第16条では環境に重大な影響を及ぼす可能性があるとみなされる事業には環境影響評価を義務付けている。環境影響評価に関する実施規定はこの条文に基づき、1986年に「環境影響評価に関する政令（Govenmental Regulation No.29／1986 on Environmental Impact Analysis)」で制度化された。

3. 環境影響評価に関する制令（Governmental Regulation No.29／1986 on Environmental Impact Anaiysis)

計画段階及び供用中の事業が対象であるが、計画中の事業が将来実施されたときに環境を適切に管理するものとするための、意志決定プロセスに合理的な根拠を与えることが期待されている。

同法では環境影響評価の実施方法、提出書類、審査手順などの概要を示している。

4. 公共事業省における環境影響調査

公共事業省では環境影響調査について独自のガイドラインDecree of the Minister of Public Works No.557／KPTS／1989を制定しており、当プロジェクトの環境影響調査も、これに従うこととなる。

公共事業省の環境アセスメント法制度の発達の経緯を以下に示す。

1982 -----	環境保全基本法（Act No. 4 of 1982) Basic Provisions of the Management of the Living Environment 第16条で環境アセスメントの必要性を定めた
1986 -----	Government Regulation No. 29 of 1986 (PP29) EIAプロセスの確立
1989 -----	公共事業省大臣令（No. 557／KPTS／1989) 公共事業省におけるEIAガイドラインの確立
1989 -----	Gentral Committee 発足
1990 -----	Working Team 発足

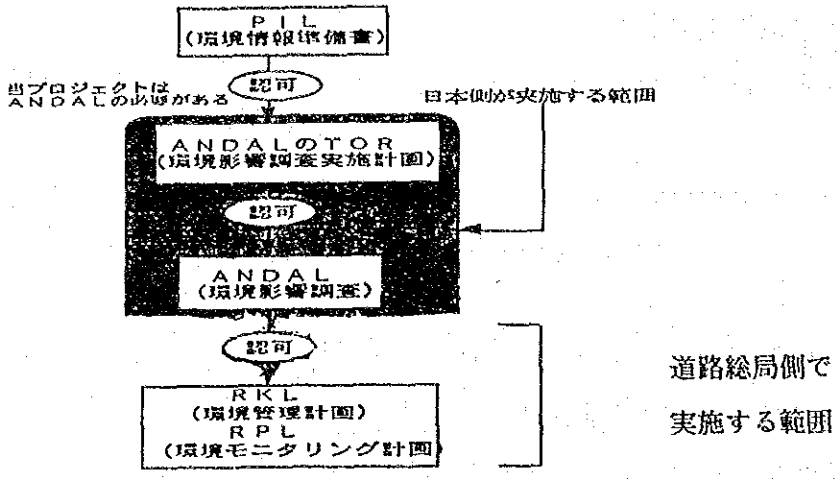
(1) 環境アセスメントの概略

環境アセスメントの流れは、次頁の図に示すようにPIL（環境影響準備書／初期環境評価：Intial Environmental Examination）によって広範囲にわたる調査を行い、計画事業に伴うと予想される環境へのマイナス影響を記述する。公共事業省の環境アセスメント委員会が行うPILの審査によって更に詳しい環境影響調査が必要と判断された場合はANDAL（環境影響評価：Environmental Impact Assessment）を行い、環境保全の目標設定や予想される影響を回避、軽減するための対策の提示を行う。

M／Mに記載されているように本件調査では環境影響調査は必要であることが確認され、協議の結果、日本側の役割は次頁の図に示すとおり、環境影響調査実施計画の作成と環境影響調査（ANDAL）を実施することになっている。

ANDALの承認と環境管理計画（RKL）と環境モニタリング計画（RPL）を提出し、承認

を受ける作業は道路総局側で行うことになっている。これらの承認とその他プロジェクト実施に関する全てのライセンスを受けたことが確認されてはじめて、プロジェクトの実施に入ることができる。



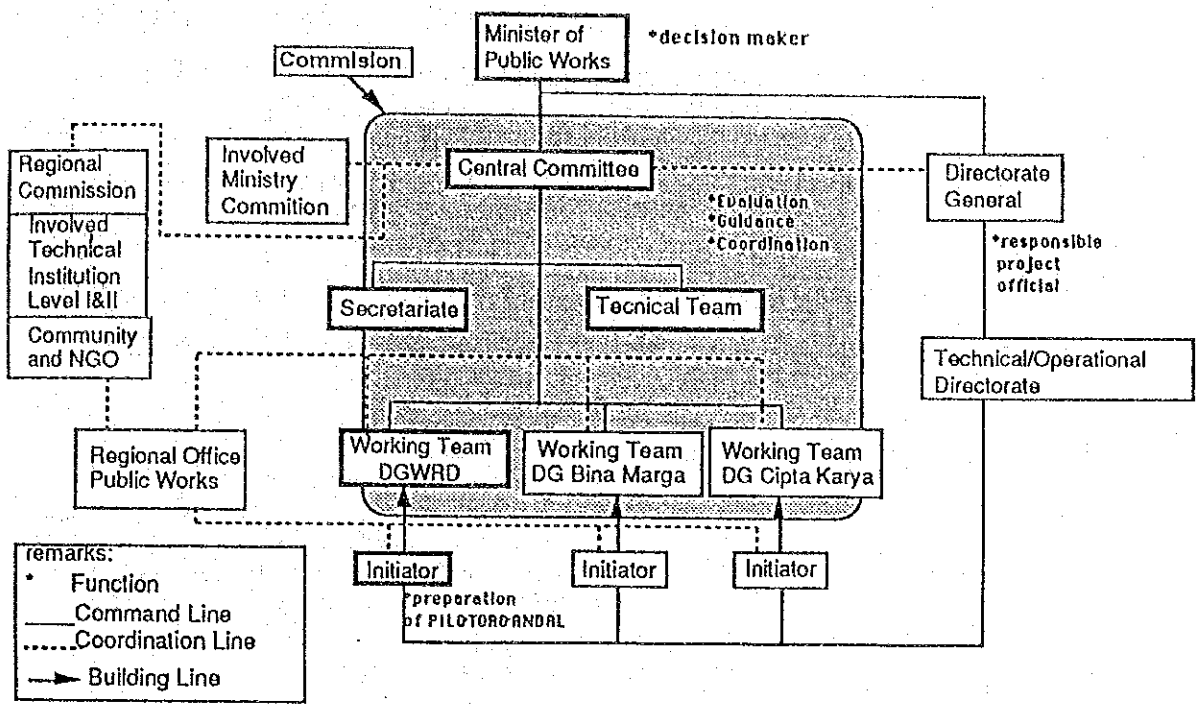
環境アセスメントの流れ

(2) ANDALの手続及び審査手順

ANDALのTOR（環境影響調査実施計画）の書類はInitiator（道路総局の計画局）が用意し、アセスメント委員会のWorlking Team が評価する。Working Teamは書類の評価に基づいて、提出された書類の要約レポートをCentral Committee（道路総局環境アセスメント委員会中央評議会）に提出する。Central Committee は Technical Teamの助言を参考に道路総局のWorking Teamが作成した要約レポートを評価、査定する。Central Committeeの評価が最終決定となり、Technical Teamは覚書（案）を添付する。

・ANDALの書類はアセスメント委員会のWorking Team（主にImpact and Benefit Subdivision）が評価する。Working Teamは提出された書類の要約レポートをCentral Committeeに提出する。Central CommitteeはTechnical Teamの助言を参考にWorking Teamが作成した要約レポートを評価、査定する。Central CommitteeはANDAL承認の推薦状に説明書を添付して公共事業省大臣に提出、認可を仰ぐ。PLLの承認はCentral Committeeの1回の会議で決定されるが、ANDAL及びTORの承認のためには、それぞれ2度の会議を召集する。

公共事業省の環境アセスメント委員会及び関係機関



7－2　環境予備調査

1. 自然状況と現在の環境

ジャカルタ市及びその周辺地域は南部から北部に流れる多数の川（Ciliwung River等）により形成された沖積層の上にあり、全般的に低湿で平坦な地形となっている。事前調査の一環として東西軸予定路線（タンゲラン～ブカシ）と南北軸予定路線（ハーバー道路～アウターリング道路）付近の環境予備調査を実施した。その結果は表7－1と表7－2に示されている。

2. 環境調査事項

本格調査で行う環境調査項目については現地スクリーニングにより概定した。先方との協議の中で合意に達したスクリーニングの結果、F／Sで実施する調査事項は次のようなものであろう。

1) Quality of life
- Resettlement
- Historical and cultural heritage (incl. archaeological aspect)
- Aesthetics (Landscape)
- Socio－economic activities

2) Ecological resources
- Forest／Wild life
- Aquqtic biology

3) Physical resources
- Air*
- Noise／Vibration*
- Surface water, especially concerning those impacts generated through construction work and in service area (Quality and hydrology)
- Soil erosion
- Geology
- Infrastructure and utility

＊については5か所にて実施する予定

表７－１　スクリーニングの結果「道路」

環境項目			内容	評定	備考（根拠）
社会環境	1	住民移転	用地占有に伴う移転（居住権、土地所有権の転換）	(有)・無・不明	計画路線に沿って多数の住居がある
	2	経済活動	土地等の生産機会の喪失、経済構造の変化	(有)・無・不明	計画路線に沿って住居／商業地が存在する
	3	交通・生活施設	渋滞・事故等既存交通や学校・病院等への影響	(有)・無・不明	学校・病院が存在する可能性が高い
	4	地域分析	交通の阻害による地域社会の分断	有・無・不明	地域社会の関連性が不明
	5	遺跡・文化財	寺院仏閣・埋蔵文化財等の損失や価値の減少	有・無・不明	寺院・文化財等の有無が不明
	6	水利権・入会権	漁業権、水利権、山林入会権等の阻害	有・(無)・不明	漁業権等の設定はない
	7	保健衛生	ゴミや衛生害虫の発生等衛生環境の悪化	有・(無)・不明	ゴミ・衛生害虫の発生はない
	8	廃棄物	建設廃材・残土、一般廃棄物等の発生	(有)・無・不明	建設廃材・残土等の発生が考えられる
	9	災害（リスク）	地盤崩壊・落盤、事故等の危険性の増大	有・(無)・不明	災害発生の可能性は少ない
自然環境	10	地形・地質	掘削・盛土等による価値のある地形・地質の改変	有・(無)・不明	大規模な地形改変はない
	11	土壌浸食	土地造成・森林伐採後の雨水による表土流出	有・(無)・不明	都市圏の道路であり土壌浸食は少ないと思われる
	12	地下水	掘削に伴う排水等による涸渇	有・(無)・不明	地下水揚水はない
	13	湖沼・河川流況	埋立や排水の流入による流量、河床の変化	(有)・無・不明	河川数に橋脚が立つ
	14	海岸・海域	埋立や海況の変化による海岸浸食や堆積	有・(無)・不明	Ｎ－Ｓ道路がハーバー道路に結びつく
	15	動植物	生息条件の変化による繁殖阻害、種の絶滅	有・(無)・不明	都市圏道路で動植物の生息地域は通過しない
	16	気象	大規模造成や建築物による気温、風況等の変化	有・(無)・不明	気象変化を引き起こす行為はない
	17	景観	造成による地形変化、構造物による調和の阻害	(有)・無・不明	都市景観阻害を引き起こす可能性がある
公害	18	大気汚染	車両や工場からの排出ガス、有害ガスによる汚染	(有)・無・不明	共用開始後の自動車排出ガスによる大気汚染が考えられる
	19	水質汚濁	土砂や工場排水等の流入による汚染	有・無・不明	重大な水質汚濁を引き起こすような行為は少ない
	20	土壌汚染	粉じん、農薬、アスファルト乳剤等による汚染	有・無・不明	土壌汚染地域の有無が不明である
	21	騒音・振動	車両等による騒音・振動の発生	(有)・無・不明	自動車騒音・振動の影響がある
	22	地盤沈下	地盤変状や地下水位低下に伴う地表面の沈下	有・(無)・不明	地下水のポンピングは考えられない
	23	悪臭	排気ガス・悪臭物質の発生	有・(無)・不明	悪臭の発生要因はない
総合評価　：　ＩＥＥあるいはＥＩＡの実施が必要となる開発プロジェクトか				(要)・不要 ＩＥＥ／(ＥＩＡ)	影響の考えられる項目が複数ある

表７－２　総合評価結果「道路」

環境項目	評定	今後の調査方針	備考
1．住民移転	A	移転対象地域の現況調査 移転候補地の状況調査	商業地におけるビルの統合性についてのスタディ
2．経済活動	A	商業地域の分布状況と商業活動の状況調査	
17．景観	A	National Monument 付近の景観調査 フォトモンタージュ等	モニュメントに対するインドネシア国民の意識を把握する
18．大気汚染	A	大気の現況調査 大気汚染予測	南北幹線路では大気汚染はかなり進んでいる
21．騒音・振動	A	騒音・振動の現況調査 騒音・振動予測	
3．交通・生活施設	B	学校・病院施設等の分布状況調査	
4．地域分断	B	コミュニティーの分布調査，生活施設の分布状況調査が必要	
5．遺跡・文化財	C	計画路線近傍の遺跡・文化財、宗教施設の状況調査	
13．湖沼・河川流況	C	過去の洪水被害状況 必要ならば洪水のシミュレーション	

（注１）評定の区分
Ａ：重大なインパクトが見込まれる
Ｂ：多少のインパクトが見込まれる
Ｃ：不明（検討をする必要はあり、調査が進むにつれて明らかになる場合も十分に考慮に入れておくものとする）
Ｄ：ほとんどインパクトは考えられないためＩＥＥあるいはＥＩＡの対象としない

＜環境分野ローカルコンサルタンツ一覧表＞

地元で環境調査を実施できるコンサルタント会社のリストを下記に示す。

Consultants (Contact Person)	Consultants	
	Address	Telephone
1. PT. BINA KARYA (Ir. Gerdhy Utoro)	JN. D. I. PANJAITAN KAVELING NO. 2 CAWANG JKT. 13001	8198445 8198446
2. PT. INDAH KARYA	－－	7990234 7990848 7990567
3. CIRIAJASA ENGINEERING CONSULTANTS (Ir. Intan Asdarianto)	JL. JATIPADANG V／1 PASAR MINGGU, JAKARTA 12540	7805828 7805848
4. PT. PAMINTORI CIPTA (Ir. Adi Tanuarto)	JL. LAPANGAN ROOS RAYA 12 TEBET UTARA JAKARTA 12820	8282852 8282109
5. ENCONA (Ir. Soeharto／Ir. Sunarto)	JL. ANGKASA NO. 32 BLOK B／5－8 KEMAYORAN, JAKARTA PUSAT	414808

7－3 自然条件

1. ジャカルタ市付近の地質

ジャカルタ市及びその周辺はジャワ海に若干の傾きを持つ平坦地にあり、地盤高は海抜5～10mである。地質の概要は次の文章に簡潔にまとめられている（表7－3、図7－1参照）。

ジャカルタ市の地質

ジャカルタの地質に関して3つの出版物がある。すなわちインドネシア鉱山省地質調査所が1963年と1968年に出版したものと、1949年にVan Bemmelenが出版したものである。ジャカルタの第四紀の地質概要をこれらの文献を基に表7－3にまとめた。

鉱山省地質調査所発行のジャカルタ及びボゴール地区の地質図（縮尺＝1／50,000、図7－1参照）によれば、ジャカルタの海岸付近では軟弱で圧縮性の粘土、緩い砂と砂礫から構成される沖積層が分布しており、ジャカルタの中部と南部には新しい火成層を削って出来た多くの川に上記の沖積層が堆積している。ジャカルタ市外周部には第四紀の古い火成岩と第三紀層が分布している。しかしながら当地質図には新しい火成岩と古い火成岩が更に新世に形成されたのか、完新世（現世）に形成されたのか、またはその両方で形成されたのかについては述べていない。

これらの火成岩はジャカルタ市内の建設物の杭基礎の支持層となっている。この火成岩は一般にセメント化してかなりの強度を示すが、深部まで風化作用を受けラテライト化している。新しい火成岩の標準貫入試験、N値は4から50以上と広いレンジにある。深さ10m～30mにはしばしばN値50以上の比較的硬い地層があり、ジャカルタの30～32階の高層ビルの幾つかは、これらの比較的硬い地層の上にベタ基礎を採用している。（チャンドラ、藤堂、1990より）

表7－3　ジャカルタの第四紀層の地質概要

<table>
<tr><td rowspan="2">Age</td><td colspan="2" rowspan="2">Epoch</td><td colspan="2">Geological Survey of Indonesia Ministry of Mines</td><td rowspan="2">The Geology of Indonesia by Bemmelen (1949)</td></tr>
<tr><td>Geological Map of Jakarta and Bogor Area (1969)</td><td>Geological Map of Java and Madura (1963)</td></tr>
<tr><td rowspan="4">Quater－nary</td><td colspan="2">Holocene</td><td rowspan="3">Alluvium

Young volcanic rocks

Old volcanic rocks</td><td>Alluvium</td><td rowspan="2">Alluvial and Quaternary Volcanoes</td></tr>
<tr><td rowspan="3">Pleis－tocene</td><td>Upper</td><td rowspan="3">Volcanic facies</td></tr>
<tr><td>Middle</td><td>Old Quaternary volcanoes</td></tr>
<tr><td>Lower</td><td>Tambakan Beds</td></tr>
</table>

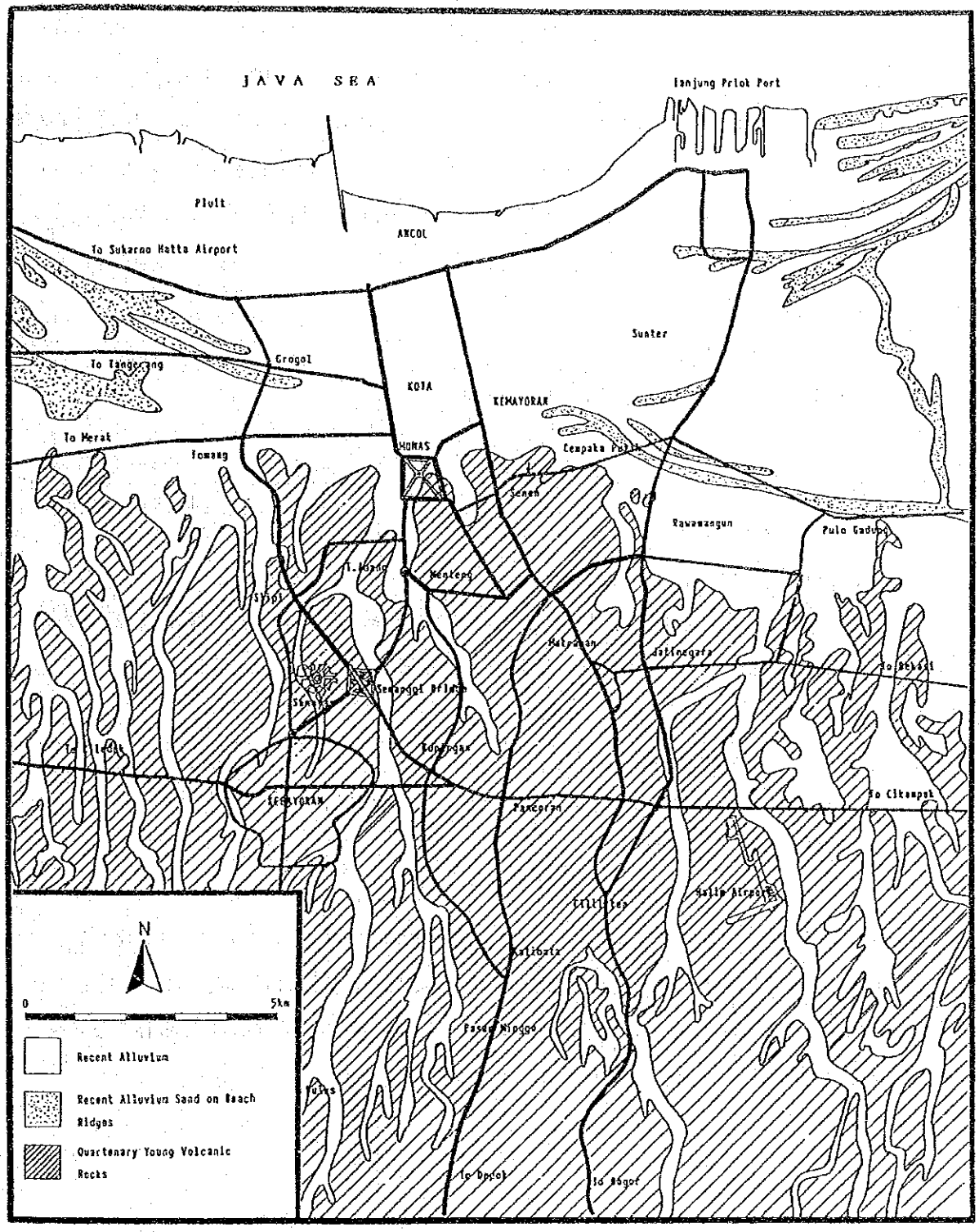


図７－１　ジャカルタの地質図

出典：　鉱山省地質調査所発行のジャカルタ・ボゴール地区の地質図、 1969年

2. 計画路線付近の地形図

道路総局によればインドネシア測量局にS＝1／50,000、1／100,000、1／250,000の地形図があり、DKIジャカルタの地図局（Bureau of Mapping）にS＝1／5,000、1／2,000、1／1,000があり、西ジャワ州のBappedaにS＝1／10,000、1／5,000があると、今回の事前調査団の質問書に対して回答している。しかし上記の地図の入手には申請後数週間かかるとのことで今回事前調査中には実物を見ていない。今回の調査団で確認できた地形図・航空写真は次のようである。

① ジャカルタ市

S＝1／1,000の地形図

空中写真：1987年撮影（S＝1／5,000）

図　　化：1988～1991年

② ブカシ、タンゲラン

S＝1／5,000空中写真

空 中 写 真：1989～1990年

保 管 場 所：SURTA ABRI (SURVEY & MAPPING., ARMED FORCES)

使用許可申請先：MAJOR SYAHRUL, AIR FORCES

③ ジャカルタ市、ブカシ、タンゲラン

S＝1／25,000空中写真

空 中 写 真：1981～1982年　撮影（S＝1／50,000）

測量した年：1990年

入 手 先：BAKOSURTANAL, JL. JAKARTA－BOGOR, KM. 46

本格F／S調査では現存する地形図（S＝1／25,000等）より概略のルート選定を行い、このルートを基に空中撮影を行うことになろう。F／S作業は空中撮影より作成した略モザイク（S＝1／5,000）図を利用することになるが、インターチェンジ等の重要箇所では現存するスケールの異なる地形図を使用することになろう。

＜ボーリング業者と土質コンサルタント会社の一覧表＞

地元で地質調査を実施できるコンサルタンツまたはドラリー名を以下に示した。

(アルファベット順)

Company (Contact Person)	Address	Telephone
BINA PUDIA INTI P.T. (Ir. Triadi Abimanju)	Jl. Kyai Carigin 22a Jakarta 10150	357293,357014
DATA PERSADA P.T. (Ir. Sugie P.)	Jl. Pandegiling 240 Surabaya	(031)45626
ENVIRONMENT NUSA GEOTECHNICA P.T. (Ir. Sugianto Chandra)	Jl. Tebet Barat Dalam No. 16, Jakarta Selatan	8301646,8303512, 8302045 8290163 (fax)
GAMMA EPSILON (Ir. Sri Wihadi)	Jl. Dr. Junjunan No. 222 Bandung	(022)85450,87259
GEO ACE (Drs. Sajiboen)	Jl. Jend. Sudirman 36 Wisma Benhil Lt 6/RA-4	58227
GEOCON INTI PERSADA P.T. (Ir. Muljadi)	Jl. Kebon Nanas 2/7 Kebayoran Lama Jakarta 12210	5492744
GEONORMA UTAMA P.T. (Mr. Anas Kurniatan)	Ligamas Indah Blok E4/1-2 Pancoran, Jl. Raya Pasar Minggu, Jakarta 12760	7991509 7993886 (fax)
INDRA KARYA P.T. (Ir.Mahmud Ali)	Jl. Biru Laut X Kav. 9 Jakarta 13340	8504158,8504159 8192636 (fax)
PONDASI KISOCON RAYA P.T. (Ir. Y.P. Chandra)	Summitmas Tower 20th Fl. Jl. Jend. Sudirman Kav. 61-62, Jakarta 12069	5200909,512907, 512890 513077 (fax)
PRATAMA WIDYA ENGINEERING P.T. (Ir. Paulus)	Greenville AW64 Jakarta 11510	5604839,5604840
SOFOCO P.T. (Ir. Benny Kumara)	Jl. Arteri Pondok Indah No. 1 (Jl. Praja Dalam BI/No 4) Jakarta Selatan	7692363 716455 (fax)
SOILENS P.T. (Ir. Rismantojo)	Jl. P.H. Hasan Mustafa No. 51, Bandung	(022)73211 (022)73831 (fax)
SOLEFOUND SAKTI P.T. (Ir. Soerjatmo Wreksoatmodjo)	Jl. Gading Putih Raya Blok KR 15-17 Kelapa Gading Permai Jakarta Utara	4710804,4710808
WIRATMAN & ASSOCIATES (Ir. Irawan Firmansyah)	Jl. Bendungan Hilir Raya Kav. 36a Blok B No. 14-18 Jakarta 10210	587597,587598 583407 583769 (fax)

