

る。またインドネシア側は、環境管理庁(BAPEDAL)と東ジャワ州政府が確立する有害廃棄物管理システムとスラバヤ市が確立する都市廃棄物管理システムの連携のあり方についても提言がなされることを希望しているので、この点への配慮も必要である(M/M I-5 項参照)。

## 5-2 調査実施上の留意点

### (1) 調査対象地域

M/Pの目標年である西暦2010年には、スラバヤ市の境界を越えて都市化が進むと予測される。従って、基礎調査はスラバヤ市並びにその周辺の都市化区域を対象に行う。しかしながらM/Pは、スラバヤ市清掃事業のM/Pであることから、収集、街路清掃についてはスラバヤ市の行政区域のみを対象として検討することとする。ただし、最終処分については、処分地がスラバヤ市の外になる場合にはそこに搬入される他都市のごみ量も考慮するものとする。このこととの関連で、Gresik, Bangkalan, Mojokerto, Surabaya, Sidoarjo, Lamonganの6都市からなるGREBANGKERTOSUSILA広域都市圏構想にしかるべき考慮を払うこととする。

### (2) 共同調査

M/P調査は、その提言が実施されてこそ意味を持つが、M/Pが実施されるためには、まず現地の実情に即した現実的な計画である必要がある。そのためには、調査へのインドネシア側(チプタカリヤ並びにスラバヤ市)の全面参加を得て共同調査として実施することにより、現地事情に適合した結論を導き出し、またイ側カウンターパートに対するOJTの機会となるとともに調査の内容・提言に対するイ側の自信を深めることにもなり、よりスムーズなM/Pの実施につながる。

この観点からは特にスラバヤ市当局の調査への巻き込みが重要で、中央政府(チプタカリヤ)から言われたので調査に協力するという受け身の姿勢をどこまで打ち破れるかが本格調査の成否を握る鍵となる。幸いにもスラバヤ市は、1988, 1989, 1990年と3年続けてクリーンシティ表彰制度(ADIPURA)による表彰を受けており、今後ともこの表彰を受けるのだという意気込みが市当局にも市民にもある。従って本格調査団には、スラバヤ市の清掃事業へのこのような積極姿勢を活用して、市のプレステージの維持、向上にJICA調査が貢献し得るのだとの理解を市当局者に、ことあるごとに植え付けるように努めることが求められる。

なおチプタカリヤには、四阿秀雄専門家(東京都清掃局出身)が廃棄物分野のJICA派遣個別専門家として勤務しており、今回の事前調査は同専門家の強力な支援・協力を得て成功裏に実施することができた。本格調査段階においても、イ側と有効な共同調査

体制を組むには同専門家の全面的支援が欠かせない。このためには本格調査団は、調査の進捗状況や計画について適宜同専門家に報告し、その上でアドバイスを得ることが求められる。

### (3) ローカルコンサルタントの活用

インドネシアには既にごみ分野のローカルコンサルタントが複数で存在し、チブタカリヤのごみ管理ガイドラインの策定、世銀プロジェクトのプレアプレーザル用の報告書や事後評価用の報告書の作成等に從事している。これらのローカルコンサルタントはインドネシアの社会・経済条件に通じており、また世銀協力の今までの経過にも詳しいことから、本格調査では積極的に活用することが望まれる。またそれは、チブタカリヤがスラバヤM/P調査をモデル調査と位置づけ、他の都市にもM/Pアプローチを広げていく計画があることから、それを担うローカルコンサルタントのOJTともなり望ましい。

### (4) 既存プロジェクトとのすり合わせ

世銀はスラバヤ、スマラン、スラカルタ（ソロ）、ウジュンパンダンの4都市を対象にUrban-III, Urban-Vとごみ管理改善を含む都市インフラの整備について10年以上にわたって資金協力を行ってきた実績がある。またスラバヤ市に関しては、世銀はその次ぎの段階のIUIDP（総合都市インフラ整備プロジェクト、詳しくは3-1-4節参照のこと）に引き続き協力する予定であり、イ側は1991年4月末の世銀プレアプレーザルミッションの訪イに備えて、廃棄物セクターのプレアプレーザル用報告書をローカルコンサルタントを使用して作成済みである。

このようにスラバヤ市では、過去においてもまた今後も世銀の協力があることから、世銀協力の一連の経過・成果と今後の展望を的確に把握しておく必要があり、このためには前項で指摘したように世銀プロジェクトに関与したローカルコンサルタントの活用が検討に値する。また、彼らが用意した廃棄物セクターのプレアプレーザル用報告書は、世銀のコンサルタントの指導を得ていることもあって内容的にかなりの水準にある。本格調査団たらんとする本邦コンサルタントには、この報告書を事前に十分検討の上、取り込むべき所は取り込んでプロポーザルを作成することが求められる。

ただし、この報告書は既にスラバヤに200トン/日の焼却炉が建設され、9年間にわたる共同運転の契約が建設者である民間企業とスラバヤ市との間で結ばれているという現実を無視している大きな難点がある。Material Flowとしてはゴミ量で200トン/日、Cash Flowとしては毎年契約に基づく民間業者への支払が38.26億ルピアあり、これ無視した計画は非現実的である。従って本格調査では、これらの条件は所与の前提として取り込んでいく必要があろう。

