS Small Capacity Distributed System is a Pair Gain System [PGS] employing Single Mode Optic Fibre [SMOF], or 2M (E1/G.703) bearer, to distribute POTS, ISDN, or a simultaneous combination of both.

SCAR/DCAR Single Channel Access Radio/Dual Channel Access Radio.

SDH Synchronous Digital Hierarchy - transmission systems using integral intelligent multiplexing equipment (eg ADM).

SIO Service In Operation. In the case of the PIE model, a working PSTN service at a customers premises.

STP Signalling Transfer Point. A switch equipped to transmit switch CCS7 signals.

Sub-tend where an NU supports a remote CMUX (such as AGH or HUG) and connects it to the rest of the PSTN.

T

TNS Transit Node Switch. A high level switch located in capital cities. TNSs provide links to LASs.

Transmission see Transport.

Transport the call transport network makes up the connections between the Local Access Switch ("LAS") and the Transit Network Switch ("TNS") and between the Remote Access Units (RAU) and the LAS.

U

UGH Underground Housing. A medium sized variant of CMUX located in an underground housing, remotely fed from Network Units in exchange buildings.

Urban area an area of relatively high SIO density that is primarily composed of Urban DAs.

USO Universal Service Obligation. Obligation placed on Telstra to provide a telephone service all customers who desire one.

W

WACC Weighted Average Cost of Capital.