＜航空測量会社一覧表＞

地元で航空写真撮影が実施できる測量会社を以下ににリストアップした。

① P. T. AEROKART INDONESIA 住　所　Jalan Let. Jen. S. Parman 37 Slipi Jakarta 11480 電　話　5481584 F a x　5482585
② P. T. EXSA INTERNATIONAL CO., LTD 住　所　Jalan Tomang Raya No. 74 Tomang, Jakarta 11430 電　話　5604361 F a x　5672734
③ P. T. GEOJAYA TEHNIK 住　所　Jalan Kaoten Tendean No. 9B Jakarta 12790 電　話　7995100 F a x　7982951

第８章　本格調査の概要

８－１　本格調査の目的・範囲

調査の目的は次の２点である。

(1)　ジャカルタ首都圏における幹線道路網のマスタープラン調査（ARSDS）において提案されている南北軸幹線道路（ハーバーロード――外環状道路間約20km）、東西軸幹線道路（タンゲラン――ブカシ間約70km）について、その機能並びに役割を近年における社会・経済の情勢を踏まえつつ整理するとともに、整備の優先性について検討し、フィージビリティ調査を実施すべき区間を選定する。

(2)　選定された区間についてルートの検討、環境影響評価及び必要に応じ有料採算性の検討等を行うフィージビリティ調査を実施する。

概略の調査フローは図８－１に示すとおりである。

＜調査項目＞

①　基礎調査（フェーズ　Ⅰ）

1)　既往調査結果のレヴュー

2)　社会・経済調査

3)　技術調査

4)　交通量予測

5)　道路の必要性・機能・役割

②　フィージビリティ調査（フェーズ　Ⅱ）

1)　地形・地質調査

2)　ルート選定

3)　環境影響評価

4)　概略設計

5)　建設・維持管理・運営計画

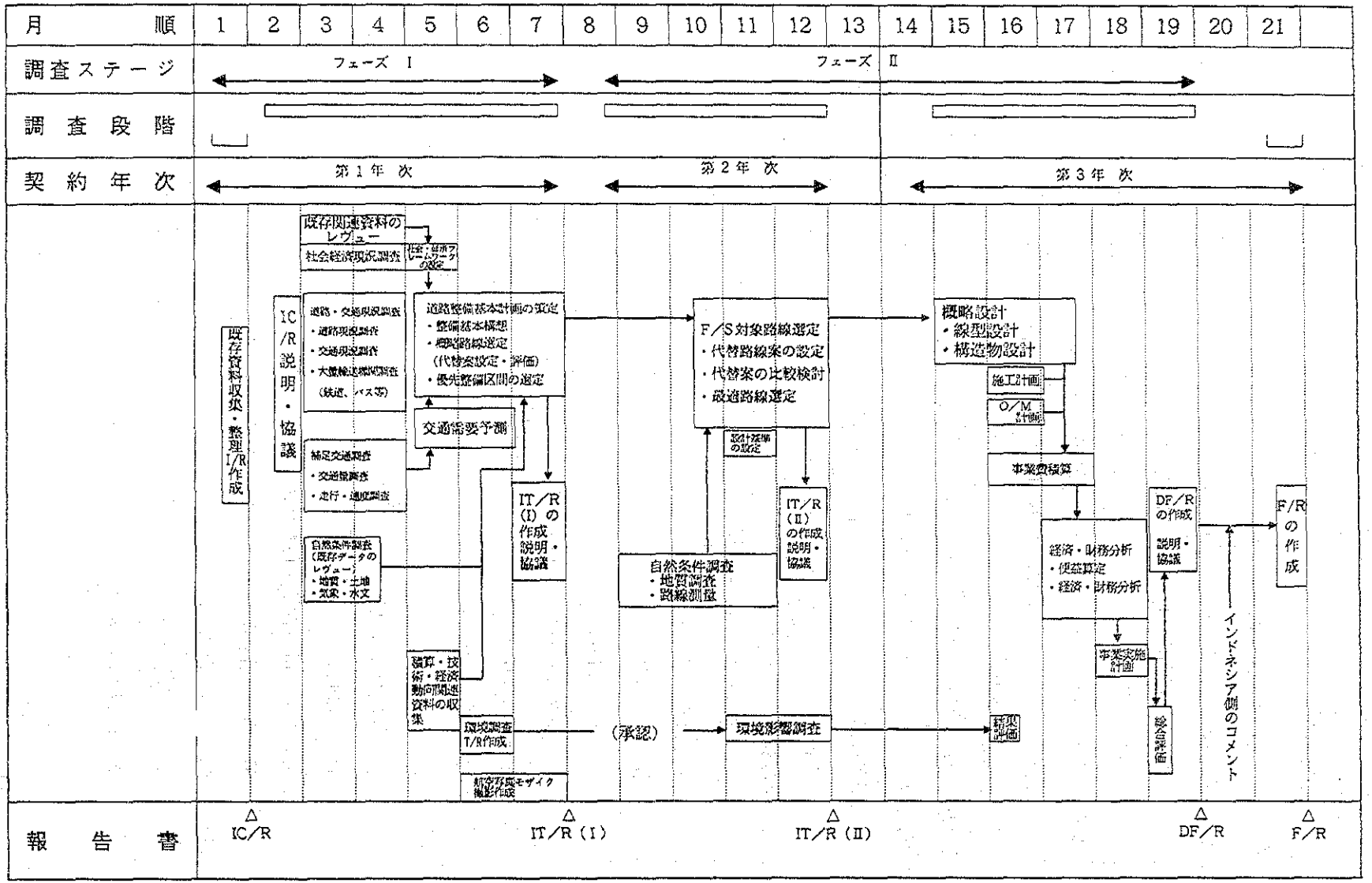
6)　用地・工事費・維持管理費、運営費の見積

7)　経済・財務分析

8)　事業実施計画

9)　総合評価・提言

図８－１　本格調査実施工程



8－2　調査対象地域及び目標年次

調査対象地域はジャカルタ市及びその周辺を含む地域とする。目標年次は「土地利用計画法(1992. No.24)」に基づき作成されつつあるジャボタベック圏の土地利用計画の目標年次との整合を図り、2010年とする。

8－3　本格調査の概要

1. 基礎調査（フェーズ　I）

(1) 既往調査結果のレヴュー

① JICAで実施した幹線道路網のマスタープラン調査（ARSDS 1987）の内容のレヴューを行う。

② ジャカルタ市またはジャボタベック圏における交通計画またはプロジェクトに関する既往の調査または実施中の調査資料を収集し、その内容を調査する。

(2) 社会・経済調査

① 社会・経済状況を表わす諸指標及び土地利用現況並びに将来の土地利用計画にかかわる諸データ、資料を収集し、分析する。

② ARSDSにおける社会・経済の将来フレームは2005年を目途としたものであるので、その内容を再検討し、本格調査の目標年次である2010年を目途としたフレームを作成する。

(3) 技術調査

① 道路計画、設計のための規格・基準及び環境基準などの技術基準をまとめる。このため、これらに係る技術上の参考文献、報告書等を収集し整理する。

② 調査対象地域内の関連道路網について、幅員、交通量等の現況に係る資料を調査するとともに、既存道路計画または事業進行中の道路事業等について、その実態を把握する。

(4) 交通量予測

ARSDSにおける交通量予測の再検討を行うとともに、社会・経済調査による将来フレーム等を踏まえ、本格調査の目標年次における交通量予測を行う。交通量予測はARSDSの修正によるものとし、そのために必要に応じて交通現況の調査を追加して実施する。

(5) 道路の必要性、機能と役割

① 現況道路網及び既存計画道路網における問題点を社会・経済面、交通面から幅広くとらえて整理することにより、提案されている南北軸及び東西軸の幹線道路について、その必要性及び具有すべき機能、果たすべき役割を整理し、道路の基本的な役割を明らかにする。

② 道路の性格、機能、役割を踏まえ、現況及び将来の土地利用等に配慮しつつルート選定上の留意点（コントロールポイントを含む）を明らかにするとともに、既存の地形図（縮尺1／25,000程度）により、概略的なルートの検討を行う。ルートの設定にあたっては、留意点を踏まえ数案の比較ルートを設定するものとするが、設定ルートの如何により想定

される交通量が異なると考えられる場合は、ルート別に将来交通量を算出する。

③ 道路の性格、機能、役割を踏まえ、選定されたルートのうち、フィージビリティ調査を行うべき区間（整備の優先性が高い区間）を選定する。

2. フィージビリティ調査（フェーズ II）

(1) 地形・地質調査

① 基礎調査で選定されたルートを中心として両側約2kmの範囲で縮尺1／5,000の航空写真撮影を行い、同縮尺のモザイク図を作成する。また、主要な地点については、水準測量を行い、原地盤の高さを算出する。

② 地盤の状態を調査するため、既存の地質図、ボーリングデータ等の収集を図るとともに、必要に応じて新たなボーリング調査を実施する。

(2) ルート選定

作成したモザイク図を用いてフィージビリティ調査対象区間のルート選定を行う。ルート選定は基礎調査において選定した概略の最適ルートをベースとして、フィージビリティ・レベルのルート選定上の留意点を明らかにするとともに、これを踏まえて数案の代替案を設定し、相互に比較検討を行うこと。

(3) 環境影響評価

道路整備が自然環境・社会環境に及ぼす諸影響の評価を行う。

(4) 概略設計

① 平面線型、縦断線型、標準横断等の主要な項目のほか、有料道路の場合は料金所、管理施設等についても設計を行う。

② 主要な構造物、舗装構成、排水施設等主な道路構造及び構造物の形式、構造について検討し、概略の設計を行う。

(5) 建設・維持管理・運営計画

部分供用の有効性、ステージコンストラクション等も考慮し、建設計画を作成する。また、主な維持管理の項目を想定し、その頻度、内容を整理し、維持管理計画を作成する。さらに有料道路の場合、料金体系、徴収システム、走行便益等の分析に基づく料金水準等の運営計画を作成する。

(6) 用地費、工事費、維持管理費、運営費の見積

用地買収、建設工事、維持管理及び有料道路の場合、運営に係るコストの見積りを行う。

(7) 経済・財務分析

道路の建設、維持管理等に要するコストと道路を建設することによる便益の算定を行い、比較分析を行う。また、有料道路の場合は、採算性の検討を行うとともに、原資について検討を行う。

(8) 施工計画・事業実施計画

財政に応じた実施可能な事業規模を想定し、建設区間及び段階施工を検討する。さらに全体の事業実施工程を、事業内容、時期等を勘案し策定する。

(9) 総合評価と提言

事業の建設、維持管理計画、事業実施計画、経済分析等を総合し、事業に対する総合的な評価を行う。また、事業の実施に向けて今後実施すべき作業、調査等を整理してフィージビリティ調査のまとめとする。

3. 報告書

(1) インセプションレポート

本格調査開始時に30部提出する。

(2) プログレスレポート（インテリムレポート（Ⅰ）に変更）

本格調査開始後6か月以内に30部提出する。

(3) インテリムレポート（インテリムレポート（Ⅱ）に変更）

本格調査開始後10か月以内に30部提出する。

(4) ドラフトファイナルレポート

本格調査開始後15か月以内に30部提出する。

(5) ファイナルレポート

ドラフトファイナルレポートに対するインドネシア側コメント受領後2か月以内に60部提出する。

8－4 本格調査団の構成

本件本格調査を実施するにあたり、必要とされる専門分野としては以下のものが考えられる。

（1） 総括／道路計画： 業務全体の総括、重要事項の決定、道路現況調査、道路整備基本構想策定、優先整備区間選定、F／S対象区間のルート選定、維持・管理計画等

（2） 交通計画／需要予測： 交通現況調査、交通調査解析、交通需要予測等

（3） 地域・都市計画： 地域・都市開発計画分析、社会・経済フレームの設定等

（4） 交通調査： 交通調査の監督、調査結果整理・解析等

（5） 環境調査： 環境調査T／Rの作成、環境調査の監督、調査結果の解析等

（6） 土地・地質： 土質ボーリング調査監督、調査結果の解析等

（7） 道路設計： 気象・水文データ・レヴュー、路線測量監督、設計基準の選定、道路概略設計等

(8) 構造物設計： 土質・地質データのレヴュー、路線測量監督、設計基準の設定、構造物概略設計等

(9) 施工計画／積算： 施工計画策定、事業費積算等

(10) 経済・財務分析： 便益の算定、経済分析、(有料道路の場合) 財務分析、運営計画策定等

(11) 撮影監督／測量： 航空写真の撮影及び略モザイク作成の監督

8－5 本格調査実施上の基本方針

1. 対象道路の必要性・役割

(1) 現在ジャカルタ市における最大の商業・業務地区であるCBDジャカルタ地区へのアクセスは、同市中央部を南北に走るスディルマン～タムリン通りによって担われているが、同街路は、近年急速な発展を遂げているジャカルタ市近郊からの通勤、商業交通の増大により極めて混雑しており、インドネシア側関係者の間では、同街路の渋滞解消が大きな課題として取り上げられている。

(2) 一方、ジャカルタ市は、歴史的に北から南へ向けての拡大を遂げてきたため、南北方向の道路網については比較的整備されているものの、東西方向については、街路の整備が不十分な状態にある。同市においては、引き続き南北方向の道路に沿って、市南部を中心として人口が急速に拡大し続けているが、インドネシア側は、ジャカルタ市の南方に位置する水源涵養地帯を保護するため、同市の従来の発展パターンを東西方向のそれへと転換することを都市計画上の主要課題としているところである。しかしながら、現存する道路網は貧弱であり、交通量も増加の一途をたどっている。

(3) 以上の現状認識に基づき、今回調査において道路総局側との協議を通じて以下の道路整備の必要性が認められた。

① 南北軸については、スディルマン～タムリン通りの代替路線となり、CBDジャカルタへのアクセスを確保する道路の整備を行うこと。

道路総局側としては、同道路については、内環状道路、外環状道路、及び湾岸道路で構成されるジャカルタ市内の有料道路網の一部として位置付けることを考えており、自動車専用道路（有料道路を含む）としての可能性を考えている旨の意向の表明があった。

② 東西軸については、ジャカルタ市及び近郊における東西方向の交通網を整備するとともに、同市の東西方向への開発を誘導することを目的にして、タンゲラン、ブカシ両市とジャカルタ市とを結ぶ道路の整備を行うこと。道路総局側の意向としては、一般道路としての可能性を考えている旨の意向の表明があった。

(4) 道路整備の優先順位としては、南北軸については全線、東西軸については、まずジャカルタ市内にかかわる部分として、外環状道路の内側を考える。

2. 調査内容

ジャカルタ市内の道路計画については、その必要性や役割に十分配慮し、適切な道路構造を選定する必要があるが、その場合でも基本的な視座として「道路」の計画を行うという点は十分踏まえられるべきであると考える。

インドネシアにおいては、自動車の保有層は限られたものであるし、大量公共輸送機関としては鉄道が著しく粗末である状況から、バス交通がその主流をなすとして、既存道路のバス専用道化やバス専用道路の計画を行うべきとする意見もあるが、本調査はもっと長期的な視野からジャカルタ首都圏の骨格を考慮すべきである。

バスについては、通勤時間帯における利用状況は概ね満車状態であり、バスレーンも一応守られているように見受けられることから、既に問題は利用の促進でなく、混雑の抜本的解消にあると考えられる。また乗用車等の規制については経済全体の発展を考えると決して好ましいものではなく、そもそもジャカルタの道路率が低いことを考慮すれば、小手先の対策は既に限界にきていることは明らかである。

したがって、本調査においては、これらを踏まえ、道路を増やし、都市としての総合的な経済力及び環境の向上を目指すことを念頭に置くことが望ましいと考えられる。

3. 調査委員会の設置

人口の集中する大都市圏における社会資本の整備は非常に困難が伴うものであるが、特に道路整備は諸々の基盤の中でも最も基礎的な部分を構成し、他の分野に及ぼす影響力が最も強い社会資本であるとともに、整備にあたっては既に利用がなされている多くの土地を必要とするものであることから、計画の策定にあたっては関係する諸官庁を含め、利害を調整すべき関係機関の合意形成を図りながら調査を進める必要がある。

また、実際の建設にあたっては、土地の収用、周辺の土地利用の調整など、相当の期間を要する事業を伴うことから、この種の道路計画については、土地利用の基本的な計画として誘導能力を有する計画の一部に位置付け、長期にわたり、関係する土地利用について行政的な指導を行うことが望ましく、かつ必要である。

このことから、本調査の実施にあたっては、利害を調整すべき関係諸機関の代表を含めた調査委員会を設置することが必要である。また委員会を設置するにあたり、各委員会に対して、本調査の結果はジャカルタ市またはジャカルタ首都圏の土地利用のマスタープランに位置付けられ、行政指導の対象となるべきものであることを明確に宣言する必要がある。

委員会には最低限、公共事業省道路総局、ジャカルタ市当局、周辺関係州（or 県）行政担当局、公共事業省人間居住総局、運輸省、国家開発計画庁、道路公社を含む必要があると思われる。

4. フィージビリティ調査の対象区間について

本報告において、フィージビリティ調査を行うべき区間は南北軸及び東西軸のうち、外環状道

路間の区間を想定している。これは、当面するジャカルタ市内の主交通軸の混雑緩和とそれによる市域の東西方向への翼状の展開を可能ならしめることを念頭に置いたものである。現在の交通の主流が内環状道路からスディルマン～タムリン通りに至るものであることから、これの代替路線の整備の必要性が高いことは論を待たないと思われるが、南北軸または東西軸の整備にあたり、その代替地区を用意する必要があり、これを東西軸のジャカルタ市外区間に求める等の政策的な理由など、妥当と認められる理由があるときはフィージビリティ対象区間を変更することもやむを得ないと考えられる。

なお、現在道路総局においては、南北軸を自動車専用道タイプ、東西軸を広幅員の平面道路タイプとしたい意向が強いようであるが、この意向は、現状の道路交通の主軸が南北であること、内環状道路及びハーバーロードとの連結の可能性等を考慮すると概ね妥当であると考えられる。

8－6　本格調査実施上の留意事項

1. 交通調査

(1) 規　模

本調査の対象となる交通施設はジャカルタ全域にわたる交通の変化をもたらすものであることから、将来交通量の予測や、それに基づく評価等を行う場合はOD表による交通量の配分計算が必要である。しかし、今回はOD調査は行わず、ARSDS調査で行った調査結果を使用することとする。

このためには、現況の社会・経済指標に基づく現況OD表を作成し、現況の交通量と突き合せることが必要であると思われる。このための交通調査としては最低限度ARSDSのコードンライン調査とスクリーンライン調査と同地点での調査が必要である。

しかし、ARSDS調査以後に道路総局により行われた調査[1]が幾つかあり、極力それらの調査結果を使用することとすると調査地点は約20程度となる。人口等の調査が1990年であるので、これを基準年とし、交通量調査の2、3年の年次の差は年間の伸び率を考慮して基準年に合せるものとする。

交通状況の変化を追跡する場合は前回と同程度の交通量調査と旅行速度調査が必要であろう。ただし、前回調査以降の道路総局による諸プロジェクトで交通調査が実施されているので、それを利用するとすれば、今回行う調査は約10地点となろうと思われる。

＜交通調査規模＞

スクリーンライン：16地点

コードンライン：4地点

現況交通量地点：12地点

旅行速度調査：10ルート

(1) 例えば "The Consulting Engineering Services for Outer Ring Road Project" 1988. 10, Bina Marga

また広幅員街路の交通量観測においては、交通量も多く、路側での観測は困難であろうと思われる。したがって、付近の高所から見下ろす位置に調査員を配置し実施する配慮が必要となろう。

<交通調査実施可能ローカルコンサルタントリスト>

INDEC	(022) 73428
BIEC	(022) 447479
PAMINTORI – CIPTA	(021) 8282852
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2. 環境影響調査

インドネシア国の道路建設にあたって、環境問題に関して下記のような法令があり、これらをクリアすることが要求される。

1 - Republic of Indonesia Law No. 4 of 1982 about the Principal Formulation of Managing Living Space.
- Republic of Indonesia Law No. 13 of 1980 on Road.

2 - Government Regulation No. 29 of 1986 about the Analysis of Environmental (AMDAL).
- Government Regulation No. 26 of 1985 on Road.

3 - Decree of the Minister of Population and Environment No. 49/ MENKLH/1987 about Guideline of Determining Important Impact.

4 - Decree of the Minister of Population and Environment No. 51/ MENKLH/6/1987 about Guideline of Formulizing Evaluation Study of Environmental Impact.

5 - Decree of the Minister of Population and Environment No. 52/ MENKLH/6/1987 about Time Limit of Formulizing Evaluation Study of Environment Impact.

6 - Decree of the Minister of Population and Environment No. 02/ MENKLH/1988 Determining Environmental Quality Standard.

7 - Decree of the Minister of Public Works No. 557/KPTS/1989 about Implementing Environmental Management of Road Construction.

8 - Decree of the Minister of Public Works No. 46/PRT/1990 AMDAL Technical Guideline in General Work Sector.

9 - Decree of the Minister of Public Works No. 779/KPTS/1990 about AMDAL Guideline in road and Bridge Sector.

10 - Decree of the Minister of Public Works No. 367/KPTS/1992 about Defining Project General Work which Need AMDAL/SEMDAL.

Others : DKI JKT Requirements etc.

環境調査にあたっては事前にTORを作成して公共事業省環境影響評価中央委員会の承認が必要である。TORを作成し、調査をスムーズに進めるために公共事業省の下記の担当官にコンタクトすることが望ましい。

IR. Sunardi H.

Badan Penelitian dan Pengembangan Pekerjaan Umum

DEPARTEMEN PEKERJAAN UMUM

Address : Jl. Pattimura No. 20

Kebayaran Baru

Jakarta Selatan

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Eax. (021) 7395062

3. 自然条件調査

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1. Scope of work (S／W)

2. Minutes of Meetings (M／M)

3. 要 請 書 (T／R)

4. Questionnaire 回答

5. 収集資料リスト

附属資料1. Scope of Work

SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
URBAN ARTERIAL ROAD SYSTEM DEVELOPMENT PROJECT
IN
JAKARTA METROPOLITAN AREA
IN
THE REPUBLIC OF INDONESIA

AGREED UPON BETWEEN
DIRECTORATE GENERAL OF HIGHWAYS
MINISTRY OF PUBLIC WORKS
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

DECEMBER 2, 1992
JAKARTA, INDONESIA

Ir. SUNARYO SUMADJI
DIRECTOR OF URBAN ROAD
DEVELOPMENT
DIRECTORATE GENERAL
OF HIGHWAYS
MINISTRY OF PUBLIC WORKS

服部亮二

Mr. HATTORI RYOJI
LEADER
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia, the Government of Japan has decided to implement the Feasibility Study on Urban Arterial Road System Development Project in Jakarta Metropolitan Area in the Republic of Indonesia (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of the Republic of Indonesia.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are;

1. to formulate a basic development plan for the East-West corridor between Tangerang and Bekasi (approximately 70 km in length) and North-South corridor between Harbour Road and Outer Ring Road (approximately 20 km in length) in Jakarta Metropolitan Area, and
2. to carry out a feasibility study on the selected sections of the said corridors.

III. STUDY AREA

The Study covers DKI Jakarta and its environs.