世銀ジャカルタ事務所の担当者のフェルナンド氏によれば、世銀が考えているのは、

差し当たってIUIDPの廃棄物セクタープロジェクトの1992～94年の短期の融資である。従って、2010年を目標年次とするマスタープランの策定と優先プロジェクトのF/Sの実施を二大眼目とするJICA開発調査とは、大筋では重複しないと考えられる。しかしながら、IUIDPスラバヤの廃棄物セクタープロジェクトの推移は本件調査にとって大いに注視すべきものであり、本格調査団あるいは作業管理委員会はジャカルタの世銀オフィスの担当者とも適宜情報交換を行うことが望ましい。また、IUIDPスラバヤの廃棄物セクタープロジェクトの今後の推移には、世銀のみならずインドネシア側の援助の窓口のBAPPENASの考えも大きく影響するので、その意向を適宜把握することも重要である。さらには本件開発調査のF/S案件の実施の局面では、円借款を資金ソースとする場合も考えられるところから、OECDインドネシア事務所との情報交換も求められてこよう。

#### (5) インドネシアの他都市の経験の活用

わが国の経験や他の途上国の経験を適用する前に、社会経済条件の類似するインドネシアの他の都市の経験の活用を第一に考えるべきである。清掃事業において傑出したところがあるとされるインドネシアの都市としては、チプタカリヤは特にバンドン（清掃公社の設立、衛生埋め立ての実施において見るべきものがあるとされている。アジア開発銀行とフランスが協力している）、メダン（清掃公社の設立と機材整備システムの強化で見るべきものがあるとされている）の2都市をあげている。なおスラバヤは、住民参加、料金徴収、民間委託の点で先進都市であるとされている。

#### (6) SWMの社会的側面の重視

インドネシアの都市清掃事業は、ハンドカートによる1次収集をRT,RWなどのコミュニティ組織が行い、市内に多数設置された小規模の積み替え基地で積み替え、そこから先の輸送、最終処分を清掃局あるいは清掃公社（バンドン、メダンの組合）が行うという点に大きな特色があり、世銀に融資を求めるべく準備されたIUIDPのプレアブレーザル用報告書でも、短期的にはこのシステムの拡充強化に力点を置いている。しかしながらM/Pの目標年を2010年に置くと、特に高所得層・中所得層の居住地域において、このシステムが目標年においても最もcost-effectiveであり続けるかどうかは疑問なしとしない。この点についてはSWMの社会的側面からの検討が重要で、インドネシア経済の発展の見通し、都市住民の意識の変化、コミュニティ組織の変質等についての検討を踏まえつつ時代の変化に対応したSWMシステムの改善・発展方向を提示していく必要がある。

スラバヤ市の清掃事業改善のM/Pで、あと1つ目玉となるのが既設オープンダンピング埋立地の衛生埋立地化、新規の衛生埋立地の開設であるが、ここでもスキャベン

ジャーをいかに取り扱うかという社会的側面への配慮が欠かせない。本件調査に先行するJICA開発調査として実施されたジャカルタ市都市廃棄物整備計画調査の場合、その提案したブカシ埋め立て地の円借款による建設がスキャベンジャーの問題で遅れ気味であるので、本件調査ではその経験に学びつつ現実的な段階的衛生埋立化策の策定に努めることとする。なおスキャベンジャー問題は、政治的に微妙な問題であるからその取り扱いには慎重を期する必要がある、まずスラバヤ市当局のスキャベンジャー対策の基本方針を理解した上で、彼らをサポートする形で対策案の詳細をつめることとし、対策案の確定と対策の実施はあくまでもスラバヤ市当局の責任において行わせることが重要である。スラバヤ市清掃局は、スキャベンジャーの登録、名簿作成、組合結成の促進、研修計画の検討など、スキャベンジャーとのコミュニケーションを良くする努力を重ねてきている。従って本格調査団には、こうしたスラバヤ市清掃局の一連の取り組みの経緯を十分に踏まえ、インドネシア社会の現実に応じた実施可能な提案を行うことが求められる。

#### (7) 焼却プラントの取り扱い

フランスとインドネシアの合併企業P.T. Unicomindo Perdanaにより200t/dの焼却炉がKuplih最終処分場に完成し、1991年3月13日より試運転を開始している。今まで再三にわたってジャカルタ市で焼却炉の導入が検討され、例えば日本の無償資金協力で焼却炉(100t/d)が建設されたとしても、OM費の負担がおぼつかないということで時期尚早と見送られたなどの経緯があることを考えると、スラバヤ市でのこの焼却炉の導入は唐突であり、科学技術応用庁(BPPT)大臣やスラバヤ市長などのトップの政治判断が強く働いているとの感が否めない。

従ってこのプラントについては、技術面、2次公害面、財政面、制度面から本格調査団も独自に検討を行う必要があるものの、その結果の取り扱いには慎重を期する必要がある。具体的には、M/MのⅡ項で示す事前調査団のこの点についての考え方をひとつの参考にしながら、インセプションレポート協議、インテリムレポート協議等の節目節目のイ側(特にスラバヤ市)との協議の場でこの点について意見交換を積み重ね、合意形成を行っていくことが求められる。

日本の経験から判断すると、ごみ質等その国の条件にあった焼却技術の開発には少なくとも10年の試行錯誤の過程が不可避であり、スラバヤ市にはその位の時間がかかることを覚悟の上で、BPPTの技術アドバイス\*を受けながら、民間企業とこの焼却炉を共同運営していくことが勧められる(現在の契約では9年間の共同運営となっている)。従ってM/Pでは、200t/dのごみ量は焼却炉に振り向けるものの、その他のごみは基本的に埋立法によって処分することとし、処分法を現行のオープンダンピング法から衛生