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study covers the following items;

A. Phase I:Basic development plan formulation

1. Review of relevant study and project reports
   (1) JICA's ARSDS (Arterial Road System Development Study) reports
   (2) Other existing and on-going urban transport development project and study reports in DKI Jakarta and JABOTABEK area

2. Socio-economic study
   (1) Review of ARSDS's future socio-economic framework
   (2) Collection and analysis of existing socio-economic data and information
   (3) Analysis of existing land use pattern and review of urban development plans in DKI Jakarta and JABOTABEK area
   (4) Updating of ARSDS's future socio-economic framework

3. Preliminary engineering study
   (1) Collection and analyis of basic engineering data and information, including design standard and criteria
   (2) Inventory survey of roads and corridors related to the subject corridors

4. Traffic demand forecast
   (1) Review of ARSDS's traffic-demand forecast
   (2) Conduct of supplementary traffic survey, if necessary
   (3) Updating of ARSDS's future traffic demand forecast

5. Formulation of a basic development plan
   (1) Formulation of a conceptual development plan

(2) Preliminary alternative route study

(3) Selection of high priority sections of corridors for a feasibility study

B. Phase II:Feasibility study

1. Engineering surveys for the selected sections of corridors

(1) Topographic survey (taking of aerial photographs and preparation of mosaics, route survey, etc.)

(2) Geological survey

2. Route study for the selected sections of corridors

3. Conduct of environmental impact assessment (EIA)

4. Preliminary engineering design

5. Formulation of construction and maintenance plan (and operation plan, if necessary)

6. Estimation of cost for land acquisition, construction and maintenance (and for operation, if necessary)

7. Economic analysis (and financial analysis, if necessary)

8. Formulation of project inplemetation plan

9. Project evaluation and recommendation

V. STUDY SCHEDULE

The Study will be carried out in accordance with the

attached tentative study schedule.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of the Republic of Indonesia.

(1) INCEPTION REPORT

Thirty(30) copies at the beginning of the Study in the Republic of Indonesia.

(2) PROGRESS REPORT

Thirty(30) copies within six(6) months after the beginning of the Study.

(3) INTERIM REPORT

Thirty(30) copies within ten(10) months after the beginning of the Study.

(4) DRAFT FINAL REPORT

Thirty(30) copies within fifteen(15) months after the beginning of the Study.

(5) FINAL REPORT

Sixty(60) copies within two(2) months after receipt of the written comments on the Draft Final Report from the Government of the Republic of Indonesia, which is expected to deliver such comments to JICA within thirty(30) days after receipt of the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

1. To facilitate smooth conduct of the Study, the Government of the Republic of Indonesia shall take necessary measures:

(1) to secure the safety of the Japanese study team,

(2) to permit the members of the Japanese study team to enter, leave and sojourn in the Republic of Indonesia for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees.

(3) to exempt the members of the Japanese study tean from taxes, duties, fees and other charges on equipment, machinery and other materials brought into the Republic of Indonesia for the conduct of the Study.

(4) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowance paid to the members of the Japanese study team for their services in connection with the implementation of the Study,

(5) to provide necessary facilities to the Japanese study team for the remittance as well as utilization of funds introduced into the Republic of Indonesia from Japan in connection with the implementation of the Study.

(6) to secure permission for entry into private properties and restricted areas for the implementation of the Study.

(7) to secure permission for the Japanese study team to take all data and documents including maps and photographs related to the Study out of the Republic of Indonesia.

(8) to arrange medical services as needed. Its expense will be chargeable on the members of the Japanese study team.

2. The Government of the Republic of Indonesia shall bear claims, if any arises, against the members of the Japanese study team resulting from, occuring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Japanese study team.

3. Directorate General of Highways, Ministry of Public Works (hereinafter referred to as "Bina Marga"), shall act as a counterpart agency to the Japanese study team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. Bina Marga shall provide, at its own expense, the Japanese study team with the followings, in cooperation with other agencies concerned;

(1) available data and information related to the Study, including aerial photographs and maps,
(2) counterpart personnel,
(3) suitable office space with necessary equipment in Jakarta, and
(4) credentials or identification cards.

VIII. UNDERTAKING OF JICA

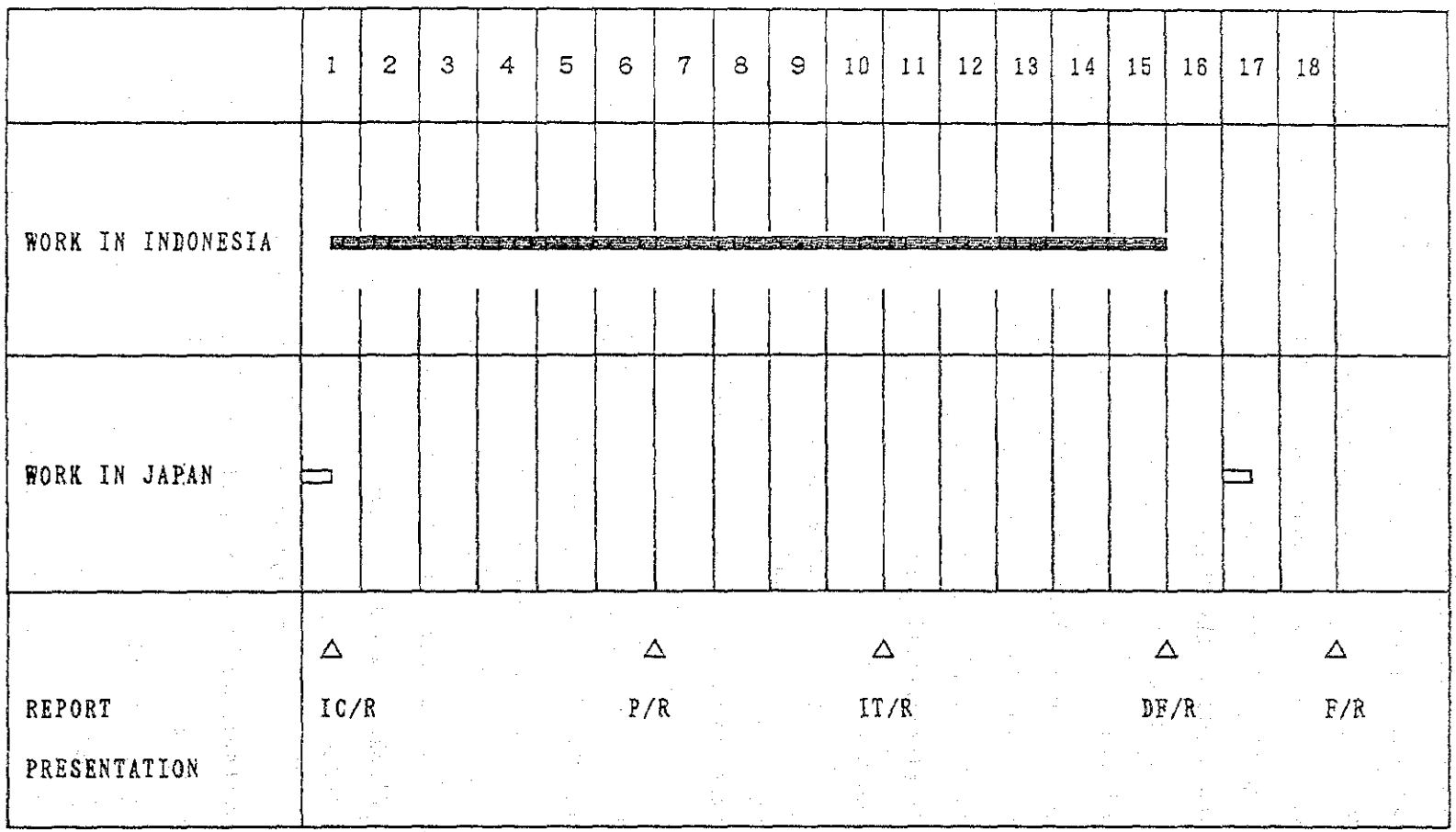
For the implementation of the Study, JICA will take following measures;

1) to dispatch, at its own expense, the study team to the Republic of Indonesia,
2) to pursue technology transfer to the Indonesian counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and Bina Marga shall consult with each other in respect of any matter that may arise from or in connection with the Study.

TENTATIVE STUDY SCHEDULE



IC/R:INCEPTION REPORT
P/R :PROGRESS REPORT
IT/R:INTERIM REPORT
DF/R:DRAFT FINAL REPORT
F/R :FINAL REPORT

附属資料 2. Minutes of Meetings

MINUTES OF MEETINGS
FOR
THE SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
URBAN ARTERIAL ROAD SYSTEM DEVELOPMENT PROJECT
IN
JAKARTA METROPOLITAN AREA
IN
THE REPUBLIC OF INDONESIA

AGREED UPON BETWEEN

DIRECTORATE GENERAL OF HIGHWAYS

MINISTRY OF PUBLIC WORKS

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

DECEMBER 2, 1992

JAKARTA, INDONESIA

Ir. SUNARYO SUMADJI
DIRECTOR OF URBAN ROAD
DEVELOPMENT
DIRECTORATE GENERAL OF HIGHWAYS
MINISTRY OF PUBLIC WORKS

服部亮二

Mr. HATTORI RYOJI
LEADER
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY

In response to the request of the Government of the Republic of Indonesia, the Government of Japan dispatched the Preparatory Study Team (hereinafter referred to as "the Team") for the Feasibility Study on Urban Arterial Road System Development Project in Jakarta Metropolitan Area (hereinafter referred to as "the Study"), from November 24 to December 3, 1992, to discuss the Scope of Work of the Study.

The Team conducted field surveys in the Study area and had a series of discussions with the officials concerned of the Directorate General of Highways, Ministry of Public Works of the Republic of Indonesia (hereinafter referred to as "Bina Marga"). The list of attendants is attached as Annex I.

This document is to supplement the Scope of Work signed between Bina Marga and the Team on December 2, 1992, summarizing the main results of the said discussions as follows.

1. Both sides confirmed that the Study will be limited to the feasibility study on the North-South corridor and the East-West corridor, and that the feasibility study on the parking system in CBD Jakarta will be excluded from the Scope of Work.

2. Both sides confirmed that the study route of the North-South corridor for the Phase I work of the Study will be between Harbour Road and Outer Ring Road, extending approximately 20 km in length. Bina Marga intimated the possibility that the said road could be an expressway/tollroad.

3. Both sides confirmed that the route length of the East-West corridor to be studied in the Phase I work of the Study, is tentatively set at 70 km based on the description of the Terms of Reference. Bina Marga intimated the possibility that the said road could be an arterial road.

4. Both sides confirmed tentatively that the route length to be studied in

Phase II of the Study (feasibility study level) will be approximately 50 km, consisting of 20 km of the North-South corridor and 30 km of the East-West corridor (section between Outer Ring Road).

5. Both sides confirmed that the target year of the Study will be set at year 2010, which is in line with that of JABOTABEK structure plan currently reviewed by the Directorate General of Cipta Karya, under Indonesian Law on Land Use Plan No. 24, 1992 (UU Rep. Ind. No. 24 Tahun 1992 Tentang Penataan Ruang).

6. Both sides confirmed that the scale of the mosaic aerial photographs to be prepared for the feasibility study will be 1/5,000, and that these will be used for the preliminary engineering design as well.

7. The Team stressed to Bina Marga the importance of having good coordination with DKI Jakarta Government, Directorate General of Cipta Karya (Ministry of Public Works), Directorate General of Land Transportation (Ministry of Communications), Provincial Government of West Java and BKSP JABOTABEK, in the course of the Study, and proposed to set up a steering committee, composed of the said organizations and Bina Marga.

   The Team also requested Bina Marga that the latter will see to it that the Study result will be incorporated in the future DKI Jakarta masterplan.

   Bina Marga agreed on both of the above.

8. Both sides confirmed that the environmental impact assessment (EIA) should be conducted in accordance with laws and regulations in force in Indonesia. In this connection, both sides agreed that the JICA's cooperation in the full-scale study, with regard to EIA, will be confined to the preparation of KA-ANDAL and conduct of ANDAL study.

The result of the screening work conducted by Bina Marga and the Team is as follows, and both sides confirmed that EIA will cover the following items.

(1) Quality of life
- Resettlement
- Historical and cultural heritage (incl. archaeological aspect)
- Aesthetics (landscape)
- Socio-economic activities

(2) Ecological resources
- Forest/wild life
- Aquatic biology

(3) Physical resources
- Air
- Noise/vibration
- Surface water, especially concerning those impacts generated through construction work and in service area (quality and hydrology)
- Soil erosion
- Geology
- Infrastructure and utility

9. The Team requested Bina Marga to secure the office space with necessary equipment (electricity, telephone, furniture) for the full-scale study team to work in Jakarta.

10. The Team explained to Bina Marga that the full-scale study team members will carry regular passports instead of official ones. In this connection, the Team requested Bina Marga the followings;
(1) to issue letters of invitation to the members of the full-scale study team to facilitate their obtainment of entry visas to Indonesia, and

(2) to assist the full-scale study team in their customs clearance of the study equipment.

Bina Marga agreed to do so.

11. Bina Marga requested that the counterpart training in Japan be given to the counterpart personnel of the Study.

The Team promised to convey the request to the Government of Japan.

12. Bina Marga requested that the transportation means for the full-scale study team be secured by the Japanese side.

The Team agreed on this point.

ANNEX I

THE LIST OF ATTENDANTS

INDONESIAN SIDE

Ir. SUNARYO SUMADJI	Director, Directorate of Urban Road Development (BINKOT), Bina Marga
Ir. MUKSIN	Sub-Director of East Region, BINKOT, Bina Marga
Ir. MARIJANTO	Chief, Regional Betterment Office (RBO) IX Bina Marga
Ir. SUDARYONO	RBO IX, Bina Marga
Ir. INEKE INDRARINI	RBO IX, Bina Marga
Ir. BHUDJONO	BINKOT, Bina Marga
Ir. TONTRO PRASTOWO	BINKOT, Bina Marga

JAPANESE SIDE

Mr. HATTORI RYOJI	Team Leader, JICA Preparatory Study Team
Mr. HAYASAKA SEIZO	Team Member, JICA Preparatory Study Team
Mr. TAKEDA HIROO	Team Member, JICA Preparatory Study Team
Mr. TANIGAWA KUMPEI	Team Member, JICA Preparatory Study Team
Mr. HANATANI ATSUSHI	Team Member, JICA Preparatory Study Team

OBSERVERS

Mr. FUSHIMI HIROYUKI	JICA Expert, Bina Marga
Mr. NAKAMURA MINORU	JICA Expert, Bina Marga
Mr. TAKATA HIROHIKO	JICA Indonesia Office

REPUBLIC OF INDONESIA

TERMS OF REFERENCE
FOR
FEASIBILITY STUDY
ON
URBAN ARTERIAL ROAD SYSTEM DEVELOPMENT PROJECTS
IN
JAKARTA METROPOLITAN AREA

FEBRUARY, 1992

DIRECTORATE OF URBAN ROAD DEVELOPMENT
DIRECTORATE GENERAL OF HIGHWAYS
MINISTRY OF PUBLIC WORKS

1.2 Background

Major recommendation by the Arterial Road System Development Study in Jakarta Metropolitan Area (ARSDS) are as follows :

a) For the urban transportation the integrated public transport system shall be required and to be a key, but from various reasons including financial aspects the realization takes a long time. Bus system is an intermediate solution for the urban transport in Jakarta Metropolitan Area with additional improvement for the hardware and the software e.g. bus network, bus fleet and bus types.

b) When consider the future scale of Jakarta Metropolitan Area, existing motivation of southward expansion should face the limitation and the scarsity and should lead to large problems.

From these points of view :

- To promote with the first priority the transportation corridor development in east-west direction in order to guide and induce the area development in eastern and western areas,
- To prepare necessary and additional transportation facilities to the north-south axis.

c) As an area developmet method, apply an urban unit to ease the road traffic problems in the area and to make it easy to apply a development policy as well as a transportation management policy.

d) When the integrated public transport system is prepared well, further plan and program of access traffic to business districts shall be prepared. For this purpose, it is necessary to prepare the step-by-step vehicle parking system and parking policy.

Following the above stated recommendations the further studies of ARSDS are proposed for the following three studies :

(i) Study and preliminary, design of the 70 kilometers corridor from Tangerang to Bekasi, arterial roads cum mass transit routes.

(ii) Study and preliminary design of Blok M - Kota corridor (app. 14 Kilometers)

(iii) Study and preliminary design of vehicle parking system in business districts of DKI Jakarta.

II. PRESENT SITUATION OF JAKARTA METROPOLITAN AREA AND DEVELOPMENT STRATEGIES FOR FUTURE.

2.1 Present Situation of Jakarta Metropolitan Area

1) Population Growth and Urbanization

DKI Jakarta is the capital city of the Republic of Indonesia and is the predominant city in its scale and diversity of industrial and population concentrations.

The population of JABOTABEK area, ie. Jakarta and its surrounding area which includes Bogor, Tangerang and Bekasi, has become to 14 million in 1985 and 17 million in 1990. During 1980-1985 the population growth rate in Jabotabek area was 3.7%, compared to that of Indonesia of 2.1%. As for the recent population growth, the growth ratio in the suburbs was much higher than that of the central Area, which implies that the rapid urbanization is extending towards the suburban area around 30 km from the centre of Jakarta.

POPULATION GROWTH IN JABOTABEK AREA

Area	1980	1990	Growth Rate (%. p.a)
Jakarta	6,503	9,387	3.7
Botabek	5,413	7,949	3.9
Jabotabek	11,916	17,336	3.8
Indonesia	147,490	179,322	2.0

2) Urban Structure

The primary urban functions of DKI Jakarta have historically progressed from the north to the south with the development of commercial, business and administration centers.
Characteristics of urbanization in Jakarta city is non-continuous. Secondly developed urban area Gambir and Menteng was located in about 3 km to the south far from originated urban area (Kota area) in order to get better living condition, and followed by Blok M (Kebayoran Baru) area development in about 4 km far from Menteng area.

The through-way system connecting between non-continuous urban areas is identified as basic transportation system in such urban development system. For the time being prime development tendency to the south is observed because priority traffic to the south and north is helpful to urbanization. On the contrary, access traffic from the east and the west to the central area cannot go through directly to the central area and is distributed to the south and north by two major throughway systems.

In addition less east-west radial streets, compared with north-south, are hindering to develop eastern and western areas in the city. This causes not to realize spatial balanced development in the city.

Principally Jakarta city is recognized as mono-centric city except for the core of Blok M in the sub-urban area and both dependency motor vehicle and lack of planned development is taking advantage of "Ribbon Development" along major arterial streets in the way that major urban functions take their locations by themselves.

The city has expanded depending on vehicle transportation system in DKI Jakarta and it also resulted the dispersal distribution of urban economic activities by a ribbon development, that this kind of development located along an arterial roads and it reaches to Jakarta Outer Ring Road site with a pressure to be developed further.

In such a city developed dispersially, it would be recognized that it has limitation in introducing much more efficient public transport to present bus system improvement, or to a new transit system with a same capacity of middle transportation volume. These facts or analyses lead a same kind of understanding that existing railway system may not have remarkable demand increase with its improvement program of Jabotabek railway lines to urban rapid railway system of mass transportation. Main reason is that major land uses for urban economic activities do not locate at the railway or the station area.

Viewing the future of the city, DKI Jakarta, its growth is a key to the state and to the region and this fact means that even the city grows properly and orderly, number of vehicles should be required to increase and road network are requested to expand and to improve its quality. Resultantly, the road traffic problems are obviously occurred more often and at any place.

Now is the time to consider an to program the comprehensive countermeasures to both the present traffic problems on roads and clearly expected future problems. The development and re-development of multi-functional centre is the key development. Development of numbers of centres with moderate hinterland makes it possible to utilize the mass transportation capacity of existing railway system connecting with new transit system serving to those centres and also to introduce a new mass transit system with higher service standard.

It is clearly understandable that DKI Jakarta has a strong movement axis, the North-Central-South axis. But, unless the East-Central-West axis is given priority to develop for future, the concentration of flows to the North-South axis will continue with much heavier problems unsolved.

Adding the East-West axis to the existing developed, transportation network is a key policy to solve the problems basically and to maintain the policy to conserve the development in the southern area.

3) Urban Transportation

Person Trip Survey revealed various travel behaviors of residents in Jakarta Metropolitan Area, number of trips, trip purpose composition, transport mode, peak hour of trips and so on.
About 40% of all the trips are made on foot, and about 50% of all the trips by motorized transport mode are made by buses. This indicates that buses are major mass-transit system in DKI Jakarta.

And both private car and motorcycle have share of each 20% of motorized transport mode. Railway particularly shares only 0.3% of all the trips.

Trip character of income class, according to all trips base, the higher income level is the higher private car trips ratio, the private car trips ratio for low and high income class are 6.2% and 64.2% respectively. On the other hand walk trip ratio in contrary interrelation, that is high and low income class are 14.4% and 57.9% respectively. Based on motorized transport base, low income class increase public transport trips ratio, high and low income level are 17.6% and 65.8% respectively. It would be said that public transport is used by low income class because of low fare and low service level.

Motorization in DKI Jakarta has progressed rapidly. The number of registered motor vehicles was 1.3 million in 1985, and its growth rate in these 10 years was 6.1% p.a.

The characteristic of existing street network in the Jakarta Metropolitan Area are lack of continuity, especially between east and west, and extremely low road ratio of 2.0% in DKI Jakarta. Poorly developed streets causes the U-turn traffic on arterial streets, which is not only uneconomical but also dangerous.

The development of street networks have progressed slowly because of budget constraints and the rapid accumulation of urban facilities. The new road construction has mainly been done in rural and suburban areas, while in urban area few new streets has been constructed and little road widening has been done.

Excessive motor vehicle traffic concentrate on the major arterial streets such as Jl. Sudirman and Jl. Thamrin which carry more than 175.000 four wheel vehicles and 45,000 motorcycles per day.

Major reason for traffic congestion problems are increasing traffic demands induced by expansion of the urbanized area, and various facilities which impede traffic flows located along the arterial streets such as bus terminals, railway crossing, pasars, shopping centers and schools.

Recently the lack of parking facilities has become a serious problem in the central Area. Street parking related to business and commercial activities create severe traffic congestion due to extreme reduction of passing lanes.

2.2 Development Strategies in Jakarta Metropolitan Area

1) Population Framework and Urban Structure in JABOTABEK

The population framework in JABOTABEK 2005, was determined as the given conditions from DKI Jakarta Structure Plan 2005, and JABOTABEK Development Plan. The estimated populations of the whole JABOTABEK area, DKI Jakarta and BOTABEK area in 2005 are 23.5 million, 12.0 million and 11.5 million respectively.

The development strategies based on the criteria of i) Efficiency, ii) Equity and iii) Environment, are as follows:

i) Achievement of high economic growth
   - Balanced development of formal and informal sector
   - Higher economic growth in Botabek region
   - Dispersal of basic industries

ii) Settlement hierarchy in Jabotabek Region

iii) Formation of Metropolitan Urban System
   - East-West corridor development
   - Multi-nucleous system
   - Cluster development to the south

It should be planned rigidly or firmly on the fundamental transportation service system in the city considering the requirement of urban expansion.
No otherway but the setting including public announce of right of way of streets and railways can control the rigid modern building with more than 50 years strength to maintain the public space.

Another key policy of re-structuring is to build up new centres of public transport oriented nodal point.

These centres are consist of the following:

(a) Work places and services facilities,
(b) Nodal activities of feeder services e.g. bus and taxi, and
(c) Infrastructure development to meet the activities.

2) Future Traffic Demand

Future traffic demand was forecasted on the basis of the future socio-economic framework, and also on the basis of the future urban structure.
The total person trips related to DKI Jakarta in 2005 increase to 1.78 times more than that in 1985. Furthermore the person trips by motorized transport modes will increase 1.94 times more than that in 1985. Because of the increased population in the suburban areas increase in trip length, together with the increase of motorized trips, will accelerate the burden of urban transportation.

The motor vehicle ownership potenticial is predicted to increase up to approximately 100 passenger automobiles and 270 motorcycles per 1,000 inhabitants in 2005 if present trends are allowed.

Truck traffic is predicted to increase as the result of the increase in industrial and commercial activities.

The composition of 'to work', 'business' and 'private matters' trips are expected to increase. The distribution pattern of trip attraction in DKI Jakarta will change drastically, and the pattern of trip flows will also change especially in the mass transit passenger flows.

3) Transportation System Development Strategies

The objectives of the system development are to be categorized to realize or develop the following items :

a) Viable arterial road network,
b) Amenity of residential precincts,
c) The best and most possible circumstances for commercial and business activities,
d) Vehicle parking system
e) The image and level of service in public transports.

In other words as recommended in ARSDS they will be summarized as follows.

a) Rehabilitation of railway system
b) Modernization of Bus system
c) Major arterial street development for East-West development axis
d) Improvement of traffic management
e) Freeway system development.