埋立法に段階的に変えていくこととする\*\*。焼却技術の導入が成功し、技術的にも財政的にもその実施可能性が検証された暁にはM/Pの枠組を修正すればよく、その修正は比較的容易に行い得る。また万一、この200t/d炉が稼働しない事態が生じた場合には、200t/dの余剰ごみを埋立地に振り向ければ容易に受け入れられる。従って、本格調査団が策定するM/Pは今後の事態の進展に柔軟に対応し得るものである。

\* 焼却炉の建設着手後にスラバヤ市はBPPTに技術指導を求め、BPPTはこれに応じて運転維持管理面、環境面での調査を行い1991年1月に報告書を取りまとめている。また今後2年間、引き続き技術指導を行っていく計画をもっている。従って、本格調査団はチプタカリヤやスラバヤ市を通じて正式な手続きをとり、BPPTにアプローチしてこのような調査の成果を入手するとともに、わが方の調査結果等についても適宜BPPTに知らせていく必要がある。

\*\*第1号焼却工場が既に建設されていることから、2010年を目標とするマスタープランでは、①第1号焼却工場の運転維持管理を通じて焼却技術の導入を気長に腰を据えて行うこととし、当面200トン/日以外のゴミは衛生埋立法で対処するというオルタナティブのほかに、②第2号、第3号の焼却工場の建設を行うオルタナティブも設定し、両者の利害損失を検討の上、より妥当なオルタナティブを選択する（場合によっては修正オルタナティブとする）ことが求められよう。M/MのⅡ項は、①、②案を比較検討すればおそらく①案が望ましいという結論が出ることになるだろうという事前調査団の意見を述べたものである。

この炉は、環境面から見ると、既にEIA文書が東ジャワ州EIA委員会に提出され、そこでの審査をパスしている。しかし、2次公害対策の施設がゼロであることから、将来問題が生じないと言い切ることは難しい。とは言うものの、これは途上国向きの低コスト焼却技術開発の一過程としてとらえるべき側面もあり、日本の焼却技術の現在の水準に照らして云々することは避けるべきであろう。しかしながら財政面、制度面からは、この第1号焼却工場のみについてみても、そのフィージビリティにはなお多くの疑問があり、スラバヤ市とP.T. Unicomindo Perdanaとの間の契約内容の詳細にまでわたる検討が必要である。

スラバヤ市清掃局によれば、9年間の共同運営の期間中、スラバヤ市は民間企業側に投資コストの償還分として33億ルピア、OM費分として5.26億ルピア、毎年合計で38.26億ルピアを支払う契約になっており、それ以後施設はスラバヤ市清掃局のものとなり、運営も同市単独でなされるようになるとのことである。この焼却炉の建設コストは200億ルピア（16億円、トン当たり800万円）とされており、民間企業が20%の利率のルピ

ア建て市中銀行の融資を利用し、9年の割賦償還をすれば投資コストの償還のみで毎年50億ルピアを必要とする。これにOM費を加えれば毎年60億ルピア以上を支払う必要があり、スラバヤ市清掃局が示す数字とは大幅な食い違いがある。契約内容の詳細にまで立ち入って検討する必要がある所以である。民間企業への支払いが、スラバヤ市清掃局の言うとおりの毎年40億ルピア弱にとどまるとしても、この額は現在の清掃局の予算規模40億ルピアに匹敵する額であり、徴収すべきごみ料金は倍増する。合計80億ルピア/年のごみ料金の徴収が、同市が言うように現行の水道料金にオンしたごみ料金徴収システム（現在毎年40億ルピアを徴収）を、電気料金にオンしたそれに変更することによって徴収可能であるとしても、市が税金・料金等の形で徴収し得る全財源からごみサービスへの割り振りを倍増させる（5%から10%へ）ことが、財政資源配分上問題ないかどうかという点の検討が必要であろう。

なおスラバヤ市清掃局は、スラバヤ工科大学(ITS)と共同で小規模積み替え基地設置用の小規模焼却炉を開発中である。この小規模焼却炉の目的は、発生源により近い所でのごみ減量化にあるとされているが、目的・開発状況ともに本格調査での検討が必要になる。

#### (8) 環境配慮

スラバヤ市の廃棄物管理の現状の環境的側面からの評価並びにM/P、F/Sで提案する廃棄物管理施設の環境面からの評価に当たっては、インドネシアの現行EIA制度を考慮するものとする。M/M I-9項に示すように、現状については既存のプロジェクトにかかるPEL、SELの手続きを考慮し、新規プロジェクト（現存施設の改善を含む）についてはPIL、ANDALの手続きを考慮する。

従って、4-2-2で述べたインドネシアのEIA制度に基づいて、M/P段階においては最終処分場以外の計画についてはPEL、PILを行い、SEL、ANDALのTORを作成する。最終処分場については、用地を選定したうえでANDALのTORを作成する。このTORは、チブタカリヤ（あるいは東ジャワ州政府）が中央（あるいは州）EIA委員会に提出して、F/Sに入る前に承認を得なければならない。

F/S、段階では承認されたTORに基づいてANDALを実施し、その結果はEIA委員会に提出されて承認を得なければならない。

#### (9) 用地選定

この種の調査で常に隘路となるのは用地選定であり、選定が遅れると本格調査の工程に対する影響が甚大である。そこで本格調査団は、今回事前調査団が入手した公共事業省最終処分地用地選定ガイドライン（インドネシア語）等を参考にしつつ、調査団として推奨する用地選定ガイドラインを事前に作成し、第1回現地調査の冒頭にスラバヤ市

清掃局に提示説明する必要がある。また同市の埋立地等の施設用地の確保状況を適宜確認し、相当前広（M/M I-8 項ではプログレスレポート(2)提出時を期限に設定）に用地選定を行うよう要請し、共同でこの選定作業を進めることが求められる。