The policies for developing those items or systems are to be summarized as follows;

a) Additional new arterial roads and improving or betterment of the existing links to lead the improvement of the present network to a modern system clarifying the function of each link to integrate its functions to comprehensive ones.

b) Standardize and normalize the size of street blocks or super blocks (urban unit).

c) Introducing the traffic management measures or systems and preparation or realization of pedestrian amenity.

d) Introducing the off-street parking system in Central Area.

e) Build-up a new urban structure with better mass transit system including intra-urban tollway which can supply services of high speed or of high level.

2.3 Recommended Development in ARSDS Study

1) Arterial Street system development

To meet future traffic demand, transportation system projects including mass-transportation corridors, primary arterial road systems and secondary arterial street system, are proposed.

2) Activity centers development

Activity centers which form multinucleus system, should be developed in order to lessen the concentric traffic burden to central cores.

3) Station plaza development

Station plaza development should be based on comprehensive mass transportation plan in order to guarantee integrated public transportation service. As an intermediate program the feeder system between bus and railway should also be properly developed.

2.4 Justified and Recommended Studies/Projects

As a result of ARSDS study, the followings are recommended as "Recommended Actions in the Next Five Year Period";

Based on the ARSDS it is highly recommended that full advantage be taken of the change to review the existing DKI structure Plan, which is supposed to be done every five years, in order to strengthen its transportation sector plan and to take following actions without delay in the next five-year period.

1) Feasibility Study of the whole medium/mass transportation corridor development program in order to decide the alignment, and to start the development control to secure the right-of-way.

2) Feasibility Study on the north-south corridor (Blok M - Kota) development and parking facility development in the Central Area. The reinforcing facility to be examined are arterial road, tollroad, busway, medium/mass transportation mode, etc.

3) Central Area Development Planning Study including activity center development/redevelopment, parking plan, station plaza plan, traffic management plan, arterial road plan, etc., which are essential for the provision of direct access to the Central Area from activity centers in the sub-urban area.

4) Feasibility Study for the present traffic problem oriented program such as existing arterial roads in the Central Area.

5) Feasibility Study for the major arterial streets and primary roads in order to establish the multi-nucleus system.

6) Budgetary Study of transport sector.

Within those studies recommended to carry out in the next five-year period, two projects listed above No. 1) and 2) are urgently required to commence as it should be essential and important to prepare autholized plans and programs including the announcement to public as these projects will form the major urban structures and systems.

And, parking study in the central area is expected to give such basic information to above mentioned projects as distribution pattern of urban activities, urban forms made of them, distribution system of transportation and so on.

Generally, parking system is decided by urban forms in the city. Thus these studies should be executed simultaneously.

III. SCOPE OF WORK

3.1 Objectives of the Study

Main objective of this study is to examine and study the viability of East-West corridor and North-South corridor, which will play primary role as major structures in urban transport.

In proceeding the study, it is very important to integrate between these coridors and existing urban system (land use system/transportation system) and future urban system in the central area.

Therefore, another objective is to establish Parking Policy in the central area in relation to Transportation Policy and Urban Development Policy on the basis of parking system study.

3.2 Scope of Work

The scope of work consists of the following categories.

(i) Study and preliminary design of the 70 kilometers corridor from Tangerang to Bekasi, arterial roads cum mass transit routes
Study consists of two stages.
1st stage : overall study on route selection and its right of way
2nd stage : detailed studies/feasibility study

(ii) Study and preliminary design of Blok M - Kota corridor (app. 14 Kilometers)
Study consists of two stages.
1st stage : alternative study on package solution (Tollway system , street system and mass transportation system or combined)
2nd stage : feasibility studies

(iii) Study and preliminary design of vehicle parking system in business districts of DKI Jakarta.

1) Study Area

The study area covers basically DKI Jakarta and its surrounding area.

2) Study Period

The consultancy services will be required for a period of eighteen (18) months commencing as soon as possible.

3) Study Items

Each study will cover the following study items;

(i) Study and Preliminary Design of the 70 km Corridor from Tangerang to Bekasi, the Arterial road cum Mass Transit Route

1) Existing data collection and analyses
   a. Review of JICA ARSDS Reports
   b. Review of Jakarta Urban Transport Projects Reports
   c. Socio-economic aspects of the study area
   d. Landuse and urban developments
   e. Inventory survey of the corridor
   f. On-going and proposed road projects

2) Topo Survey and Physical Condition Survey including Major Utilities

   a. Cartographical study on the available aerophoto (S = 1/5,000) and topo maps
   b. Spot height survey
   c. Existing condition survey

3) Traffic Demand Forecast

   a. Review of JICA ARSDS Study
   b. Traffic demand forecast of the corridor
   c. Road traffic and mass transit traffic forecast on the corridor

4) Cost Estimates of the construction and the operation

5) Economic and financial evaluation

(ii) Study and Preliminary Design of Block M to Kota (app.14 kms corridor.

1) Survey of Existing Situation of the Alignments and Centre Areas

2) Review and proposals of a new additional link in Intra-Urban Tollway System

3) Preliminary Design of New Route

a. Demand Forecast
b. Staging System with a Tollway Link and a New Transit System
c. Preliminary Design of Alignments
d. Cost Estimates
e. Economic and Financial Analyses

4) Implementation Program Proposal including Action Programs

5) Proposals of Related Transportation Facilities.

(iii) Study and Preliminary Design of vehicle Parking System in Central Business District of DKI Jakarta

1. Basic Policy Study on the Vehicle Parking System

a. Review of the present situation
b. Study of other countries experience
c. Basic policy studies

2. Parking Situation Survey for the Specific Zones

   a. Traffic count survey in the area
   b. Parking volume survey
   c. Parking characteristic survey
   d. Related surveys

3. Vehicle Parking System Analyses

   a. Analyses of survey results
   b. Parking demand analyses

4. Vehicle Parking Demand Forecast

5. Parking System Development Proposals

   a. Non Roadside Parking Systems
   b. Roadside Parking System
   c. Parking Policies Proposals
   d. Proposals of the park and ride system for the major stations
   e. Proposals of the arterial road including public parking space and station plaza
   f. Others

6. Economic and Financial Analyses (for the district, for the parking area operation systems proposal)

IV. WORK SCHEDULE AND STAFFING REQUIRED

4.1 Work Schedule

The work schedule is shown tenttively in the tentative study schedule of sixteen (16) months until the submission of draft final reports. This sixteen (16) months study is to be carried out in Indonesia.

4.2 Reporting

This study schedule leads the following reporting schedule.
All report is in English.

- Inception Report (50 copies) within one (1) month after the commencement of the study

- Progress Report (30 copies) after six (6) months of the commencement showing the results of stage 1 studies.

- Interim Report (50 copies) after twelve (12) months of the commencement showing the results of Parking Study and interim results of stage 2 studies.

- Draft Final Report (50 copies) after sisteen (16) months of the commencement showing the results of stage 2 studies and summaries of whole studies.

- Final Report and Summary Report (50 copies) within two (2) months since submission of the draft final reports on the condition that the committee gives the final comments on the reports within two (2) weeks of submission them.

4.3 Staffing Required

This study requires the following staffing of expatriates and local professionals.

Expatriates :

E.1	Team Leader	17 m/m
E.2	Transport Planner	17 m/m
E.3	Urban Planner	9 m/m
E.4	Traffic Engineer (A)	14 m/m
E.5	Traffic Engineer (B)	7 m/m
E.6	Transport Economist	7 m/m
E.7	System Engineer	6 m/m
E.8	Highway Engineer (A)	17 m/m
E.9	Highway Engineer (B)	7 m/m
E.10	Civil Engineer	14 m/m
E.11	structural Engineer	5 m/m
E.12	Geotechnical Engineer	5 m/m
E.13	Geodetic Engineer	6 m/m
E.14	Mechanical Engineer	3 m/m
E.15	Economist	6 m/m
	Total	140 m/m

Local Professionals :

L.1	Transport Planner	16 m/m
L.2	Traffic Engineer (A)	14 m/m
L.3	Traffic Engineer (B)	4 m/m
L.4	Highway Engineer	16 m/m
L.5	Civil Engineer	14 m/m
L.6	Geotechnical Engineer	5 m/m
L.7	Geodetic Engineer	6 m/m
	Total	75 m/m

Local Sub-Professionals :

L.11	Traffic Survey Supervisor	(4)	20 m/m
L.12	Soil Surveyor	(6)	21 m/m
L.13	Topo Surveyor	(8)	40 m/m
L.14	Draftsman	(9)	72 m/m
L.15	Traffic Surveyor	(40)	200 m/m
	Total :		353 m/m

Other-Supporting Staff :

L.21	Typist (2)	36 m/m
L.22	Clerk (1)	18 m/m
L.23	Office Boy (2)	36 m/m
L.24	Survey Labourer (24)	120 m/m
	Total :	210 m/m

Full-time base Counterpart :

C.1	Liaison Officer/Project Officer	18 m/m
C.2	Urban Planner	9 m/m
C.3	Transport Economist	7 m/m
C.4	Highway Engineer	18 m/m
C.5	Transport Planner	18 m/m
	Total :	70 m/m

V. UNDERTAKINGS OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

A. In accordance with the agreement on the technical cooperation between the Government of Indonesia and the Government of Japan, the Government of Indonesia shall provide the Japanese study team with the following benefits.

(1) To permit the members of the study team to enter, leave and sojourn in the Republic of Indonesia for the duration of their assignment and make them free of any registration and consular fees;

(2) To exempt the members of the study team from income taxes and charges of any kind imposed on or in connection with any involvement of allowance paid to them for their sevices in connection with the study; and

(3) To bear claims, if any arises against the members of the study team resulting from. Occuring in the course of, or otherwise connected with the discharge of their duties in the study, except when such claims arise from gross negligence or willful miscounduct on their part.

B. In order to facilitate smooth implementation on the study Bina Marga shall take necessary actions with other relevant organizations;

(1) To ensure permission for entry into private properties or restricted areas for the study;

(2) To secure permission for the study team to take the data and documents (including photographs related to the study out of Indonesia to Japan; and

C. Bina Marga shall at its own expense, provide the study team with the following;

(1) Available data and information related to the study;
(2) Counterpart personnel;
(3) Suitable office space with necessary equipment; and
(4) Credentials or identification cards, if required.

D. Bina Marga Shall :

(1) Appoint the project officer with full-time basis who can liase the study team and assist, arrange the necessary process and permits for smooth implementation of the study.

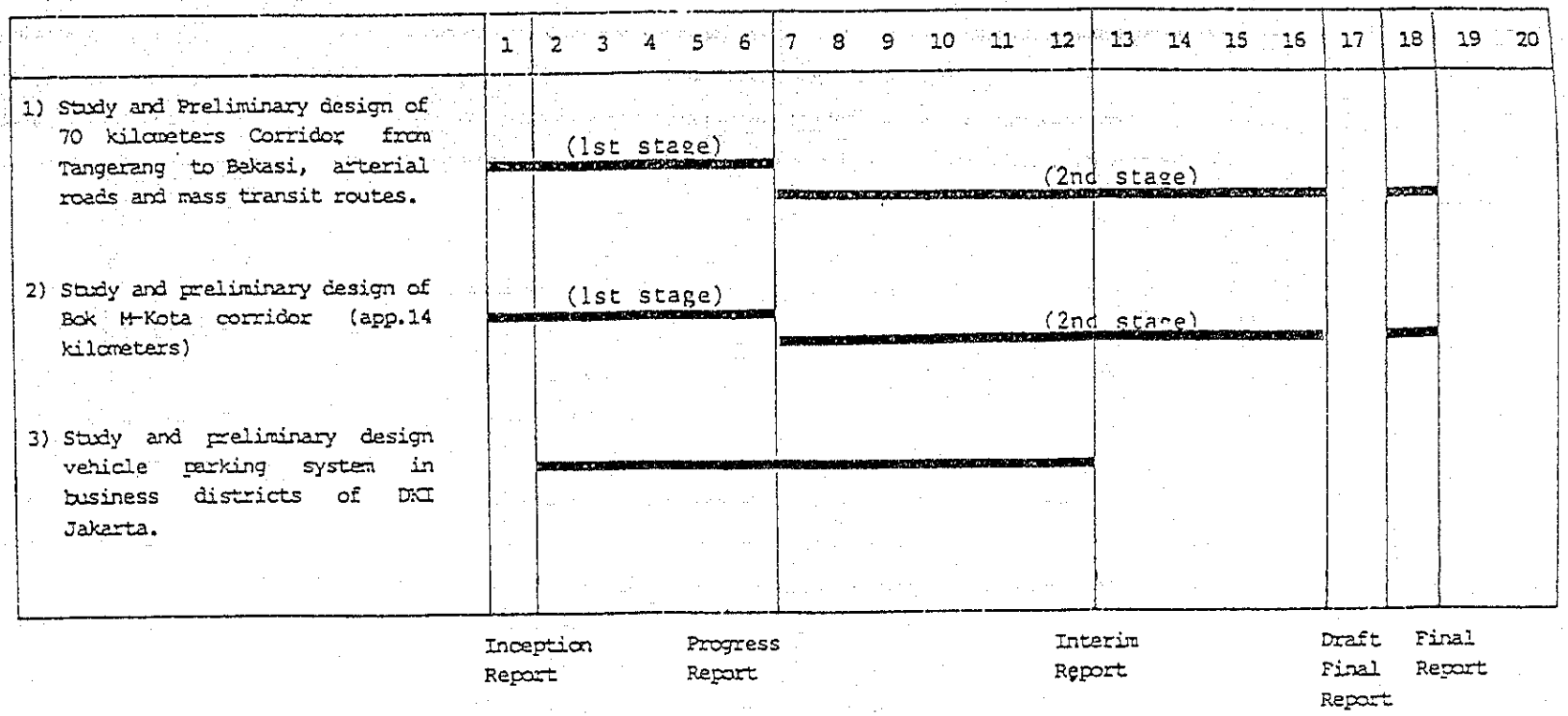
(2) Set the Steering Committee and Technical Committee with the concerned agencies officials e.g. DKI Jakarta Government, Directorate General of Land Transport and Inland Waterways, Directorate General of Cipta Karya, West Java Government and Directorate General of Highways.

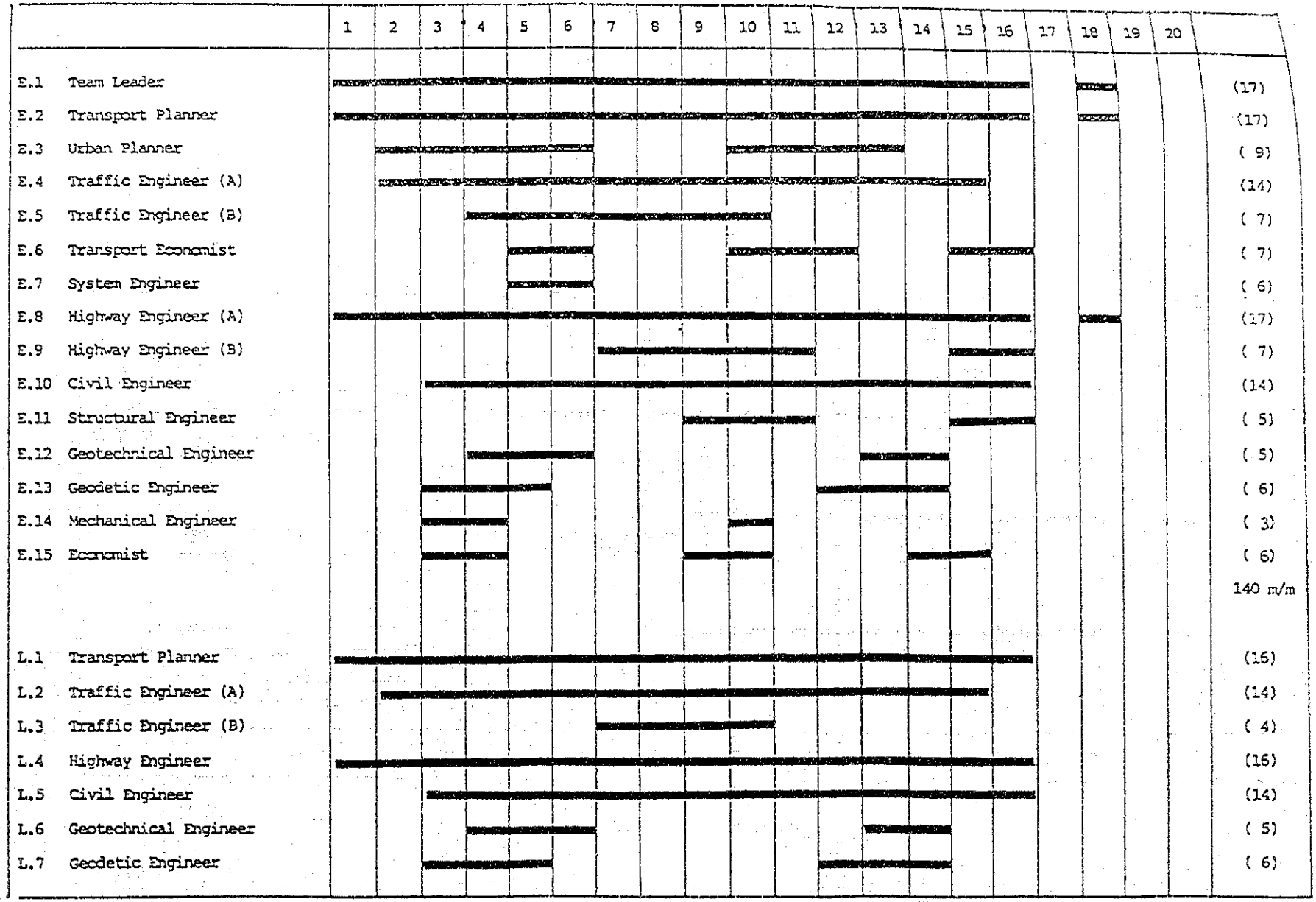
VI. UNDERTAKINGS OF THE GOVERNMENT OF JAPAN

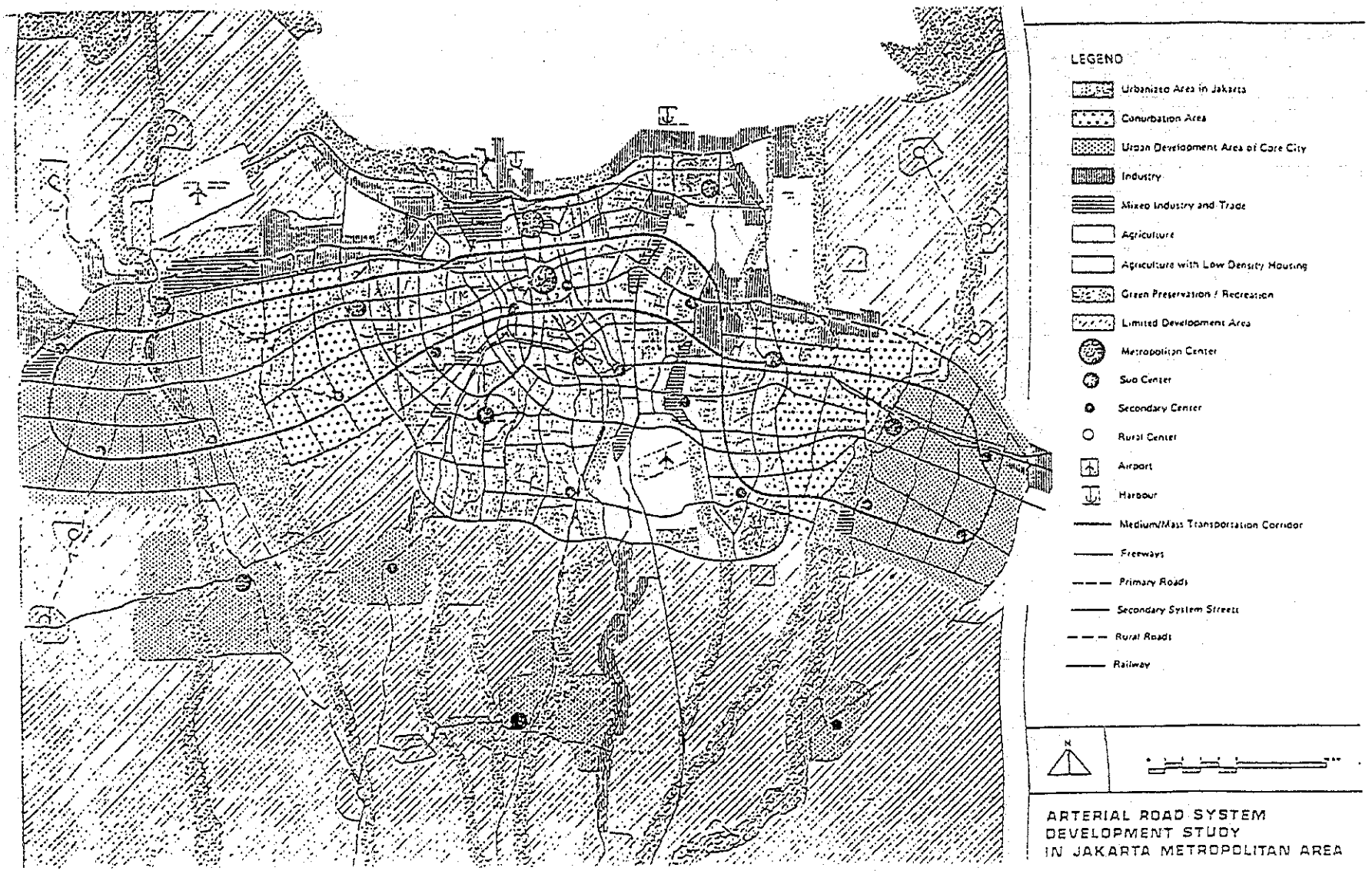
for the implementation of the study the Government of Japan will take the responsibilities;

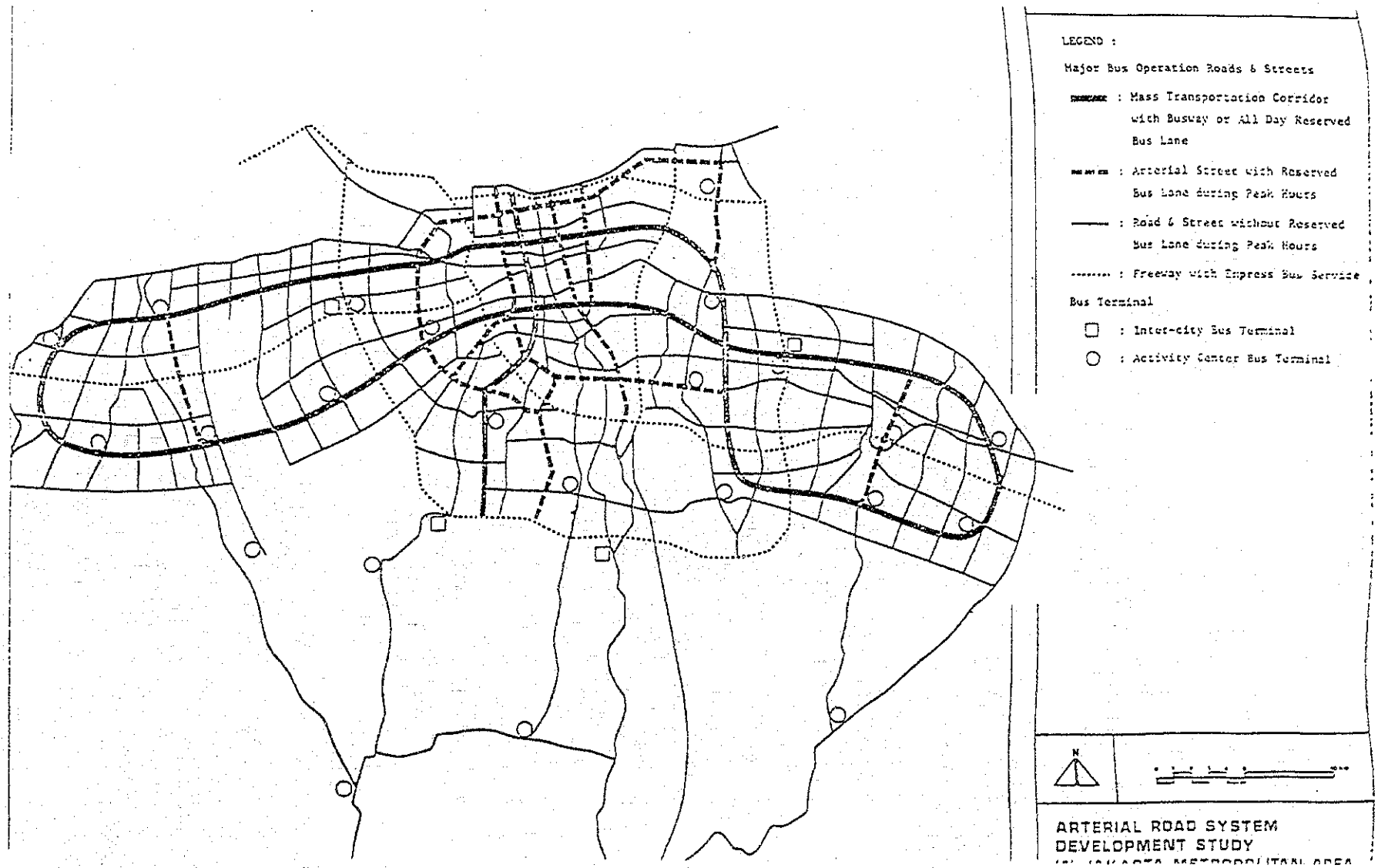
A. To dispatch, at its own expense, the study team to Indonesia; and
B. To pursue technology transfer to the Indonesian counterpart personnel in the course of the study.

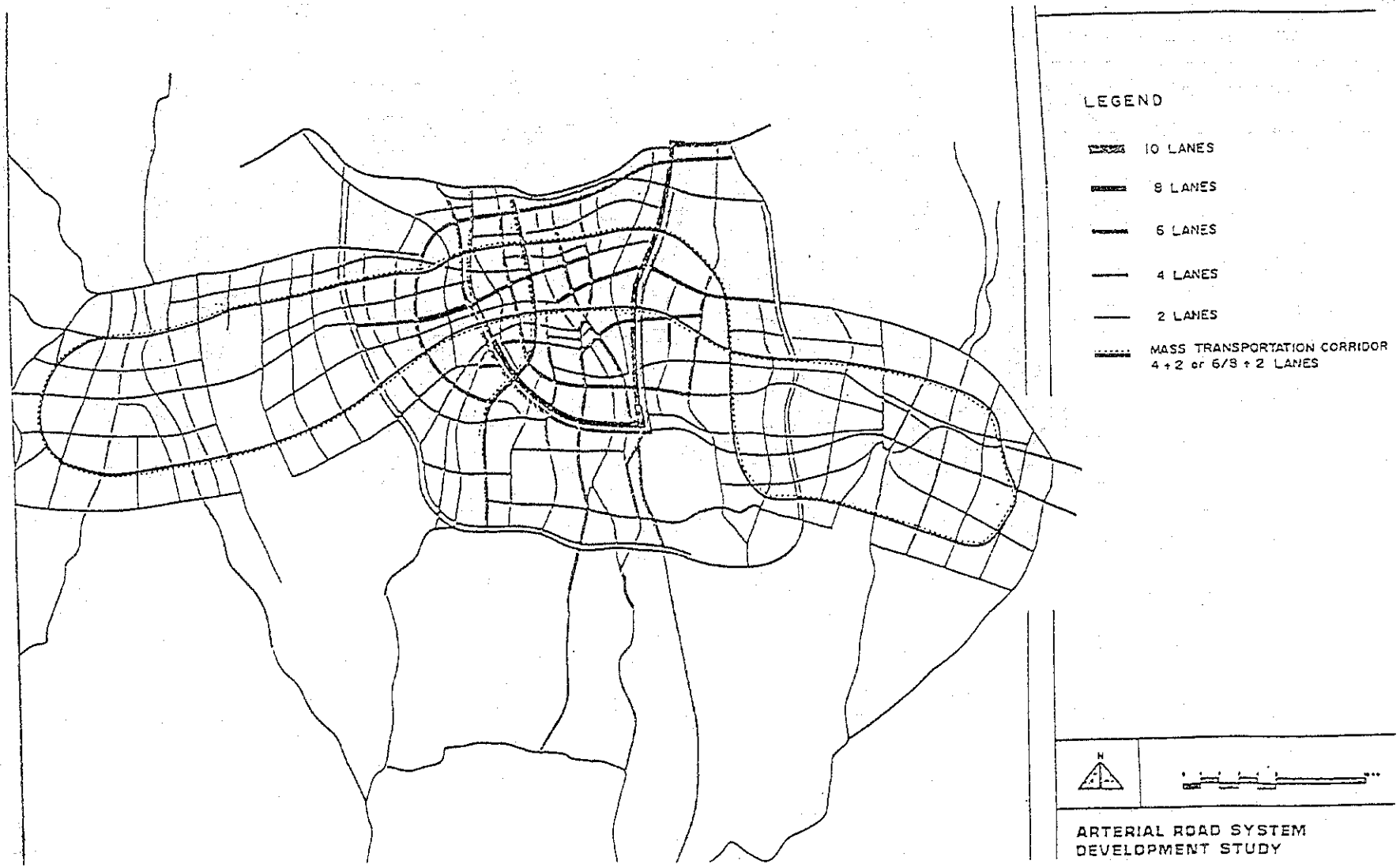
TENTATIVE STUDY SCHEDULE

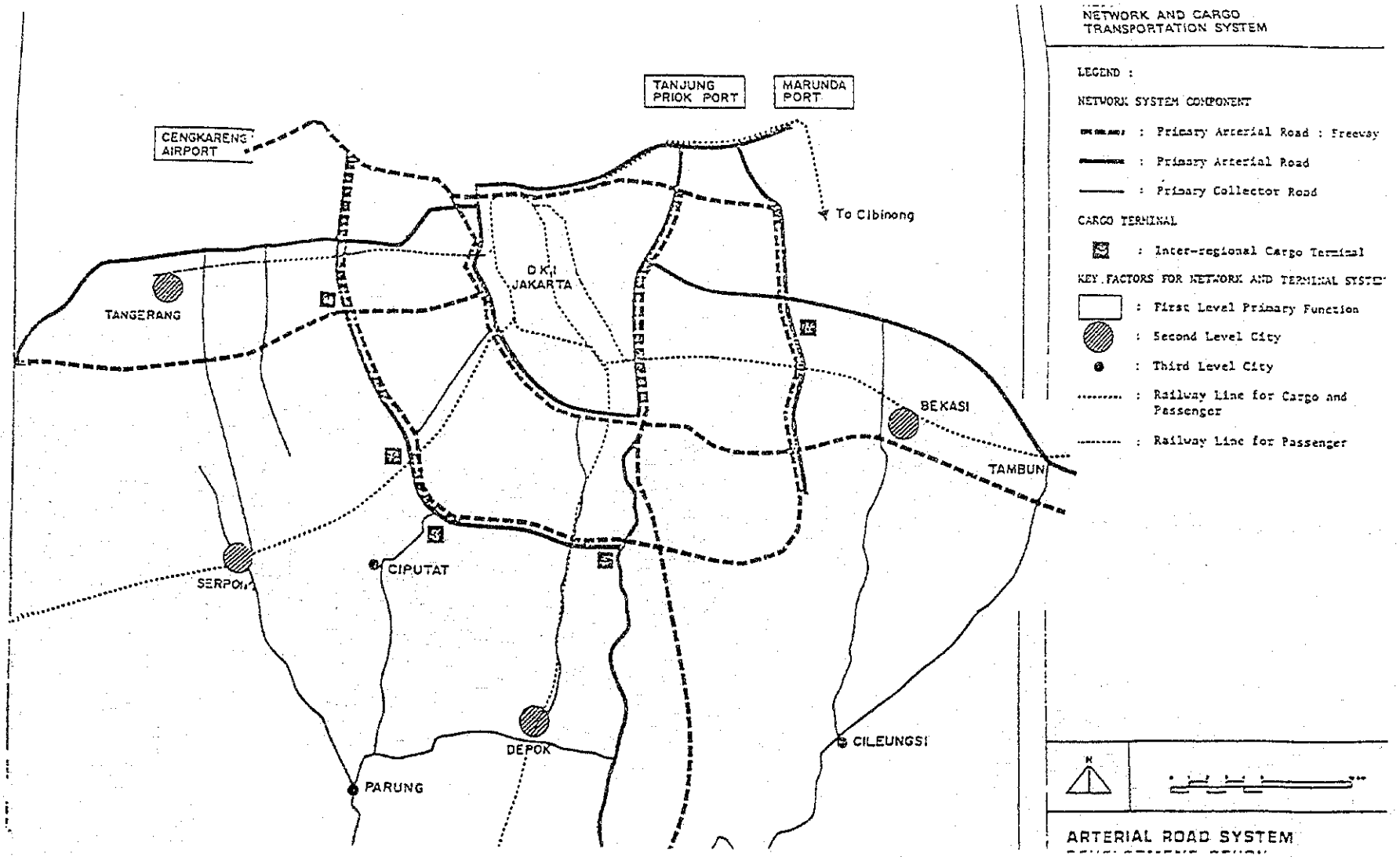



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
E.1 Team Leader (17)
E.2 Transport Planner (17)
E.3 Urban Planner (9)
E.4 Traffic Engineer (A) (14)
E.5 Traffic Engineer (B) (7)
E.6 Transport Economist (7)
E.7 System Engineer (6)
E.8 Highway Engineer (A) (17)
E.9 Highway Engineer (B) (7)
E.10 Civil Engineer (14)
E.11 Structural Engineer (5)
E.12 Geotechnical Engineer (5)
E.13 Geodetic Engineer (6)
E.14 Mechanical Engineer (3)
E.15 Economist (6)
140 m/m
L.1 Transport Planner (16)
L.2 Traffic Engineer (A) (14)
L.3 Traffic Engineer (B) (4)
L.4 Highway Engineer (16)
L.5 Civil Engineer (14)
L.6 Geotechnical Engineer (5)
L.7 Geodetic Engineer (6)


LEGEND
Urbanized Area in Jakarta
Conurbation Area
Urban Development Area of Core City
Industry
Mixed Industry and Trade
Agriculture
Agriculture with Low Density Housing
Green Preservation / Recreation
Limited Development Area
Metropolitan Center
Sub Center
Secondary Center
Rural Center
Airport
Harbour
Medium/Mass Transportation Corridor
Freeways
Primary Roads
Secondary System Streets
Rural Roads
Railway
N
ARTERIAL ROAD SYSTEM
DEVELOPMENT STUDY
IN JAKARTA METROPOLITAN AREA


LEGEND :
Major Bus Operation Roads & Streets
: Mass Transportation Corridor with Busway or All Day Reserved Bus Lane
: Arterial Street with Reserved Bus Lane during Peak Hours
: Road & Street without Reserved Bus Lane during Peak Hours
: Freeway with Express Bus Service
Bus Terminal
: Inter-city Bus Terminal
: Activity Center Bus Terminal
N
ARTERIAL ROAD SYSTEM
DEVELOPMENT STUDY


LEGEND
10 LANES
8 LANES
6 LANES
4 LANES
2 LANES
MASS TRANSPORTATION CORRIDOR
4+2 or 6/8+2 LANES
N
ARTERIAL ROAD SYSTEM
DEVELOPMENT STUDY


NETWORK AND CARGO TRANSPORTATION SYSTEM
LEGEND :
NETWORK SYSTEM COMPONENT
: Primary Arterial Road : Freeway
: Primary Arterial Road
: Primary Collector Road
CARGO TERMINAL
: Inter-regional Cargo Terminal
KEY FACTORS FOR NETWORK AND TERMINAL SYSTEM
: First Level Primary Function
: Second Level City
: Third Level City
: Railway Line for Cargo and Passenger
: Railway Line for Passenger
TANJUNG PRIOK PORT
MARUNDA PORT
CENGKARENG AIRPORT
To Cibinong
D.K.I JAKARTA
TANGERANG
BEKASI
TAMBUN
CIPUTAT
SERPONG
DEPOK
PARUNG
CILEUNGSI
N
ARTERIAL ROAD SYSTEM

ANSWER TO THE QUESTIONNAIRE

JAPANESE PREPARATORY STUDY TEAM
FOR
THE FEASIBILITY STUDY
ON
URBAN ARTERIAL ROAD SYSTEM DEVELOPMENT PROJECT
IN
JAKARTA METROPOLITAN AREA
IN
THE REPUBLIC OF INDONESIA

NOVEMBER 30, 1992

DIRECTORATE OF URBAN ROAD DEVELOPMENT
DIRECTORATE GENERAL OF HIGHWAYS
MINISTRY OF PUBLIC WORKS

I. GENERAL

(1) Background of the request of the Study

The development of the integrated transportation system is urgently necessary in Jakarta Metropolitan Area as the ARSDS study results suggest in order to maintain the development of the area.

The masterplan studies on the integrated public transport system in Jakarta Metropolitan Area is to be planned and to be implemented. But these masterplan planning studies requires a lot of fund, time and timing.

The related government agencies have started their efforts to prepare the long term plan of mass rapid transport system in Jakarta Metropolitan area.

Under such circumstances, the recommend proposals by ARSDS study are requested to proceed in the feasibility study stage as those results would be additional and important inputs actual implementation stage as well as to those masterplan studies.

Major Proposals and recommendation by the Arterial Road System Development Study in Jakarta Metropolitan Area (ARSDS) by JICA are as follows :

a) For the urban transportation the integrated public transport system shall be required and to be a key, but from various reasons including financial aspects the realization takes a long time. Bus system is an intermediate solution for the urban transport in Jakarta Metropolitan Area with additional improvement for the hardware and the software e.g. bus network, bus fleet and bus types.

b) When consider the future scale of Jakarta Metropolitan Area, existing motivation of southward expansion should face the limitation and the scarcity and should lead to large problems.

From these points of view :

- To promote with the first priority the transportation corridor development in east-west direction in order to guide and induce the area development in eastern and western areas.

- To prepare necessary and additional transportation facilities to the north-south axis.

c) As an area development method, apply an urban unit to ease the road traffic problems in the area and to make it easy to apply a development policy as well as a transportation management policy.

d) When the integrated public transport system is prepared well, further plan and program of access traffic to business districts shall be prepared. For this purpose, it is necessary to prepare the step-by-step vehicle parking system and parking policy.

The Government, in charge of the main counterpart agency, Bina Marga request for the technical assistance to Japanese Government on those studies, because the feasibility studies are required to start coordination works for implementation with related government agencies including local governments as well as interested private sector investors.

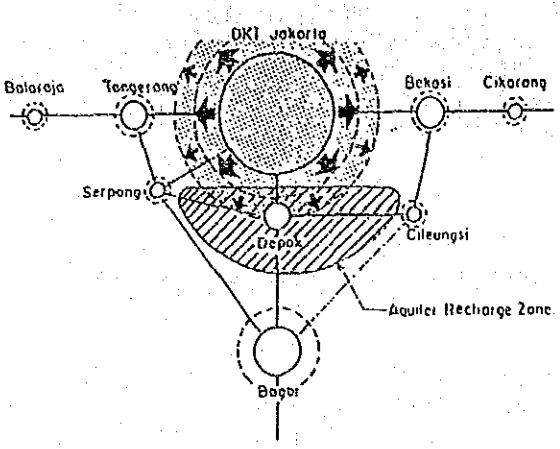
Those coordination works consist of authorization of the project, necessary preparation of laws and regulations, seeking funds for further steps etc.

Basic concept of the new N-S corridor and E-W corridor are shown in the following kconcept drawings.

ALTERNATIVE CONCEPT OF DEVELOPMENT

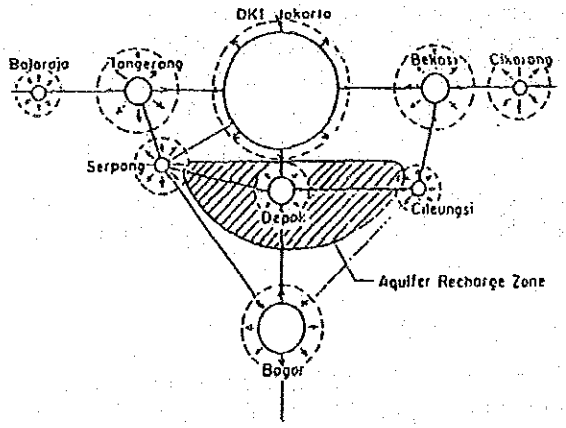
1) Concentrated Growth with Urban Expansion

This alternative expands the urban area outside of Jakarta, but the major economic activities would still be located in the centers of DKI Jakarta.



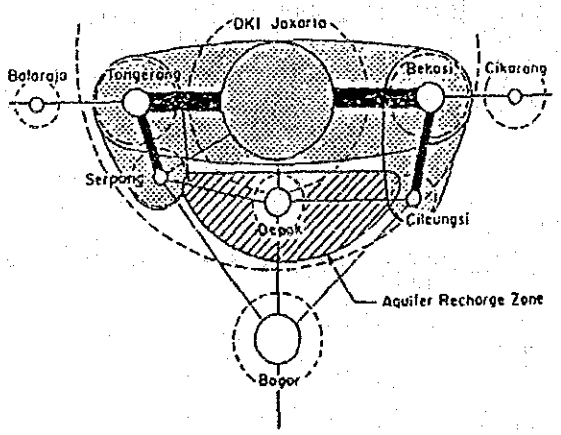
2) Formulation of Self-Sustainable Cities Outside Jakarta

This alternative aims at formulating self-sustainable cities with relatively higher levels of independence from other cities.



3) Formation of Jakarta Metropolitan Area

This alternative aims at formulating the Jakarta Metropolitan Area within a 30 km radius. The metropolitan area has one metropolitan center and several sub centers.



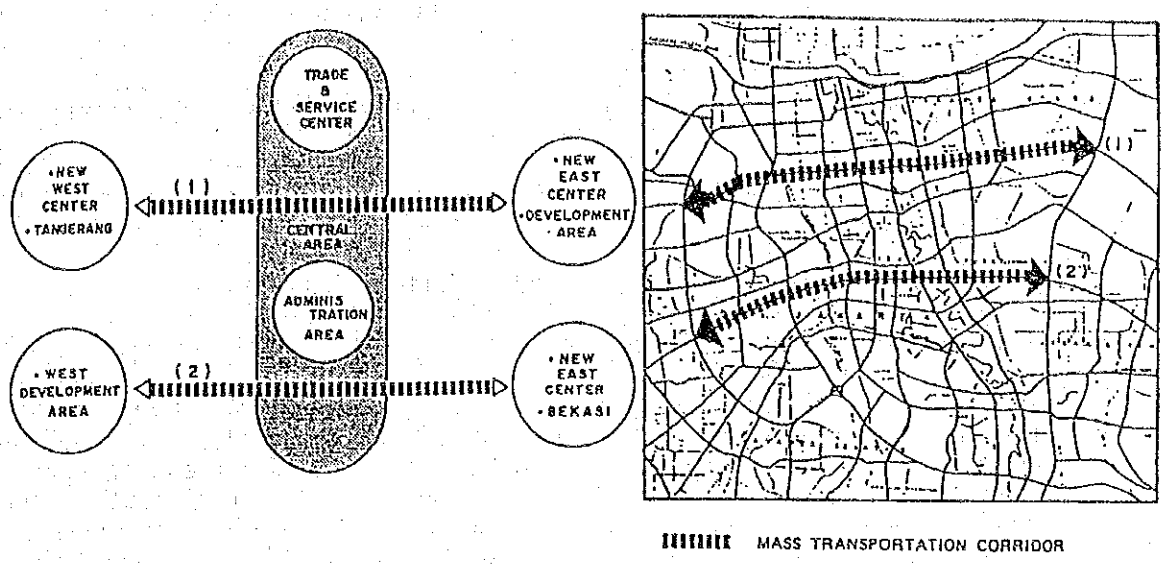


Fig. 3.5.8 MAJOR EAST – WEST CORRIDORS

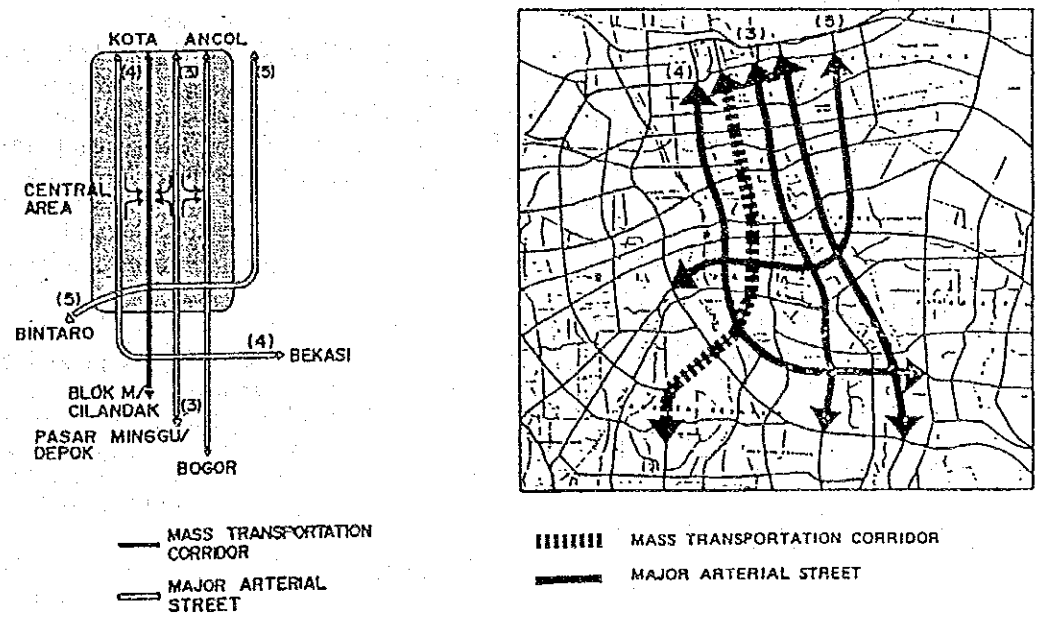


Fig. 3.5.9 REINFORCEMENT OF NORTH – SOUTH AXES

(2) Present status and problems of road traffic in DKI Jakarta and JABOTABEK area especially concerning N-S corridor and E-W corridor.

a) The traffic situation of DKI Jakarta and the surrounding area is shown in attached papers

b) The road traffic problems concerning N-S corridor and E-W corridor would be summarized as follows :

1)In general, DKI Jakarta shows such problems of urban transportation as :

TRAVEL BEHAVIOR OF PEOPLE

According to the analysis of the ARSDS Person Trip Survey, it is very clear at present that differences in income level significantly influence the choice of transport mode in Jakarta. Higher income groups depend on private transport modes to a higher degree. While the high income group prefers private passenger cars, the lower income group, which can not affort automobiles, use motorcycles as a mode of private transportation. As a representative mode of public transportation, the conventional bus system, which provides a low level of service at present; is mostly used by the lower middle and low income groups. It is obvious from the modal composition trend that the share of public transportation has been decreasing. If the service level of public transportation is not improved, an increase in the utilization of private passenger cars and motorcycles can not be avoided as income levels rise.

The low income group, accounting for 47.5% of all Jakarta residents, makes little use of not only private motorized transportation, but also of public motorized transportation. The mobility of the people belonging to this income group is restricted due to their economic situation. Therefore, to satisfy their travel desires it will be necessary to provide an inexpensive public transportation service.

LOW LEVEL OF SERVICE IN EXISTING PUBLIC TRANSPORTATION

The present railway system does not function as an urban railway because of the low level of service, the inconvenient landuse for railway users, and the poor access service to railway stations. The existing bus system lacks reliability as a primary mode of public transportation in terms of rapidity, punctuality and comfort. It can be concluded that the Jakarta Metropolitan Area is not completely served by a mass transit system with large capacity and high speed operation.

LACK OF ROAD AND STREET NETWORK

The Jakarta Metropolitan Area suffers from a shortage of roads and streets, and some areas are not covered with major arterial streets. This results in an excessive burden of road traffic on the major arterial streets.

INCONVENIENT URBAN STRUCTURE FOR PUBLIC TRANSPORTATION

At present the urban structure of the Jakarta Metropolitan Area is convenient not for public transportation users, but for private transportation users, due to its ribbon development pattern and the low development density in the areas surrounding transportation terminals.

2) As shown in the present status of road traffic, the trip attraction to the central area of DKI Jakarta is very high and resultantly shows the short of capacity supply.

3) From eastern area to the central area of DKI Jakarta which has national level of functions and from western area to the central area, both have only one corridor each and obviously understood to give constraint to those areas' development in future without better and multi corridor access.

(3) Contents of the Study (project component, scope of the study)

Following the recommendations the further studies of ARSDS are proposed for the following three studies :

(i) Study and preliminary design of the 70 kilometers corridor from Tangerang to Bekasi, arterial roads cum mass transit routes.
Study consists of two stages.
1st stage : overall study on route selection and its right of way
2nd stage : detailed studies/feasibility study.

(ii) Study and preliminary design of Blok M - Kota corridor (app.14 kilometers) but possibly extended to Cinere area from Blok M as alternative.
Study consists of two stages.
1st stage : alternative study on package solution (Tollway system, street system and mass transportation system or combined)
2nd stage : feasibility studies.