#### (10) 技術移転セミナー

本格調査では次の3つの形でイ側に対する技術移転を進めることが可能である。まず第1は共同調査によるOJT、第2はカウンターパートの日本での研修、そして第3はセミナーの実施である。セミナーについては、第2回現地調査時にブカシ水道環境トレーニングセンター(BTC)で開催するごみ分析セミナーと、ドラフトファイナルレポート提出時にスラバヤで開催するセミナーの2つがイ側より要望された。ごみ分析セミナーの実施時期、方法については第1回現地調査時に本格調査団がBTCと協議する必要があるが、BTC配属のJICA専門家の支援を得ることが欠かせない。また本格調査でのごみ分析の一連の経過をビデオで撮影編集し、インドネシア語のナレーションを入れて研修用教材とすることも検討に値しよう。

### 5-3 実施作業の詳細

本格調査は、第一フェーズ調査（基本計画の策定）と第二フェーズ調査（優先プロジェクトのフィージビリティ調査）に分けられるが、その内容は以下のとおりである。

#### 〔1〕第一フェーズ

##### (1) 基礎調査

##### (1)-1 データ収集、既存資料レビュー、踏査

- 1) 第5次開発5ヶ年計画（廃棄物行政の位置付け）
- 2) 都市の自然条件（気象、地形、地質、等）
- 3) 社会・経済
- 4) 都市計画、土地利用
- 5) 交通
- 6) 法・制度
- 7) 市の財政状況
- 8) 既存プロジェクトの実施状況
- 9) 廃棄物処理事業の現状（排出、収集、運搬、処理、処分、道路清掃、運営・組織コンポスト、リサイクル）
- 10) 現在の廃棄物問題に関連する環境汚染
- 11) 現在の廃棄物問題の社会的インパクト
- 12) 衛生

#### (1)ー 2 現地調査

- 1) 廃棄物処理に関する住民意識
- 2) ごみ量, ごみ質
- 3) 最終処分場（既存及び新設）における地質, 水質, 土地利用
- 4) パイロットテストの準備
- 5) 環境影響予備調査

#### (2) 収集データの分析

- 1) 廃棄物処理の現状分析
- 2) 問題点の抽出
- 4) 問題点の分析

#### (3) M/P策定

- 1) 計画目標の設定
- 2) 代替案の設定（排出, 収集, 運搬, 処理, 処分, 運営・組織）
- 3) 代替案の評価（衛生, 技術, 経済, 社会, 組織, 環境・財務）
- 4) 最適案の選定
- 5) M/Pの実施計画
- 6) 優先プロジェクトの選定

#### 〔Ⅱ〕第二フェーズ調査

##### F/S（優先プロジェクト）

- 1) 事業内容のフレームワーク設定
- 2) 補足基礎調査（追加資料収集, 追加現地調査, パイロットテストの実施）
- 3) 事業内容の検討（技術検討, 施設概略設計, 必要な資機材検討, 運営計画, 人員計画, 事業費積算）
- 4) 環境影響評価
- 5) プロジェクト評価（経済, 社会, 環境, 組織, 財務）
- 6) 事業実施計画作成

#### 5ー 4 調査期間及び工程

本格調査の工程は, S/Wのスケジュールに沿って以下のとおりとする。

##### (1) 調査準備期間

調査開始後0.5ヶ月間で調査全体の実施方針を示すインセプションレポートを作成する。

##### (2) 第1次現地調査（3ヶ月）



基本計画策定のための基礎調査（資料収集、既存調査のレビュー、現地踏査・実測等）を行い、プログレスレポート(1)に取りまとめる。ごみ分析等の実測は乾期（または雨期）に対応する。また、F/S対象の優先プロジェクトを見極め、パイロットテストの準備をする。

(3) 第1次国内作業（3ヶ月）

第1次現地調査の結果に基づき分析作業を行う。問題点の抽出を行い、基本計画の骨子までをインテリムレポート(1)に取りまとめる。

(4) 第2次現地調査（1ヶ月）

雨期（または乾期）に対応するごみ分析等の実測を行い、結果をプログレスレポート(2)に取りまとめる。また、F/S対象の優先プロジェクトについてイ側と協議し、合意を取り付ける。

(5) 第2次国内作業（1ヶ月）

第1次国内作業の継続であるが、第2次現地調査の結果も加味し、基本計画をインテリムレポート(2)に取りまとめる。

(6) 第3次現地調査

インテリムレポート(2)を説明するとともに、優先プロジェクト、用地選定等の確認をして、F/Sに必要な現地調査を行う。またパイロットテストを実施する。結果は、プログレスレポート(3)に取りまとめる。

(7) 第3次国内調査

第3次現地調査の結果に基づき、優先プロジェクトのフィージビリティ分析を行う。また、基本計画とともに、結果を最終報告書（案）に取りまとめる。

(8) 最終報告書

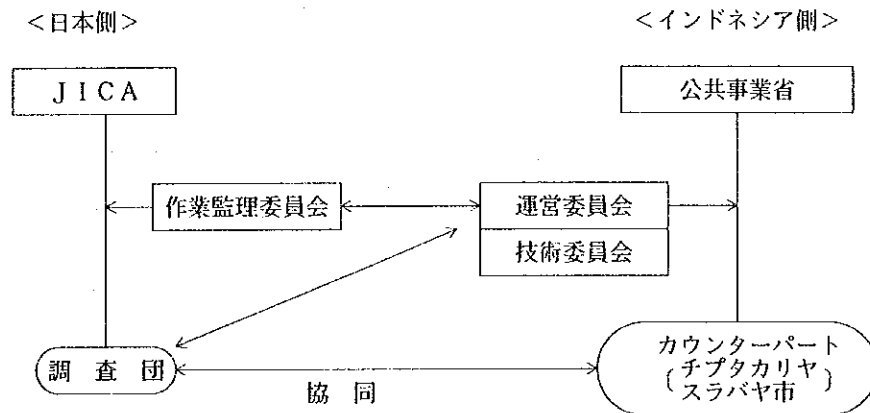
上記最終報告書（案）の現地説明・協議を経、イ側のコメントも加味して最終報告書を作成する。