(iii) Study and preliminary design of vehicle parking system in business districts of DKI Jakarta.

The scope of the study is as follows :

1) Study Area
The study area covers basically DKI Jakarta and its surrounding area.

2) Study Period
The consultancy services will be required for a period of eighteen (18) months commencing as soon as possible.

3) Study Items
Each study will cover the following study items;

(i) Study and Preliminary Design of the 70 km Corridor from Tangerang to Bekasi, the Arterial road cum-Mass Transit Route.

1)Existing data collection and analyses

a. Review of JICA ARSDS Reports
b. Review of Jakarta Urban Transport Projects Reports
c. Socio-economic aspects of the study area
d. Landuse and urban developments
e. Inventory survey of the corridor
f. On-going and proposed road projects.

2)Topo Survey and Physical Condition Survey including Major Utilities.

a. Cartographical study on the available aerophoto (S=1/5,000) and topo maps
b. Spot height survey
c. Existing condition survey

3)Traffic Count Survey on related roads

4)Traffic Demand Forecast

a. Review of JICA ARSDS Study
b. Traffic demand forecast of the corridor
c. Road traffic and mass transit traffic forecast on the corridor.

5)Cost Estimates of the construction and the operation

6)Economic and financial evaluation.

(ii) Study and Preliminary Design of Block M to Kota (app.14 kms corridor) but possibly to be extended to Cinere area from Blok M.

1)Survey of Existing Situation of the Alignments and Centre Areas including traffic count survey on related roads,

2)Review and proposals of a new additional link in Intra-Urban Tollway System

3)Preliminary Design of New Route

a. Demand Forecast
b. Staging System with a Tollway Link and a New Transit System
c. Preliminary Design of Alignments
d. Cost Estimates
e. Economic and Financial Analyses.

4)Implementation Program Proposal including Action Programs

5)Proposals of Related Transportation Facilities.

(iii) Study and Preliminary Design of vehicle Parking System in Central Business District of DKI Jakarta.

1.Basic Policy Study on the Vehicle Parking System

a. Review of the present situation
b. Study of other countries experience
c. Basic policy studies.

2. Parking Situation Survey for the Specific Zones

   a. Traffic count survey in the area
   b. Parking volume survey
   c. Parking characteristic survey
   d. Related surveys.

3. Vehicle Parking System Analyses

   a. Analyses of survey results
   b. Parking demand analyses

4. Vehicle Parking Demand Forecast

5. Parking System Development Proposals

   a. Non Roadside Parking Systems
   b. Roadside Parking System
   c. Parking Policies Proposals
   d. Proposals of the arterial road inclduing public parking space and station plaza
   f. Others

6. Economic and Financial Analyses (for the district, for the parking area operation systems proposal).

4) Reporting in English

- Inception Report (50 copies) within one (1) month after the commencement of the study

- Progress Report (30 copies) after six (6) months of the commencement showing the results of stage 1 studies.

- Interim Report (50 copies) after twelve (12) months of the commencement showing the results of Parking Study and interim results of stage 2 studies.

- Draft Final Report (50 copies) after sixteen (16) months of the commencement showing the results of stage 2 studies and summaries of whole studies.

- Final Report and Summary Report (50 copies) within two (2) months since submission of the draft final reports on the condition that the committee gives the final comments on the reports within two (2) weeks of submission them.

(4) Implementation plan of the project :

(a) Central North-South Axis Project :

As soon as possible after this Study, the Government would seek the investor to implement of this project. The target of the start of land acquisition is expected 1994 or 1995.

(b) East-West Corridor Project :

After this study, the coordination and clarification for this project are expected to require one year and to be seeked for the funds for implementation by staging including the detailed design services.

(c) Vehicle parking study in CBDs :

The study results and recommendations would be reviewed for implementation purposes for both institutional ones as well as physical development of off-road parking spaces/facilities.

Actually, at this stage the fixed implementation plan is not available but all agencies concerned are understanding that each of study component is important and to be coordinated with other plans and programs or to be a part of total urban transportation system plans and programs.

(5) Confirmation of the counterpart authority/organization :

1) Main counterpart authority :

Director of Urban Road Development (BINKOT)
Directorate General of Highways, Ministry of Public Works.

2) Other counterpart authorities :

(1) Directorate General of Land Transport and Inland Waterways, Ministry of Communications.

(2) Bappeda of DKI Jakarta and West Java Province.

(3) Dinas of City Planning, Dinas of Public Works and Dinas of Traffic and Transport on Arterial Roads of both provinces.

(4) Directorate of City and Regional Planning, Directorate of Cipta Karya, Ministry of Public Works.

TRAFFIC SITUATION IN JAKARTA AND SURROUNDING AREA

Traffic Situation is Jakarta and surrounding area.

The summarized traffic situation in Jakarta are shown by the following maps :

- Desire Line of Person Trips in DKI Jakarta in 1985 by survey
- Existing Railway Network in Jakarta Metropolitan Area
- Number of JABOTABEK Train Passengers by Section, 1986
- Bus Service Coverage of Buses with Direct Access to the CBD in DKI Jakarta, 1985
- Bus Service Coverage in DKI Jakarta, 1985
- Road Network in DKI Jakarta, 1985
- Location Map of Traffic Congestion Problems, 1985

The modal split in DKI Jakarta in 1985 of Jakarta related person trips are as follows :

Transportation Mode Shares of Jakarta-Related Person Trips, 1985 (trips/day)

Mode	Jakarta 2) Residents		To/From 3) Botabek (Cordon Line Survey)	
Railway	21,237	0.3%	53,960	8.0%
Bus	3,428,139	52.6%	392,901	57.9%
Taxi	67,833	1.0%	676	0.1%
Private Vehicles 1)	2,819,768	43.3%	208,794	30.8%
Trucks	175,695	2.7%	22,391	3.3%
Total	6,512,672	100.0%	678,722	100.0%

Source : ARSDS, 1985

Note : 1) Private vehicles include motorcycles
2) ARSDS Home Interview Survey
3) ARSDS Cordon Line Survey

The changes of trip characteristics from year 1972 to year 1985 are shown in the following tables :

Table 1.5.9 CHANGE IN TRIPS PURPOSE COMPOSITION : 1972 – 1985

Unit: %

Trip Purpose	JMATS 1972	ARSDS 1985
To Work	26.2	22.6
To School	9.3	11.5
To Home	42.4	42.2
Business	9.1	7.0
Private Matters	9.8	12.4
Shopping	3.3	4.3
Total	100.0	100.0

Note: Trips made by mode of motorized transport

Table 1.5.10 CHANGE IN MODAL COMPOSITION : 1972 – 1985

Unit: %

Mode of Transport	JMATS 1972	ARSDS 1985
Public Transport:		
Railway	1.2	0.3
Bus	59.6	50.9
Taxi, Bajaj	0.2	5.8
Sub Total	61.0	57.0
Private Transport:		
Private Car	24.3	22.8
Motorcycle	14.7	20.2
Sub Total	39.0	43.0
Total	100.0	100.0

Table 1.5.11 GROWTH OF AVERAGE TRIP LENGTH : 1972 – 1985

Unit: km

Mode of Transport	JMATS 1972	ARSDS 1985
Public Transport	6.6	7.4
Private Transport	6.0	6.9

Note: Trips made by mode of motorized transport

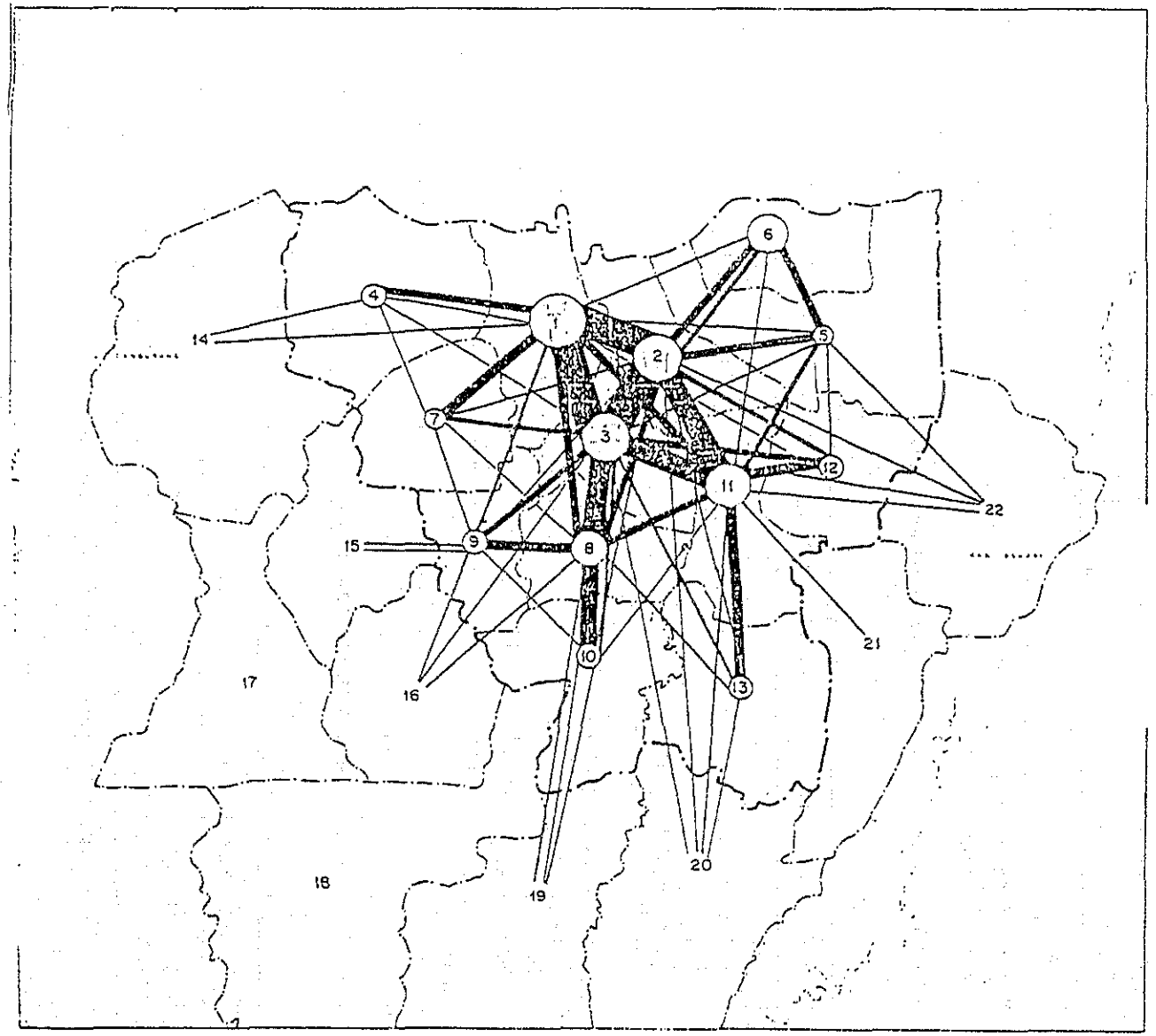


Fig. 1.5.13
PERSON TRIP FLOWS IN JAKARTA METROPOLITAN AREA, 1985

100,000 1,000,000
INTRA-ZONAL TRIPS IN DKI JAKARTA

100,000 200,000 300,000
PERSON TRIPS PER DAY

NOTE : LESS THAN 10,000 TRIPS ARE OMITTED

SOURCE : ARSDS HOME VISIT SURVEY, 1985.
ARSDS CORDON LINE SURVEY, 1985

N

0 1 2 3 4 5 10KM

ARTERIAL ROAD SYSTEM DEVELOPMENT STUDY IN JAKARTA METROPOLITAN AREA

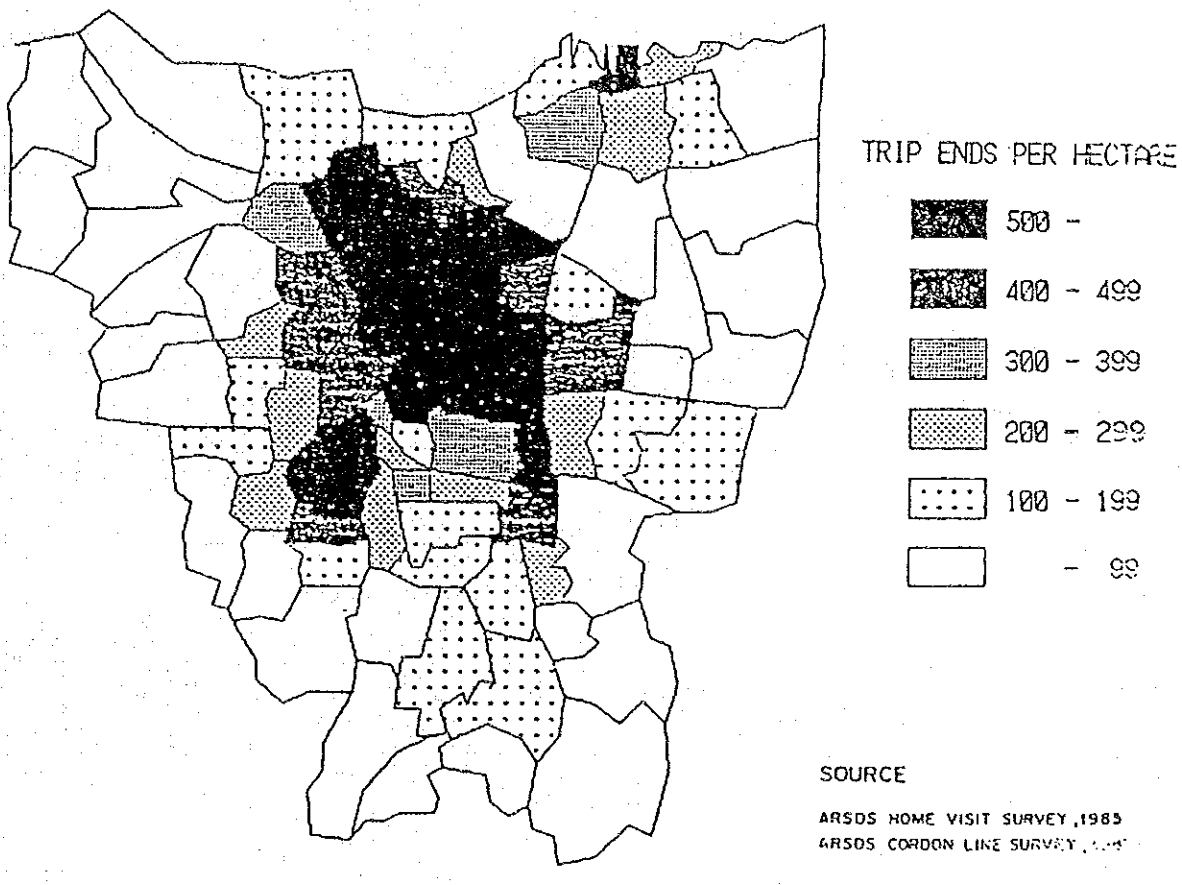
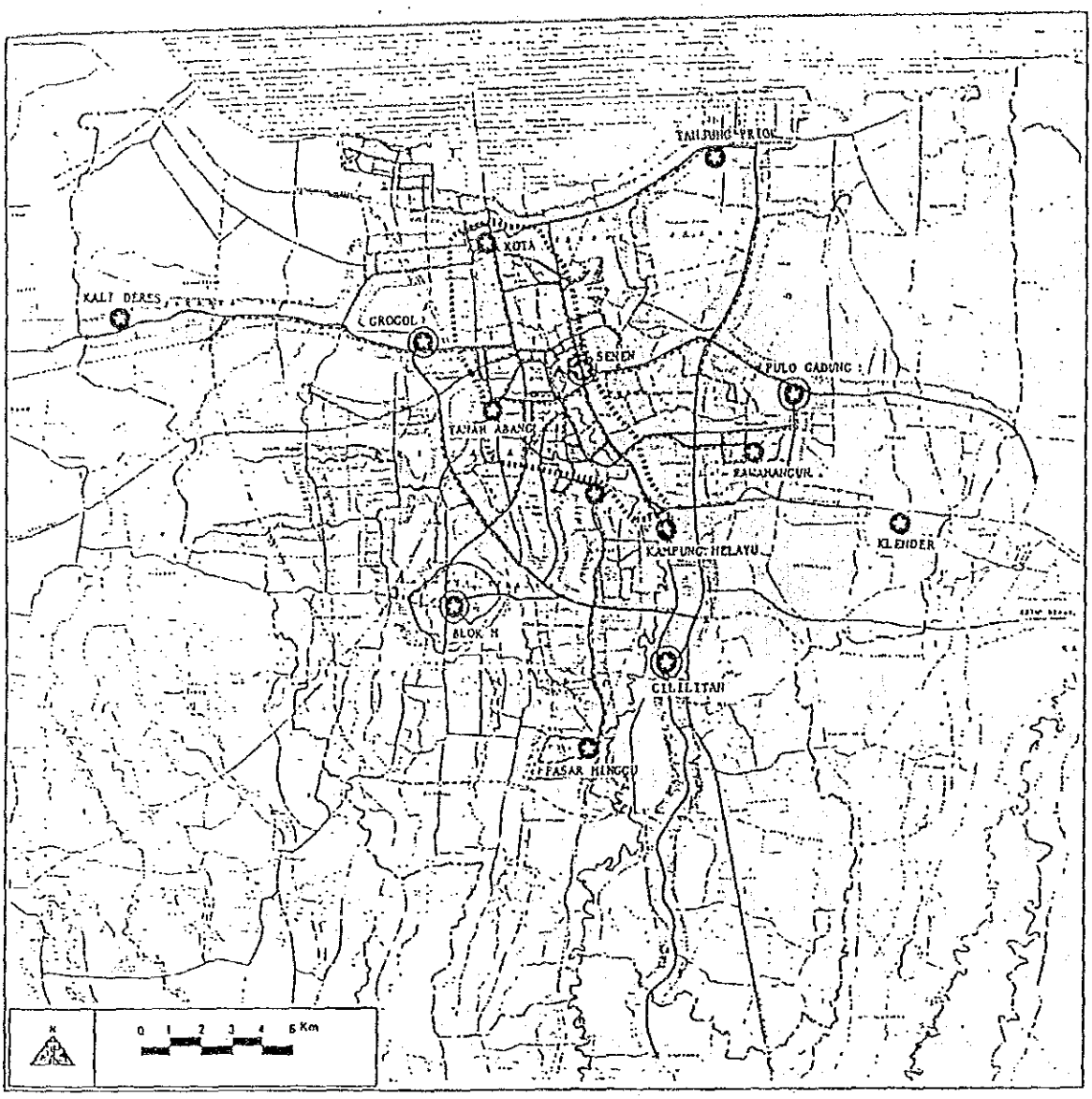


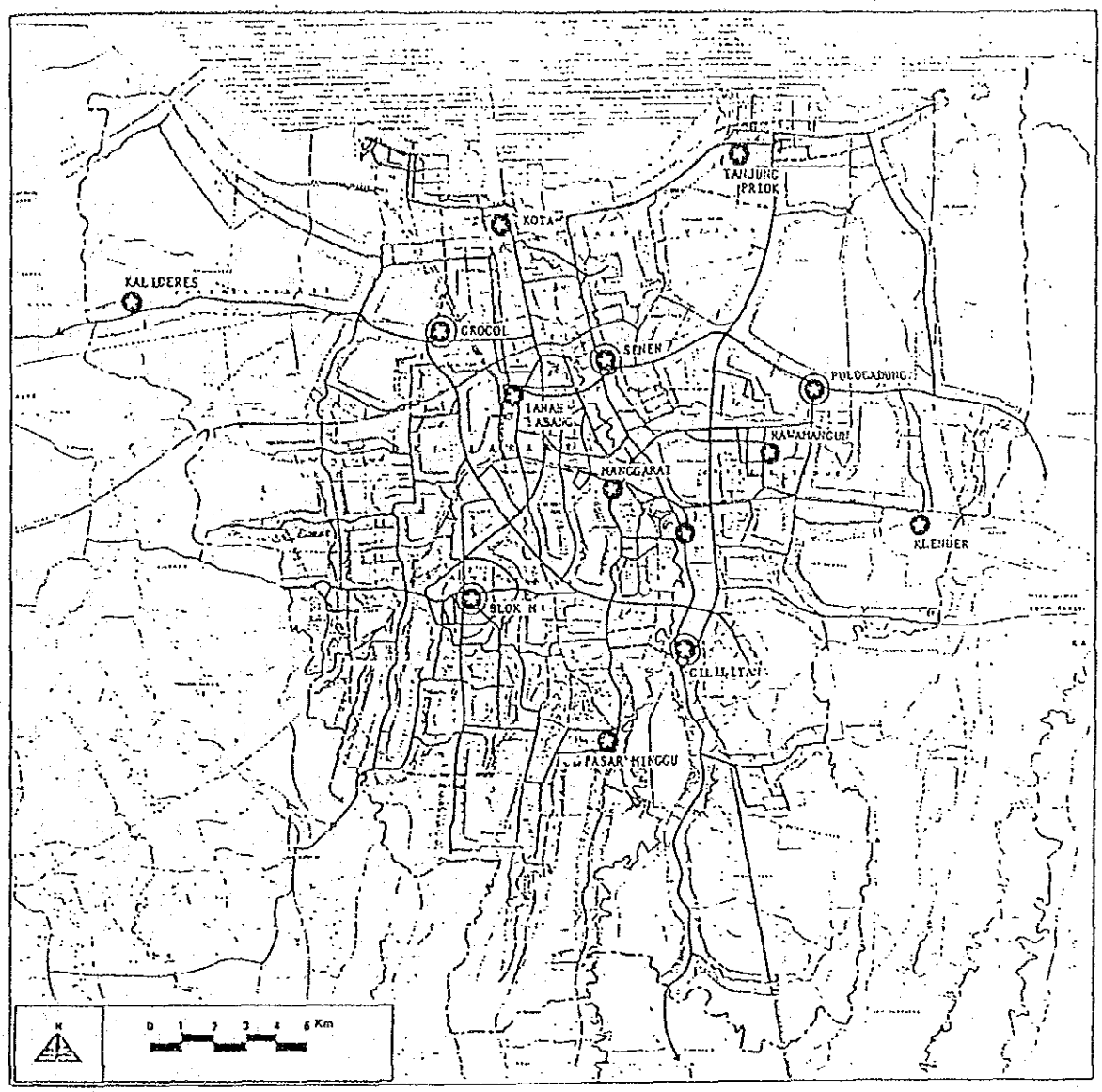
Fig. 1.8 TRIP ATTRACTION IN DKI JAKARTA, 1985



LEGEND

- MAJOR BUS TERMINAL
- MINOR BUS TERMINAL
- BUS SERVICE COVERAGE BY LARGE AND MICRO BUS
- BUS ROUTE OF LARGE BUS WITH DIRECT ACCESS TO THE CENTRAL AREA
- BUS ROUTE OF MICRO BUS WITH DIRECT ACCESS TO THE CENTRAL AREA
- CENTRAL AREA BOUNDARY