## 5-5 調査の実施体制

本調査の実施に当たって、JICAは技術的諮問を行う作業監理委員会を設置する。

本調査に係るイ側の直接のカウンターパートは公共事業省都市住宅総局（チプタカリヤ）であるが、プロジェクトの実施はチプタカリヤ、その後の運営はスラバヤ市が行うことになっており、調査の段階から同市の参画が求められる。このため、カウンターパートチームはチプタカリヤ及びスラバヤ市の技術者が中心となり、同時にチプタカリヤは運営委員会(Steering Committee)及びこれを技術的な面で補佐する技術委員会(Technical Committee)を設置することになった。

従って、調査の実施体制は下図のようになる。



## 5-6 要員構成

本調査の実施に当たっては、概ね以下の専門分野の技術者から成る調査団の構成が必要である。

- ① 総括
- ② 収集・運搬
- ③ 中間処理
- ④ 最終処分
- ⑤ 社会・経済
- ⑥ 組織・制度
- ⑦ 機材管理
- ⑧ 環境評価
- ⑨ ごみ分析
- ⑩ 財務分析
- ⑪ 施設設計、積算

## 5-7 調査用資機材

調査に必要な機材及びその対応は以下のように考えられる。

(機材名)	(使用目的)	(対応)
ブルドーザー (D6)	衛生埋立実験	現地借上
台ばかり	ごみ質分析	日本から購送
乾燥機	〃	〃
ウィーレー粉砕機 (現場用)	〃	〃
元素分析計	〃	〃
ドラム型電気炉	〃	〃
分析用ガラス器具	〃	〃
分析用試薬	〃	〃
ボンブ熱量計	〃	水道・環境衛生訓練 センターにて借用
ケルダール窒素分解装置	〃	〃
ウィーレー粉砕機	〃	〃
マッフルロー電気炉	〃	〃
蒸留水製造装置	〃	〃
トラックスケール (ポータブル型)	ごみ量、運搬効率計測	現地購入 (または日本から購送)

## 5-8 相手国の便宜供与事項

チブタカリヤは本調査を遂行するため、JICAから派遣された調査団に対して必要な協力を行うことを約束したが (S/W第Ⅶ章)、便宜供与される事項の主なものは次のとおりである。

- (1) 調査に関係する利用可能なデータ及び情報
- (2) カウンターパート
- (3) 労務者
- (4) スラバヤ市内及びジャカルタ市内に調査団用の事務所
- (5) 身分証明書
- (6) 運転手付調査用車両

## 5 - 9 報告書の作成

(種類)	(提出時期)	(部数)
(1) Inception Report	第1次現地調査開始時	30
(2) Progress Report (1)	第1次現地調査終了時	30
(3) Interim Report (1)	第2次現地調査開始時	30
(4) Progress Report (2)	第2次現地調査終了時	30
(5) Interim Report (2)	第3次現地調査開始時	30
(6) Progress Report (3)	第3次現地調査終了時	30
(7) Draft Final Report	第3次現地調査終了後 3ヶ月以内	30
(8) Final Report	コメント受領後2ヶ月以内	60

報告書はいずれも英語で作成し、(5)、(6)、(7)についてはExecutive Summaryも作成する。



## 付 録

1. 表敬・訪問先, 面談者リスト
2. 要請書 (TOR)
3. Questionnaire
4. 締結済 Scope of Work
5. 締結済 Minutes of Meetings
6. 収集資料リスト



## 付録－ 1. 表敬・訪問先, 面談者リスト





表敬・訪問先、面談者リスト

日本大使館

一等書記官

中垣 俊郎

在スラバヤ日本総領事館

総領事

真鍋

領事

千葉

JICAインドネシア事務所

所長

北野 康夫

担当所員

熊代 輝義

OECDジャカルタ事務所

首席駐在員

影山 俊郎

駐在員

宮尾 百合子

世銀ジャカルタ事務所

Senior Operation officer

Mr. Elmo Fernando

国家開発企画庁(BAPPENAS)

Bureau of Social Welfare and Public Housing

Mr. Freddy H. Tulung

公共事業省人間居住総局 Direktorat General of Human Settlements(CIPTA KARYA),  
Ministry of Public Works

総局長 Director General Mr. Soenarjono Danoedjo

総局次官 Secretary of Director General

Mr. Soeratmo Notodipoero

計画局 Directorate for Programme Development

海外援助管理部 Sub-Directorate of Foreign Aid Administration

部長 Head

Mr. Prijono Salim

Mr. Rezeki

Ms. Saptorini

Mrs. Dwi Meinita

環境衛生局 Directorate of Environmental Sanitation (PLP)

局長 Director Mr. Darmawan Saleh

固形廃棄物部 Sub-Directorate of Solid Waste

部長 Head Mr. Boediman Arif

技術計画課 Technical Planning Section

課長 Chief Mr. Jacob Ruzuar

Mr. Dwityo Akoro Soeranto

管理課 Administration Division

Mrs. Rachmawati K.