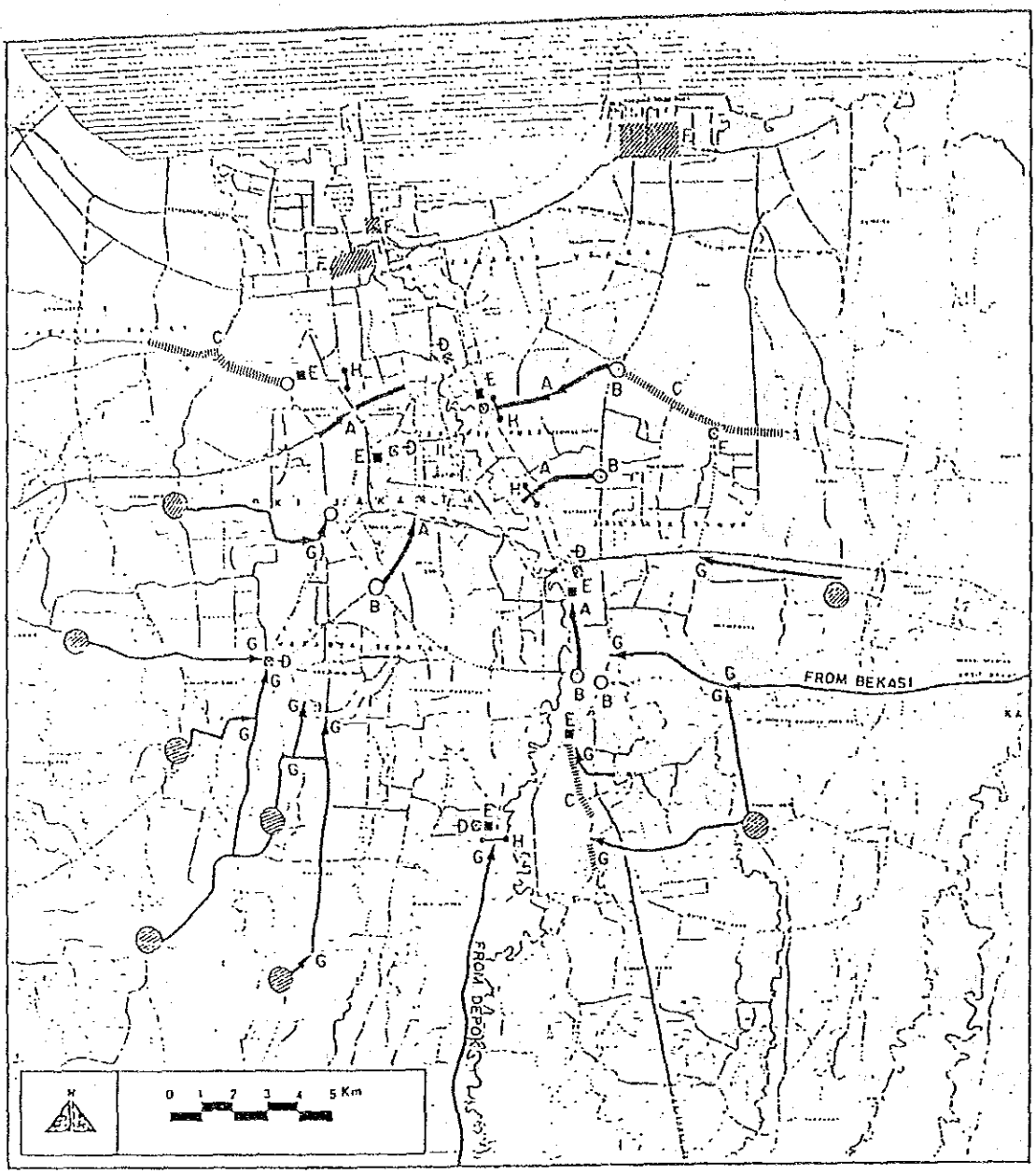
Fig. 1.5.9 BUS SERVICE COVERAGE OF BUSES WITH DIRECT ACCESS TO THE CENTRAL AREA IN DKI JAKARTA 1985



LEGEND

- MAJOR BUS TERMINAL
- MINOR BUS TERMINAL
- BUS SERVICE COVERAGE BY LARGE AND MICRO BUS
- STREETS SERVED BY LARGE BUS OR MICRO BUS
- STREETS SERVED BY MICRO BUS ONLY

Fig. 1.5.8 BUS SERVICE COVERAGE IN DKI JAKARTA 1985

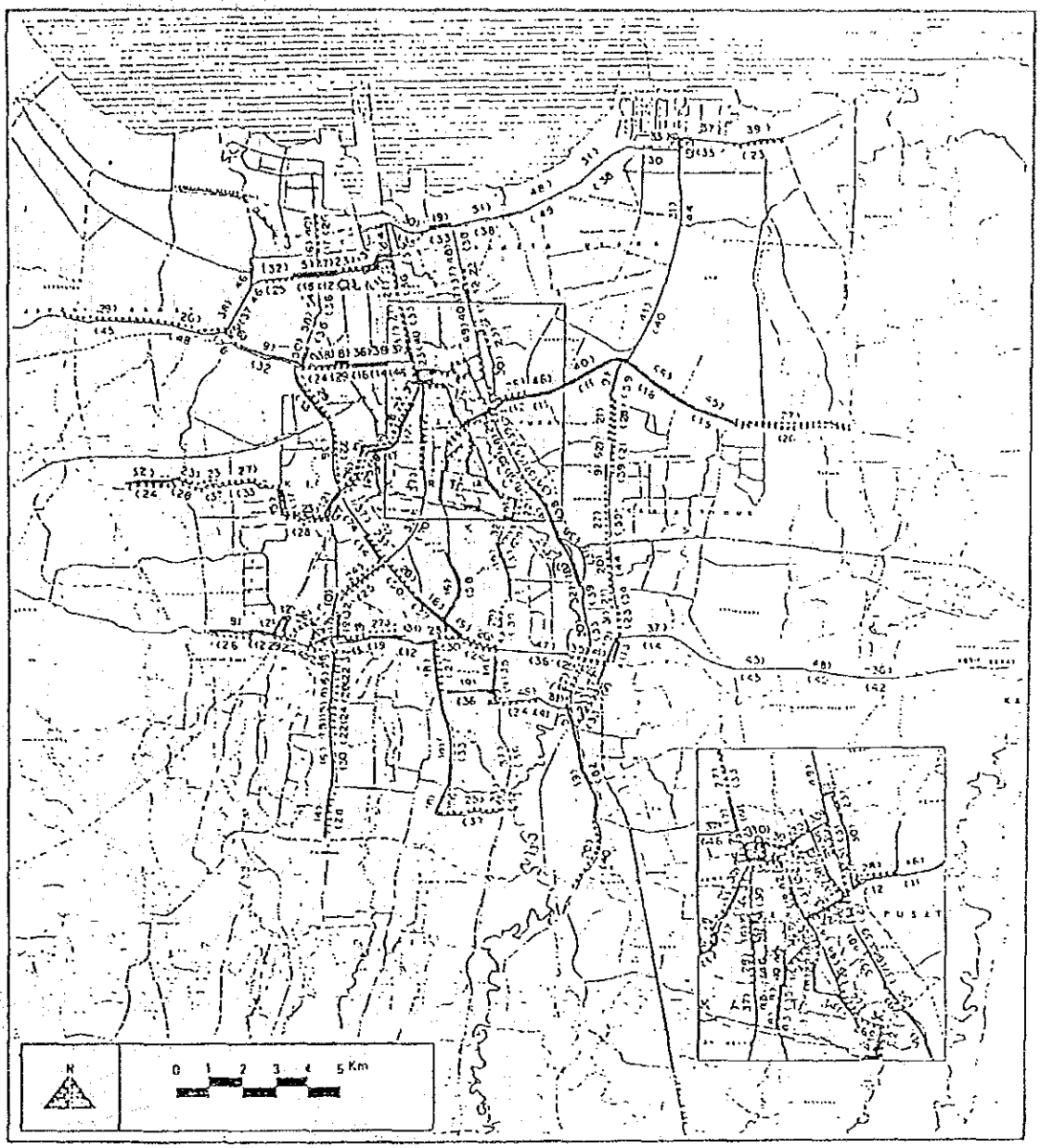


LEGEND

CONGESTION TYPE AND REASON

- A : CONGESTED RADIAL ARTERIAL STREETS TOWARD CBD
- B : CONGESTED INTERSECTIONS BETWEEN THE RADIAL ARTERIAL STREETS TOWARD CBD AND THE S-W BY-PASS AND N-S BY-PASS
- C : CONGESTION ON REGIONAL ROADS
- D : CONGESTION CAUSED BY PASARS, SHOPPING CENTERS AND SCHOOLS ALONG ARTERIAL STREETS
- E : CONGESTION CAUSED BY BUS TERMINALS LOCATED AT MAJOR INTERSECTIONS
- F : CONGESTION AROUND PORT AND WAREHOUSE AREA
- G : CONGESTION AT SUBURBAN INTERSECTIONS DUE TO SPRAWL OF THE RESIDENTIAL AREA AND DELAY OF RELATED ROAD IMPROVEMENT
- H : CONGESTION AT RAILWAY CROSSING

Fig. 1.5.7 LOCATION MAP OF TRAFFIC CONGESTION PROBLEMS



LEGEND

——— UNSTABLE FLOW (20 – 30 km/h)

····· FORCED FLOW (– 20 km/h)

——— SURVEYED ROUTE

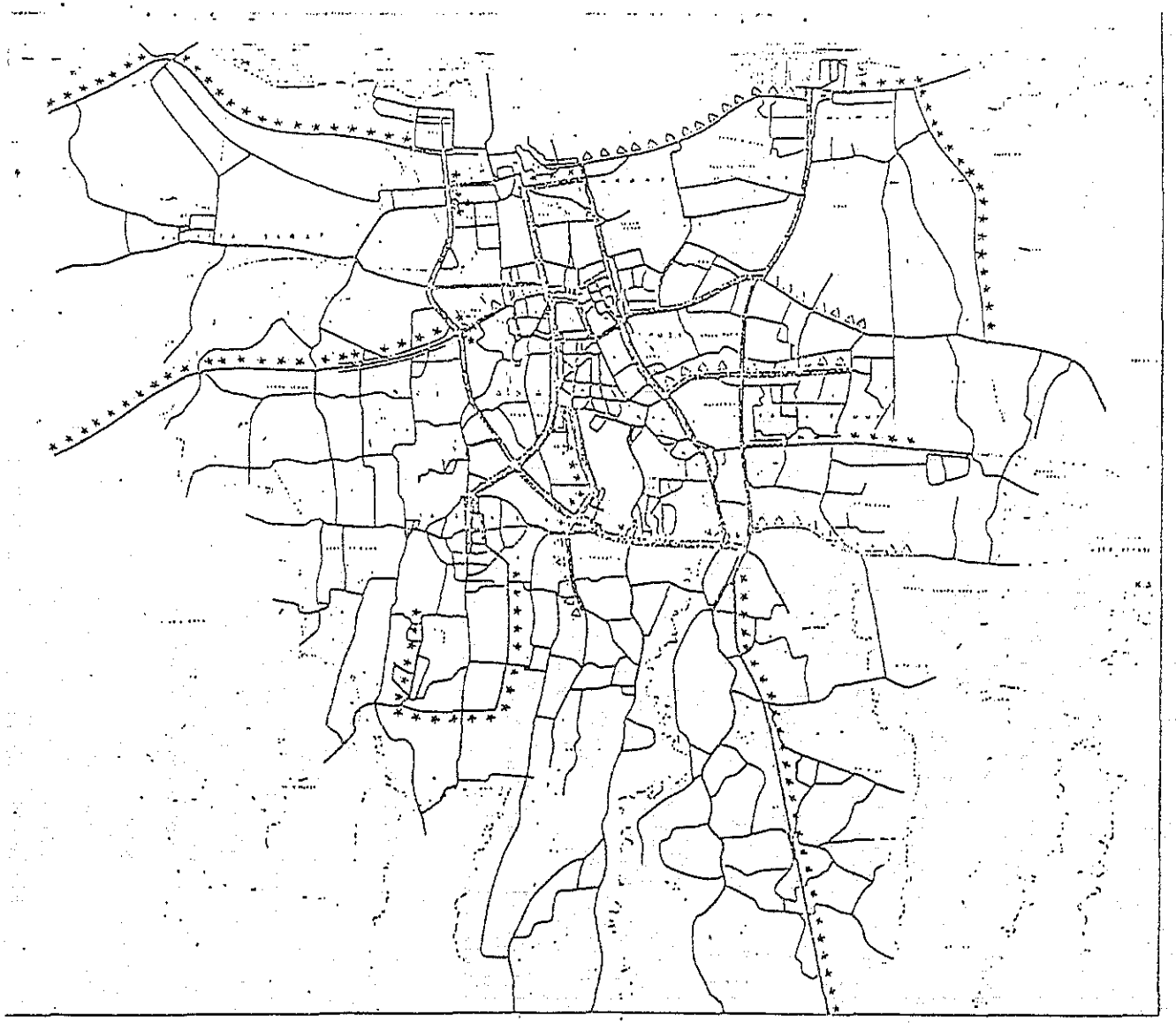
NOTE

FIGURES SHOW THE AVERAGE OVERALL SPEED (km/h) BY ROAD SECTION

SOURCE

ARSDS TRAVEL SPEED SURVEY , 1985

Fig. 1.5.6 LEVEL OF SERVICE IN MORNING PEAK HOURS



EXISTING ROADS IN DKI JAKARTA

LEGEND

- 2 - LANES
- 4 - LANES
- 6 - LANES
- 8 - LANES
- MORE THAN 10 - LANES
- DKI JAKARTA BOUNDARY

MAJOR ROAD IMPROVEMENT 1960'S - 1986

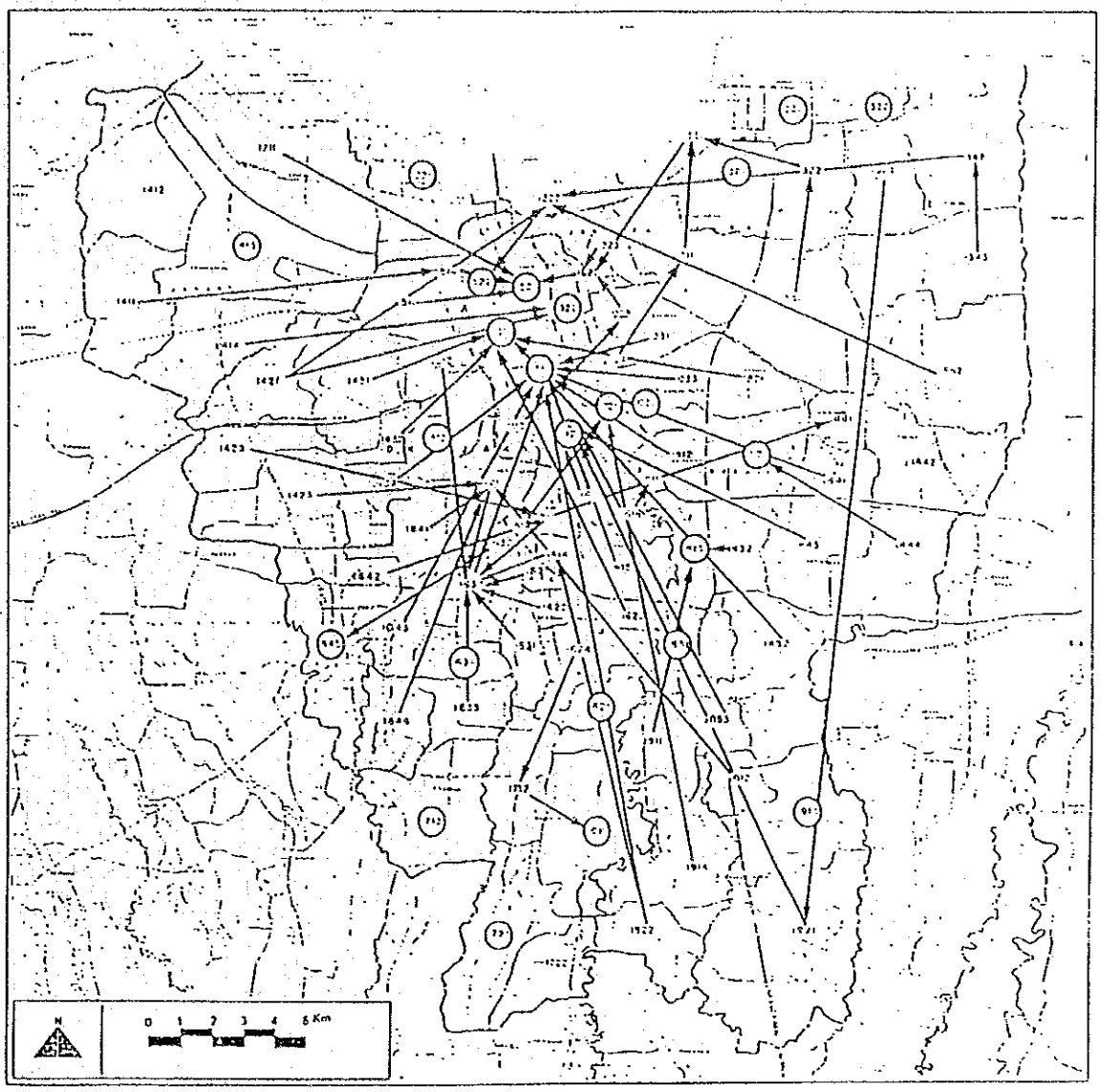
- * * * * NEW ROAD CONSTRUCTION
- Δ Δ Δ Δ ROAD WIDENING
- NEW CONSTRUCTION (FLYOVER)

Source : ARSOS INVENTORY SURVEY

N

0 1 2 3 4 5 Km

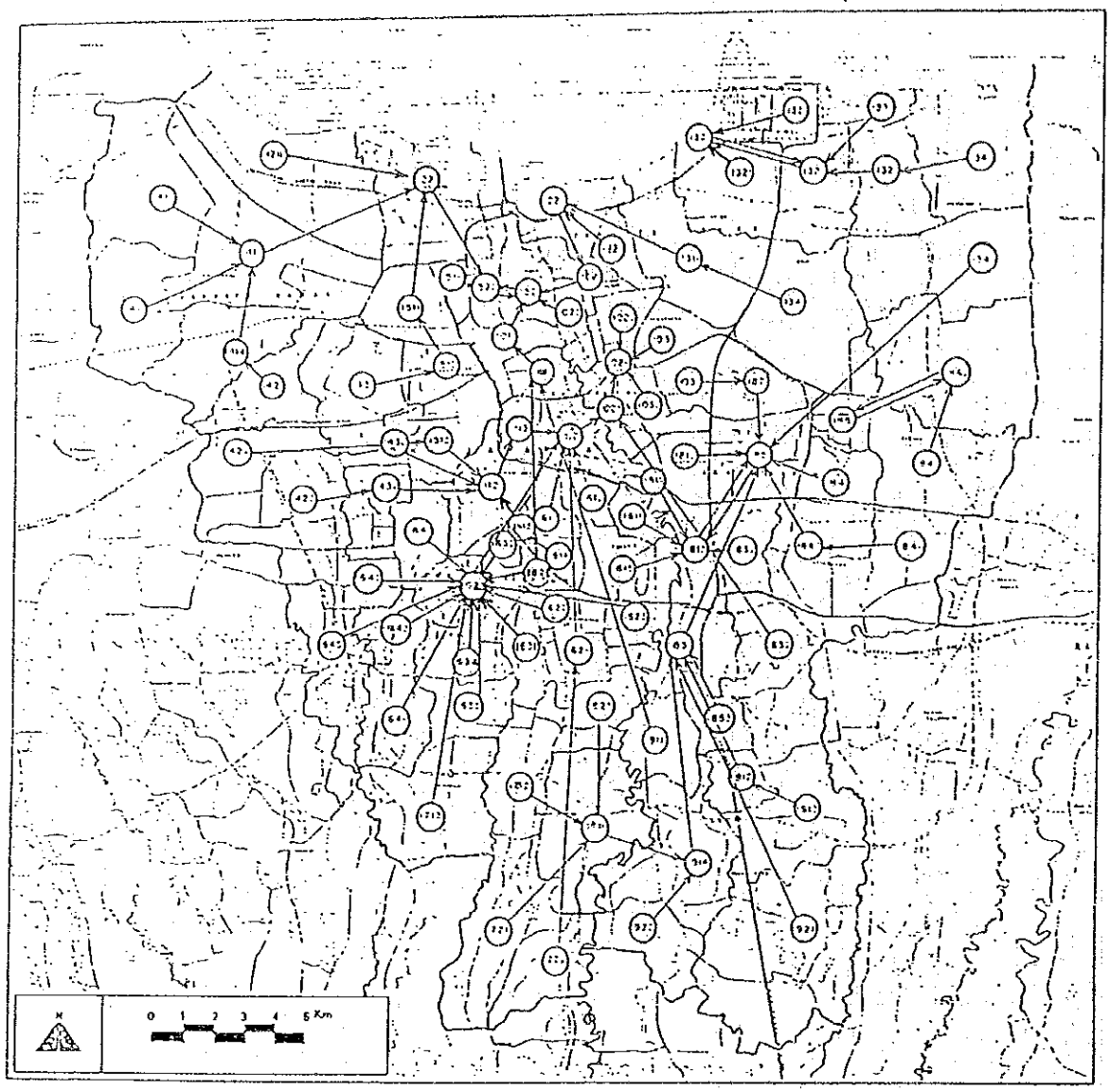
ARTERIAL ROAD SYSTEM
DEVELOPMENT STUDY
IN JAKARTA METROPOLITAN AREA



NOTE : BOLD LINE SHOWS THE FIRST LARGEST "TO WORK" TRIP FLOW
○ SHOWS INTRA-ZONAL TRIP FLOW (SMALL ZONE)

SOURCE : ARSOS HOME VISIT SURVEY, 1985

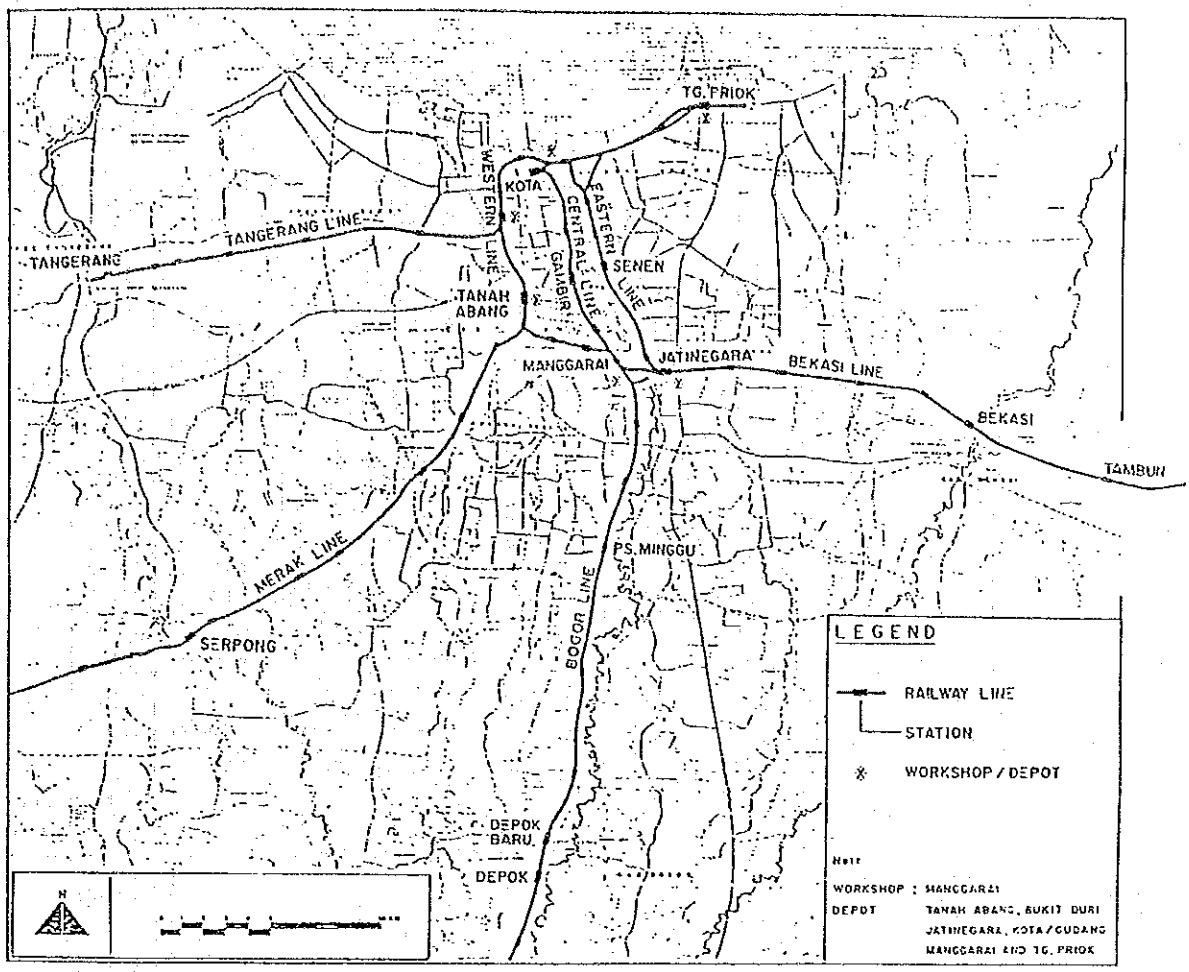
Fig. 1.5.22 THE LARGEST "TO WORK" TRIP FLOWS OF HIGH INCOME GROUP



NOTE : BOLD LINE SHOWS THE FIRST LARGEST "TO WORK" TRIP FLOW
THIN LINE SHOWS THE SECOND LARGEST "TO WORK" TRIP FLOW
○ SHOWS INTRA-ZONAL TRIP FLOW (SMALL ZONE)