JICA 専門家

四阿 秀雄

東ジャワ州事務所

所長 Project Manager

Mr. Magenda Aridiwinata

Mr. Ach. Mufid

Mr. Farich Amin

人口環境省環境管理庁 Environmental Impact Management Agency (BAPEDAL)

Ministry of Population and Environment (KLH)

開発局 Deputy for Development

次官

Mr. P. L. Coutrier

Mr. R. J. Damapalii

環境汚染管理局

Mrs. Mashellyarh

JICA 専門家

谷津 龍太郎

科学技術応用庁 Agency for the Assessment and Application of Technology (BPPT)

オペレーション・研究・管理局 Directorate of Operation, Research and  
Management

局長 Director

Mr. Didie Herkamto

Solid Waste Management Group

Mr. Bambang

Mr. Subiyanto

Mr. Dioro Heru M.

水道・環境衛生訓練センター Water Supply and Environmental Sanitation Training  
Center

所長 Director

Mr. Susanto Hertodiningrat

総務課長 Head of Administration Staff

Mr. Sudjoko

環境衛生課長 Head of Project Imp. Unit for ES

Mr. Widhi Handoko

JICA 専門家

国包 章一

二見 壽之

斎藤

東ジャワ州

BAPPEDA TKI

Mr. M. Anshar

スラバヤ市

BAPPEDA TKII

Mr. Benjamin Hilly

DUP TKII

Mr. Fatchul Muiz

清掃局 Cleasing Department (Dinas Kebersihan)

局長

Mr. Eddy Indrayana

Mr. Rayas Satyadharama

Mr. Cholik

Mr. Roni Tobocu

Mr. Satriyo Warih



## 付録－2．要請書 (TOR)



TERMS OF REFERENCE  
FOR  
STUDY AND PILOT PLAN FOR SOLID WASTE COLLECTION AND DISPOSAL  
FOR  
THE TOWN OF SURABAYA  
THE REPUBLIC OF INDONESIA

MARCH 1990  
MINISTRY OF PUBLIC WORKS  
DIRECTORATE GENERAL OF HUMAN SETTLEMENTS



## CONTENTS

1. Introduction
  - 1) Background
  - 2) Necessity for the Study
2. Institutional Framework
  - 1) Central Government
  - 2) Local Government
3. Objective of the Study
  - 1) Review of the Existing and On-Going Plans, Studies and Evaluation
  - 2) Formulation of a Master Plan (M/P)
  - 3) Implementation of a Feasibility Study (F/S)
4. Scope of the Study
  - 1) Study Area
  - 2) Master Plan (M/P) Study
  - 3) System for the Study
5. Details of Work in the Study
  - 1) Basic Investigative Study
  - 2) Master Plan (M/P) Study
  - 3) Systems for the Study
6. Schedule for the Study
  - 1) Implementation Schedule of the Study
  - 2) Expert Assignment Schedule for the Study

7. Reports

- 1) Inception Report
- 2) Progress Report (I)
- 3) Interim Report
- 4) Progress Report (II)
- 5) Draft Final Report
- 6) Final Report

8. Undertakings of Both Governments

- 1) Undertakings of the Government of Indonesia (GOI)
- 2) Undertakings of the Government of Japan (GOJ)

## 1. Introduction

### 1) Background

Government of Indonesia (GOI) has had the keen intention of improving urban living condition and conservation. Needless to say, solid waste management is one of the most important issues on which special attention should be paid.

Directorate General of Human Settlements (Cipta Karya) of the Ministry of Public Works (PU) as a responsible agency of the SWM at national level has placed a high priority on plans and projects related to the SWM in order to expand the service coverage for domestic waste collection.

### Solid Waste Management in Surabaya

Surabaya is the second largest city in Indonesia, the capital of East Java Province, with the population of around 2 million composed of 480,000 households approximately.

Should each household generate 10 liters of its domestic waste everyday, it can be estimated that the volume of the waste will be 4,000 cubic meters (m<sup>3</sup>) a day. In addition to that, it is figured out that about 200 m<sup>3</sup> of waste is being produced in markets, shops, terminals and the other places. So, the amount becomes 4,200 m<sup>3</sup> approximately.

Out of the said volume, about 70% shall be discharged at Tempat Pemouangan Akhir (TPA; Final Disposal Site) while the remaining 30% can be processed on site by accumulating the waste in a front house-yard

The above mentioned 70%-waste, that is, the amount of 2,850 m<sup>3</sup> approximately on an average consists of the following main constituents.

- a. Garbage : 65% or 1,900 m<sup>3</sup> approx. (which is biologically very easy to be rotten, including vegetable, fruits and the like).
- b. Trash : 20% or 500 m<sup>3</sup> approx. (which is a kind of the waste derived from plastic paper, glass and the other domestic waste).
- c. Rubbish : 15% or 450 m<sup>3</sup> approx. (which is chiefly the remainders of building materials such as concrete, wood, bricks, stones and the other kinds).

In Surabaya, the waste of 2,850 m<sup>3</sup> approximately is daily managed by collecting, transporting and disposing of at the TPA.

## 2) Necessity of the Study

### a. Master Plan (M/P)

A critical situation is observed on the SWM in Surabaya as indicated in the report (Page 8-9) of Integrated Urban Infrastructure Development Program (IUIDP) particularly about the solid waste in drainages, canals and so forth, since no M/P special for the SWM of Surabaya has ever been set up even though the IUIDP has greatly contributed to the SWM. That is because an M/P is urgently needed.

### b. Feasibility Study (F/S)

The existing transportation system of the domestic solid waste is mainly composed of by handcart/barrow from house to Tempat

pembuangan Sementara (TPS: Temporary Disposal Site, which is locally called Dempo), and by 12 m<sup>3</sup> - truck on the average from depot (Dempo)/TPS to the TPA.

As elucidated before, the 30% of domestic waste seems to be kept in respective house-yards and, therefore, scarcely creates any serious problem yet, but the remaining 70% of the domestic waste, namely, 2,900 m<sup>3</sup> approximately is so a vital issue to rest upon improvement of the existing SWM, because it is difficult at present to transport the waste from each TPS to the TPA.

The two TPAs, so called Keputih Sukolilo and Lakarsantri, are also critical with open-dumping giving rise to the exigent problems of air pollution like odors and smoke by burning waste, and of ground-water contamination by disposing of it without any sanitary treatment.

Provided that the 2,900 m<sup>3</sup> approximately of the domestic waste is heaped at 4 m on an average with the grade of 60% compression, a necessary land space is computed to be around 450 m<sup>2</sup> per day. It means 17 hectares (Ha) that are annually necessitated.

In light of the exigent circumstances as explicated above, it is essential to conduct an F/S for the SWM in Surabaya so as to practically establish and improve the system of the SWM for the city in question.

## 2. Institutional Framework

### 1) Central Government

The GOI has Cipta Karya, as one of the authorities, in particular for the SWM as described before, in which :

- a. Direktorat Bina Program (Directorate of Programme Development) is responsible for the general planning and programme development including criteria for the preparation of an integrated urban infrastructure development programme, local and foreign fundings.
- b. Direktorat Pencyataan Lingkungan Pemukiman (DPLP); Directorate of Environment Sanitation is responsible for sanitation, has the function to develop environmental sanitation infrastructure and aims at improving and promoting Public Health.

The GOI is desirous of specially assisting Metropolitan & Big Cities technically and institutionally for the establishment of the SWM.

### 2) Local Government

In this case, it is identified with the Government of Surabaya City which has its own :

- a. Badan Perencanaan Pembangunan Daerah (BAPPEDA ; Provincial Development Board) responsible for the provincial development, and
- b. Dinas Kebersihan (DK, Cleaning Department) responsible for the SWM comprising the city cleaning.

### 3. Objective of the Study

- 1) Review of the Existing and On-Going Plans, Studies and Evaluation
  - a. To review all the obtainable documents concerning the SWM for the city of Surabaya.
  - b. To collect and study all the available data and information on the SWM and the fields related to it, as a basic study in preparation for an M/P and an F/S.
- 2) Formulation of a Master Plan (M/P)
  - a. To formulate an M/P from all the aspects concerned, comprising an institutional plan on the SWM for the city of Surabaya.
  - b. To conduct a study on an Environmental Impact Assessment (EIA) for the M/P as well as an F/S.
- 3) Implementation of a Feasibility Study (F/S)
  - a. To make an F/S based on the M/P in specific areas sufficiently for enabling the implementation of the improved SWM in the frame of the M/P.
  - b. To carry out a pilot test on the SWM at a limited area in order that the F/S may be ensured.

### 4. Scope of the Study

- 1) Study Area
  - a. For the studies on basic investigation, the administration area of Surabaya City and its surrounding urbanized area will be defined as an area.

- b. For the M/P, the administration areas of Surabaya City will be defined as an area.
- c. For the EIA, a certain suitable spot, for instance, a TPA, a TPS and etc., will be picked out as a place for it while for the F/S, a specific district will be selected as an area in the domain of the M/P study.

## 2) Source and Kind of Waste for the Study

- a. Sort of Waste by Generation
  - i. Domestic/Household waste
  - ii. Commercial Waste
- b. Kind of Waste by Major Constituent
  - i. Garbage
  - ii. Trash
  - iii. Rubbish

## 3) Evaluation and Analysis of SWM Systems

- a. Technical System

Systems will be studied and analyzed in order to set up an appropriate system for waste discharge, collection, transportation, treatment and disposal
- b. Other systems

Operation and maintenance system, community and private participation system, organization system, finance system and legal system will be studied at their respectively necessary levels for the SWM.



## 5. Details of the Study

### 1) Basic Investigative Study

#### a. Collection of data and information

- i. Present and future land use plan
- ii. Present status of solid waste discharge, collection, transportation, treatment and disposal
- iii. Environmental pollution related to the SWM
- iv. Social impact of the present disposal system on population.
- v. Socio-economic statistics including development trends and population growth trends in the various areas concerned

#### b. Review

- i. Collected data and information
- ii. Previous publications concerning the SWM for the city of Surabaya
- iii. Technical literature on solid waste landfill
- iv. Technical literature on composting, incineration and others, if any
- v. Technical literature on recycling and bulk-waste handling

#### c. Site Survey and On-Site Investigation

- i. Current land use
- ii. Present system of discharge, collection, transportation, treatment and disposal
- iii. Environmental effects related to the disposal system
- iv. Social impact of the present disposal system on population
- v. Future land-use possibility for new facilities

## 2) Master Plan (M/P) Study

- a. Information and data from the Basic Investigative Study are to be analyzed and socio-economic projections relevant to a future SWM system are to be made
- b. Appropriate solid waste processing systems comprising methods of discharge, collection, transportation and disposal for each identified study area are to be formulated
- c. Equipment and facilities, buildings and lands which are required for each area are to be specified
- d. Staffing levels are to be recommended
- e. Land-use requirements are to be specified and recommended
- f. Implementation schedule for the improvement of the SWM including introduction of new services is to be drawn up
- g. Analysis of establishment and running costs is to be presented
- h. Environmental effects and health hazards are to be identified and counter actions against them are to be recommended through the study on the EIA.