SOURCE : ARSDS HOME VISIT SURVEY, 1985

Fig. 1.5.23 THE FIRST AND SECOND LARGEST "TO WORK" TRIP FLOWS OF LOW INCOME GROUP



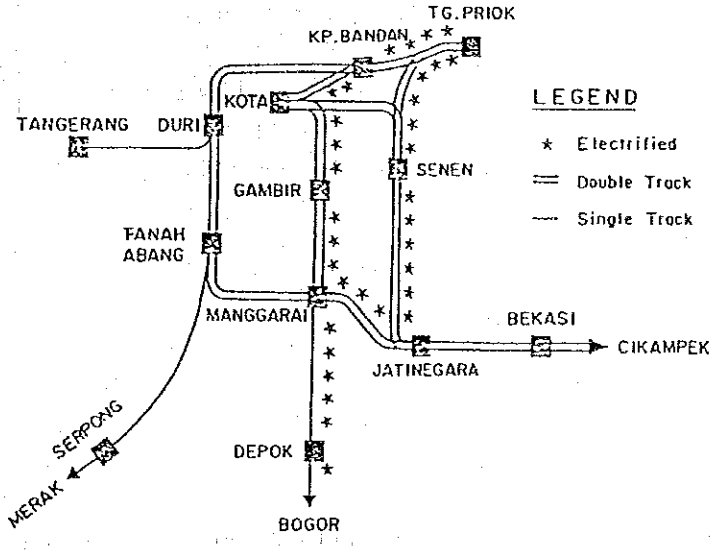
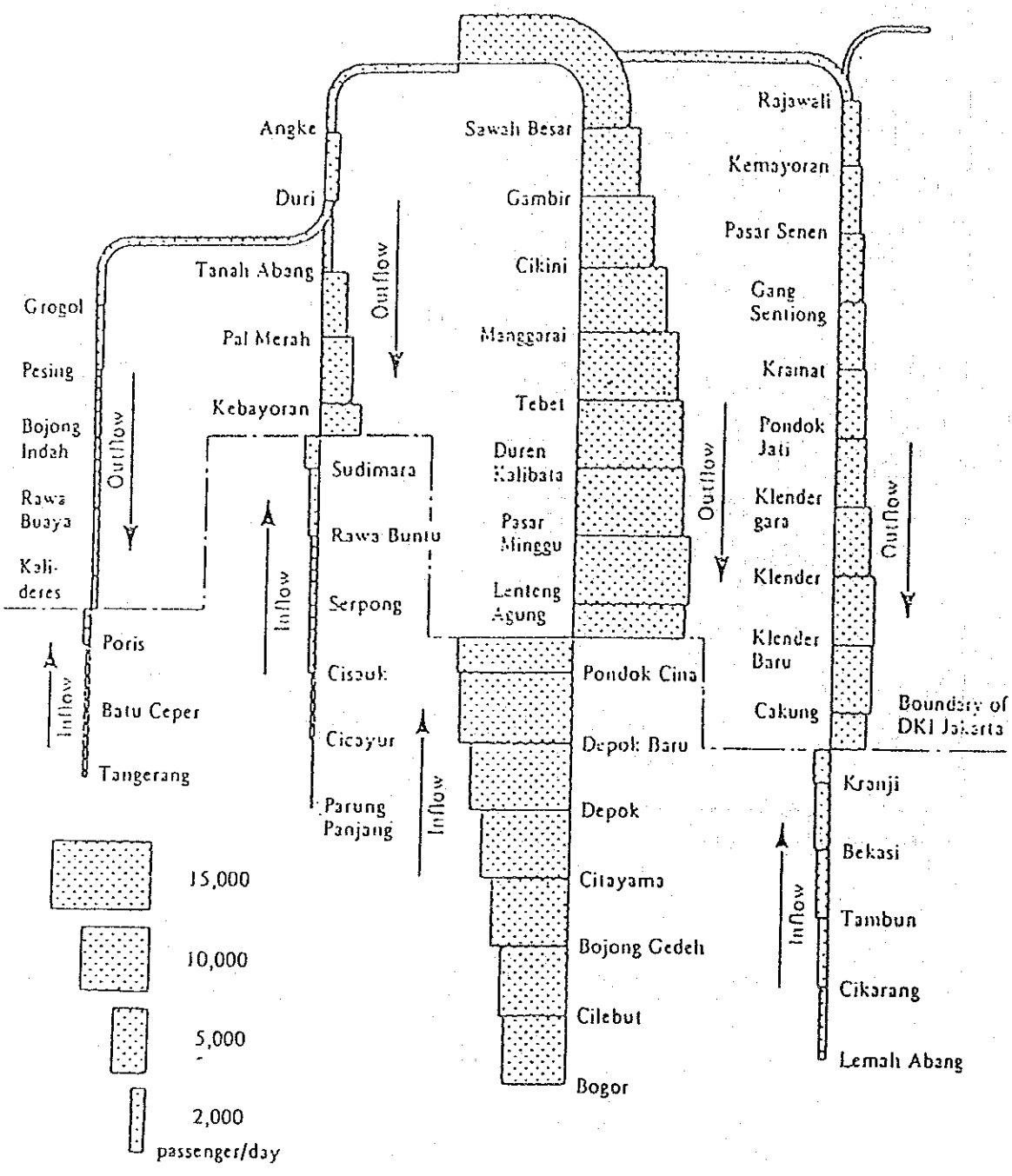


Fig. 1.5.10 EXISTING RAILWAY NETWORK IN JAKARTA METROPOLITAN AREA



Number of JABOTABEK Train Passengers by Section

Source: ARSDS Railway Survey, 1986

TRAFFIC COUNT SURVEY RESUTLS

IN 1988

FIG. 4.14 JAKARTA OUTER RING ROAD

LOCATION FOR VEHICLE MIX ANALYSIS

TABLE 4.3 1988 DAILY TRAFFIC VOLUME AND COMPOSITION, STUDY AREA ROAD NETWORK (1)

VEHICLE TYPES AND PERCENTAGES (1)

Area	Location (2)	Private Vehicle				Public Vehicle			Bus				Truck			Grand Total
		Motor Cycle	Sedan	Van	Sub-Total	Taxi	Bajaj	Sub-Total	Small Bus	Medium Bus	Large Bus	Sub-Total	Small Truck	Large Truck	Sub-Total	
I. Outer Ring Road Corridor	1	17617	12796	5789	18585	2417	0	2417	3123	2742	2453	8318	12311	5812	18123	65060
		27.10%	19.70%	8.90%	28.60%	3.70%	0.00%	3.70%	4.80%	4.20%	3.80%	12.80%	18.90%	8.90%	27.90%	100.00%
	2	0	5366	1834	7200	55	0	55	6	27	664	697	2946	1851	4797	12749
		0.00%	42.10%	14.40%	56.50%	0.40%	0.00%	0.40%	0.00%	0.20%	5.20%	5.50%	23.10%	14.50%	37.60%	100.00%
	3	11186	4023	3055	7078	813	0	813	3725	3197	38	6960	2804	191	2995	29032
		38.50%	13.90%	10.50%	24.40%	2.80%	0.00%	2.80%	12.80%	11.00%	0.10%	24.00%	9.70%	0.70%	10.30%	100.00%
	4	4641	1365	1154	2519	231	0	231	1870	269	11	2150	863	37	900	10441
		44.40%	13.10%	11.10%	24.10%	2.20%	0.00%	2.20%	17.90%	2.60%	0.10%	20.60%	8.30%	0.40%	8.60%	100.00%
	5	4000	3164	2010	5174	311	0	311	86	1127	11	1224	1860	70	1930	12639
		31.60%	25.00%	15.90%	40.90%	2.50%	0.00%	2.50%	0.70%	8.90%	0.10%	9.70%	14.70%	0.60%	15.30%	100.00%
	6	11176	9894	5986	15880	823	0	823	4512	1305	599	6416	6308	493	6801	41096
		27.20%	24.10%	14.60%	38.60%	2.00%	0.00%	2.00%	11.00%	3.20%	1.50%	15.60%	15.30%	1.20%	16.50%	100.00%
	7	8266	12674	4936	17610	1071	0	1071	57	725	386	1168	3207	123	3330	31445
		26.30%	40.30%	15.70%	56.00%	3.40%	0.00%	3.40%	0.20%	2.30%	1.20%	3.70%	10.20%	0.40%	10.60%	100.00%
	8	5768	8956	3250	12206	1588	0	1588	245	2324	270	2839	2396	75	2471	24872
		23.20%	36.00%	13.10%	49.10%	6.40%	0.00%	6.40%	1.00%	9.30%	1.10%	11.40%	9.60%	0.30%	9.90%	100.00%
	9	5971	17807	4925	22732	1201	0	1201	8	1212	150	1370	4178	216	4394	35668
		16.70%	49.90%	13.80%	63.70%	3.40%	0.00%	3.40%	0.00%	3.40%	0.40%	3.80%	11.70%	0.60%	12.30%	100.00%
	10	6462	6998	3285	10283	1062	0	1062	864	1627	154	2645	2092	224	2316	22768
		28.40%	30.70%	14.40%	45.20%	4.70%	0.00%	4.70%	3.80%	7.10%	0.70%	11.60%	9.20%	1.00%	10.20%	100.00%
	11	5256	5630	2408	8038	837	0	837	4310	1019	49	5378	1894	223	2117	21626
		24.30%	26.00%	11.10%	37.20%	3.90%	0.00%	3.90%	19.90%	4.70%	0.20%	24.90%	8.80%	1.00%	9.80%	100.00%
	12	3277	5359	2284	7643	135	0	135	58	178	34	270	1874	187	2061	13386
		24.50%	40.00%	17.10%	57.10%	1.00%	0.00%	1.00%	0.40%	1.30%	0.30%	2.00%	14.00%	1.40%	15.40%	100.00%
	13	13346	6705	5488	12193	818	0	818	14117	3847	1390	19354	6093	1905	7998	53709
		24.80%	12.50%	10.20%	22.70%	1.50%	0.00%	1.50%	26.30%	7.20%	2.60%	36.00%	11.30%	3.50%	14.90%	100.00%
	14	0	12631	4008	16639	125	0	125	68	191	1753	2012	5381	2978	8359	27135
		0.00%	46.50%	14.80%	61.30%	0.50%	0.00%	0.50%	0.30%	0.70%	6.50%	7.40%	19.80%	11.00%	30.80%	100.00%
	15	8173	4884	3650	8534	513	0	513	8130	180	34	8344	2655	202	2857	28421
		28.80%	17.20%	12.80%	30.00%	1.80%	0.00%	1.80%	28.60%	0.60%	0.10%	29.40%	9.30%	0.70%	10.10%	100.00%
	16	0	5091	1938	7029	92	0	92	6	34	604	644	2518	1201	3719	11484
		0.00%	44.30%	16.90%	61.20%	0.80%	0.00%	0.80%	0.10%	0.30%	5.30%	5.60%	21.90%	10.50%	32.40%	100.00%
	17	9663	2695	4282	6977	248	0	248	2400	2530	1913	6843	4242	321	4563	28294
		34.20%	9.50%	15.10%	24.70%	0.90%	0.00%	0.90%	8.50%	8.90%	6.80%	24.20%	15.00%	1.10%	16.10%	100.00%
	18	3504	1607	1160	2767	139	0	139	486	99	406	991	2778	3352	6130	13531
		25.90%	11.90%	8.60%	20.40%	1.00%	0.00%	1.00%	3.60%	0.70%	3.00%	7.30%	20.50%	24.80%	45.30%	100.00%
	19	3159	1457	2000	3547	128	0	128	1968	1006	296	3270	2705	3558	6263	16367
		19.30%	8.90%	12.80%	21.70%	0.80%	0.00%	0.80%	12.00%	6.10%	1.80%	20.00%	16.50%	21.70%	38.30%	100.00%

TABLE 4.3 1988 DAILY TRAFFIC VOLUME AND COMPOSITION, STUDY AREA ROAD NETWORK (2)

VEHICLE TYPES AND PERCENTAGES (1)

Area	Location (2)	Private Vehicle				Public Vehicle			Bus				Truck			Grand Total
		Motor Cycle	Sedan	Van	Sub-Total	Taxi	Bajaj	Sub-Total	Small Bus	Medium Bus	Large Bus	Sub-Total	Small Truck	Large Truck	Sub-Total	
II. Inside Outer Ring Road	20	18211	13678	6309	19987	2421	0	2421	3570	535	766	4871	7774	7115	14889	60379
		30.20%	22.70%	10.40%	33.10%	4.00%	0.00%	4.00%	5.90%	0.90%	1.30%	8.10%	12.90%	11.80%	24.70%	100.00%
	21	9497	7660	2713	10373	828	0	828	2827	60	451	3338	5586	5677	11263	35299
		26.90%	21.70%	7.70%	29.40%	2.30%	0.00%	2.30%	8.00%	0.20%	1.30%	9.50%	15.80%	16.10%	31.90%	100.00%
	22	5630	13875	4222	18098	2178	3322	5500	237	203	1106	1546	4824	877	5701	36475
		15.40%	38.00%	11.60%	49.60%	6.00%	9.10%	15.10%	0.60%	0.60%	3.00%	4.20%	13.20%	2.40%	15.60%	100.00%
	23	23792	15584	6485	22069	2416	2484	4900	773	2307	2595	5675	11365	2741	14106	70542
		33.70%	22.10%	9.20%	31.30%	3.40%	3.50%	6.90%	1.10%	3.30%	3.70%	8.00%	16.10%	3.90%	20.00%	100.00%
	24	23330	34209	10412	44621	4093	11568	15661	2897	2207	1889	7083	13602	2384	15986	106661
		21.90%	32.10%	9.80%	41.80%	3.80%	10.80%	14.70%	2.70%	2.20%	1.80%	6.60%	12.80%	2.20%	15.00%	100.00%
	25	34899	56459	16562	73021	7966	0	7966	231	996	4492	5719	18696	4465	23161	144766
		24.10%	39.00%	11.40%	50.40%	5.50%	0.00%	5.50%	0.20%	0.70%	3.10%	4.00%	12.90%	3.10%	16.00%	100.00%
	26	28653	54923	15514	70437	8127	0	8127	248	726	3876	4850	17059	4627	21686	133753
		21.40%	41.10%	11.60%	52.70%	6.10%	0.00%	6.10%	0.20%	0.50%	2.90%	3.60%	12.80%	3.50%	16.20%	100.00%
	27	35021	62833	19556	82391	8842	0	8842	208	570	3662	4440	13949	4085	18034	148728
		23.50%	42.20%	13.20%	55.40%	5.90%	0.00%	5.90%	0.10%	0.40%	2.50%	3.00%	9.40%	2.70%	12.10%	100.00%
	28	29017	78199	19567	97766	10499	0	10499	359	1323	4485	6167	8815	372	9187	152626
		19.00%	51.20%	12.80%	64.10%	6.90%	0.00%	6.90%	0.20%	0.90%	2.90%	4.00%	5.80%	0.20%	6.00%	100.00%
	29	27935	65106	21575	86681	8140	0	8140	286	2862	3517	6665	13295	4147	17442	146863
		19.00%	44.30%	14.70%	59.00%	5.50%	0.00%	5.50%	0.20%	1.90%	2.40%	4.50%	9.10%	2.80%	11.90%	100.00%
	30	33275	95888	24996	120884	13567	0	13567	385	2431	4360	7176	11801	718	12519	187421
		17.80%	51.20%	13.30%	64.50%	7.20%	0.00%	7.20%	0.20%	1.30%	2.30%	3.80%	6.30%	0.40%	6.70%	100.00%
	31	22818	32562	10788	43350	4675	0	4675	0	1861	1041	2902	4741	453	5194	78969
		28.90%	41.20%	13.70%	54.90%	5.90%	0.00%	5.90%	0.00%	2.40%	1.30%	3.70%	6.00%	0.60%	6.60%	100.00%
	32	16771	23697	8298	31995	4026	1865	5891	267	4074	125	4466	4769	608	5377	64500
		26.00%	36.70%	12.90%	49.60%	6.20%	2.90%	9.10%	0.40%	6.30%	0.20%	6.90%	7.40%	0.90%	8.30%	100.00%
	33	36945	81961	23989	105950	10648	0	10648	197	2843	7080	10120	15318	3284	18602	182265
		20.30%	45.00%	13.20%	58.10%	5.80%	0.00%	5.80%	0.10%	1.60%	3.90%	5.60%	8.40%	1.80%	10.20%	100.00%
	34	27227	27318	11785	39103	4511	1390	5901	11610	765	2919	15294	10242	503	10745	98270
		27.70%	27.80%	12.00%	39.80%	4.60%	1.40%	6.00%	11.80%	0.80%	3.00%	15.60%	10.40%	0.50%	10.90%	100.00%
	35	26808	23324	9432	32756	4034	1390	5424	13729	2316	2336	18381	9296	435	9731	93100
		28.80%	25.10%	10.10%	35.20%	4.30%	1.50%	5.80%	14.70%	2.50%	2.50%	19.70%	10.00%	0.50%	10.50%	100.00%
	36	18905	56445	21564	78009	5640	0	5640	2445	2937	6669	12051	17538	4796	22334	137029
		13.90%	41.20%	15.70%	56.90%	4.10%	0.00%	4.10%	1.80%	2.10%	4.90%	8.80%	12.80%	3.50%	16.30%	100.00%
	37	24730	32232	12494	44726	5025	0	5025	5198	3005	6459	14662	14337	5133	19470	108613
		22.80%	29.70%	11.50%	41.20%	4.60%	0.00%	4.60%	4.80%	2.80%	5.90%	13.50%	13.20%	4.70%	17.90%	100.00%
	38	3	14215	4837	19052	483	0	483	29	42	682	753	3978	1363	5341	25632
		0.00%	55.50%	18.90%	74.30%	1.90%	0.00%	1.90%	0.10%	0.20%	2.70%	2.90%	15.50%	5.30%	20.80%	100.00%
	39	15501	26507	10261	36768	3310	0	3310	251	183	2923	3357	9804	3715	13519	72455
		21.40%	36.60%	14.20%	50.70%	4.60%	0.00%	4.60%	0.30%	0.30%	4.00%	4.60%	13.50%	5.10%	18.70%	100.00%
	40	19688	17151	8586	25737	2466	6780	9246	5796	2937	1845	10578	7493	1674	9167	74416
		26.50%	23.00%	11.50%	34.60%	3.30%	9.10%	12.40%	7.80%	3.90%	2.50%	14.20%	10.10%	2.20%	12.30%	100.00%

TABLE 4.3 1988 DAILY TRAFFIC VOLUME AND COMPOSITION, STUDY AREA ROAD NETWORK (3)

VEHICLE TYPES AND PERCENTAGES (1)

Area	Location (2)	Private Vehicle				Public Vehicle			Bus				Truck			Grand Total
		Motor Cycle	Sedan	Van	Sub-Total	Taxi	Bajaj	Sub-Total	Small Bus	Medium Bus	Large Bus	Sub-Total	Small Truck	Large Truck	Sub-Total	
II. (cont'd)																
Inside	41	19122	26601	10626	37227	3482	841	4323	1594	2329	3798	7721	12351	4785	17136	85529
Outer Ring		22.40%	31.10%	12.40%	43.50%	4.10%	1.00%	5.10%	1.90%	2.70%	4.40%	9.00%	14.40%	5.60%	20.00%	100.00%
Road	42	15843	12184	6404	18588	2580	8394	10974	4697	4138	976	9811	4258	436	4724	59940
		26.40%	20.30%	10.70%	31.00%	4.30%	14.00%	18.30%	7.80%	6.90%	1.60%	16.40%	7.20%	0.70%	7.90%	100.00%
	43	24732	22442	11370	33812	4013	0	4013	673	1636	2344	4653	9581	5730	15311	82521
		30.00%	27.20%	13.80%	41.00%	4.90%	0.00%	4.90%	0.80%	2.00%	2.80%	5.60%	11.60%	6.90%	18.60%	100.00%
	44	19321	18086	8925	27011	3621	0	3621	292	761	3333	4386	9101	3007	12108	66447
		29.10%	27.20%	13.40%	40.70%	5.40%	0.00%	5.40%	0.40%	1.10%	5.00%	6.60%	13.70%	4.50%	18.20%	100.00%
	45	19299	21456	10329	31785	3570	0	3570	542	1328	2868	4738	8153	3381	11534	70926
		27.20%	30.30%	14.60%	44.80%	5.00%	0.00%	5.00%	0.80%	1.90%	4.00%	6.70%	11.50%	4.80%	16.30%	100.00%
	46	24406	28562	13558	42120	5710	0	5710	457	2725	4801	7983	10601	2112	12713	92932
		26.30%	30.70%	14.60%	45.30%	6.10%	0.00%	6.10%	0.50%	2.90%	5.20%	8.60%	11.40%	2.30%	13.70%	100.00%
	47	23542	19964	10086	30050	3870	0	3870	747	1591	2236	4574	9228	6551	15779	77815
		30.30%	25.70%	13.00%	38.60%	5.00%	0.00%	5.00%	1.00%	2.00%	2.90%	5.90%	11.90%	8.40%	20.30%	100.00%
	48	6179	6576	2514	9090	615	0	615	56	459	81	596	3903	2510	6413	22893
		27.00%	28.70%	11.00%	39.70%	2.70%	0.00%	2.70%	0.20%	2.00%	0.40%	2.60%	17.00%	11.00%	28.00%	100.00%
	49	62785	54782	14414	69196	12311	0	12311	13074	294	3044	16412	13355	233	13588	174292
		36.00%	31.40%	8.30%	39.70%	7.10%	0.00%	7.10%	7.50%	0.20%	1.70%	9.40%	7.70%	0.10%	7.80%	100.00%
	50	29077	44657	15090	58547	6614	2	6616	2125	163	2192	4480	6114	463	6577	105297
		27.60%	42.40%	13.20%	55.60%	6.30%	0.00%	6.30%	2.00%	0.20%	2.10%	4.30%	5.80%	0.40%	6.20%	100.00%
	51	30780	69096	20322	89418	10598	0	10598	28	2238	3879	6145	9469	187	9656	146597
		21.00%	47.10%	13.90%	61.00%	7.20%	0.00%	7.20%	0.00%	1.50%	2.60%	4.20%	6.50%	0.10%	6.60%	100.00%
	52	20768	42723	12189	54912	5769	3	5772	0	1518	1005	2523	4161	148	4309	88284
		23.50%	48.40%	13.80%	62.20%	6.50%	0.00%	6.50%	0.00%	1.70%	1.10%	2.90%	4.70%	0.20%	4.90%	100.00%
	53	10262	5754	2564	8318	904	6697	7601	13	34	4	51	1229	34	1263	27495
		37.30%	20.90%	9.30%	30.30%	3.30%	24.40%	27.60%	0.00%	0.10%	0.00%	0.20%	4.50%	0.10%	4.60%	100.00%
	54	32192	32022	15445	47467	6925	8114	15039	5767	700	3208	10675	8572	394	8966	114339
		28.20%	28.00%	13.50%	41.50%	6.10%	7.10%	13.20%	5.90%	0.60%	2.80%	9.30%	7.50%	0.30%	7.80%	100.00%
	55	44059	36093	20050	56143	7316	16995	24311	3589	1209	4431	9229	10503	560	11063	144805
		30.40%	24.90%	13.80%	38.80%	5.10%	11.70%	16.80%	2.50%	0.80%	3.10%	6.40%	7.30%	0.40%	7.60%	100.00%

Note: (1) Initial row per location includes 24 hour volume in both directions of travel (Source: PCI, 1988)
(2) Refer to Figure

TABLE 4.6 ROADWAY ACCIDENT INCIDENCE AND SEVERITY, DKI JAKARTA

YEAR	NUMBER OF ACCIDENTS	SEVERITY		
		Fatalities	Serious Injuries	Minor Injuries
1979	6616	456	2661	1878
1980	6553	455	2997	2303
1981	6991	662	1840	2828
1982	5865	554	1569	2612
1983	6739	466	2242	2531
1984	6388	479	2222	3508
1985	N.A	480	1872	2983
1986	5124	458	1842	2439

Source : "Jakarta in Figures", annual Publication, Jakarta Statistical Office and Polisi Lalu Lintas

TABLE 4.7 1983/84 ACCIDENT INVOLVEMENT BY VEHICLE TYPE, DKI JAKARTA

VEHICLE TYPE	REGISTERED VEHICLES	ACCIDENT INVOLVEMENT	ACCIDENTS/ VEHICLES RATIO
Motorcycle	628414	2833	1:222
Sedan	283209	2642	1:107
Pick-up/Truck	128859	1733	1:74
Bus			
Minibus	53812	784	1:70
Metromini	2163	303	1:7
Mikrolet	1756	161	1:10
Bis Kota	1723	518	1:3

Source : "Jakarta Urban Transport Project", by Colin Buchanan and Partners, 1986