## 3) Feasibility (F/S) Study

- a. Evaluation of the results from the Basic Investigative Study and the M/P Study
- b. Preliminary design of collection, transportation, treatment and disposal facilities and equipment
- c. Composting, recycling and bulk-waste handling facilities to be investigated and, if possible, incorporated
- d. Construction planning of SWM facilities  
Quantity survey and cost estimation

- f. Economic evaluation and financial analysis
- g. Pilot test on the SWM at a limited area in preparation for the implementation
- h. Comparison of alternative systems with particular reference to cost and the EIA
- i. Implementation schedule

#### 6. Schedule for the Study

##### 1) Implementation Schedule of the Study

The study will be conducted in accordance with the tentative study schedule as shown in the Attachment I.

##### 2) Expert Assignment Schedule for the Study

The study will be carried out by the experts specified in the Attachment II.

#### 7. Reports

The following reports will be prepared in English and submitted to the GOI at various stages in the course of the study as indicated on the tentative implementation schedule.

- 1) Inception Report in 30 copies to be submitted soon after the commencement of the study, indicating how the study will be conducted
- 2) Progress Report (I) in 30 copies to be submitted after the completion of the site survey
- 3) Interim Report in 30 copies to describe an outline of the M/P

indicating the concept

- 4) Progress Report (II) in 30 copies to describe an outline of the F/S and the EIA as well
- 5) Draft Final Report in 30 copies as its main, summary and its supporting reports respectively to be submitted to the GOI in order to receive comments on it from the GOI
- 6) Final Report in 60 copies as the main, the summary, and the supporting reports respectively to be finalized after being improved with the said comments and to be submitted to the GOI.

#### 8. Undertakings of Both Governments

##### 1) Undertakings of the GOI

- a. To provide counterpart staff to work with the Japanese team members and to provide secretarial services as well
- b. To provide furnished, serviced and suitable office space(s) in various study areas to the study team and to bear the cost of water, electricity and local telephone calls
- c. To provide vehicles to the Japanese members of the study team for site investigation
- d. To provide the study team with available data, information, documents, photographs and maps including topographical maps (S=1/200,000) and so forth, relevant to the study
- e. To assist in carrying out supplementary survey and observation such as the EIA, a topographical survey, soil investigation, meteorological survey, analysis of waste composition and so on

- f. To exempt from any duties, levies, and any other imposition the Japanese study team members themselves, their personnel effects and machinery/equipment imported for the study
- g. To arrange meetings as required between the study team and the various relevant authorities
- h. To be of assistance to the study team whenever necessary and possible

2) Undertakings of the Government of Japan

a. Expert Service

To dispatch to Indonesia the study team consisting of the experts as shown on Attachment II

b. Technology Transfer

To perform technology transfer to Indonesian counterpart personnel in the course of the study

Attachment I

Implementation Schedule of the Study

Description	month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Masterplan Study																		
Feasibility Study																		
Reports Submission	a			b							c			d			e	f

- a = inception report  
 b = progress 1 report  
 c = interim report  
 d = progress 2 report  
 e = draft final report  
 f = final report

Attachment II Assignment Schedule of Expert

Expert	Month	1	5	10	15	20W/M
1. Team Leader		---	---	---	---	0
2. City Planner		---	---	---	---	10
3. Sanitary Eng. 1		---	---	---	---	12
4. Sanitary Eng. 2		---	---	---	---	0
5. Mechanical Eng.		---	---	---	---	10
6. Civil Eng. 1		---	---	---	---	12
7. Civil Eng. 2		---	---	---	---	0
8. Architect		---	---	---	---	0
9. Economist		---	---	---	---	12
10. Socio-economist		---	---	---	---	12
11. Waste Analyst		---	---	---	---	6
12. EIA Expert		---	---	---	---	8
13. Geologist		---	---	---	---	6
Total						120

### 付録－ 3. Questionnaire





INSTITUTE FOR INTERNATIONAL COOPERATION, JICA

International Cooperation Centre Bldg.  
10-5, Ichigaya Honmura-cho, Shinjuku-ku, Tokyo  
162 Japan

Telephone: 03-269-3201  
Facsimile: 03-269-2054  
Telex: 22271 JICAHDQ

5 February 1991

Directorate of Environmental Sanitation  
Directorate General of Human Settlements  
(Cipta Karya)  
Ministry of Public Works  
Government of Republic of Indonesia

Dear Sirs:-

I am writing to you in connection with "The Study on Solid Waste Management Improvement for Greater Surabaya" to be carried out by the Japan International Cooperation Agency (JICA) based on the official request made by the Government of Republic of Indonesia.

As a preparatory process for the start of the said Study, JICA is planning to send the Preliminary Survey Team headed by the undersigned to Indonesia from 10 to 21 of March 1991. The objectives of the Team's visit are to understand the background of the request, collect basic informations for the Study, and discuss with Cipta Karya and other organizations concerned on the Scope of the Study.

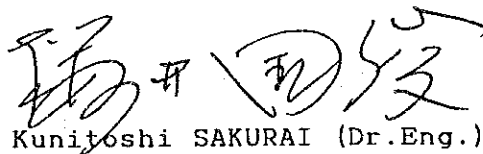
In this connection, I would appreciate it very much if Cipta Karya could prepare for our arrival the informations requested in the attached questionnaire. The questionnaire has been prepared in order to understand sufficiently the

background of, and respond efficiently and effectively to the request made by the Government of Republic of Indonesia about the execution of the Study.

I would like to express my sincere thanks to all the efforts to be made by Cipta Karya in the preparation of informations required in this questionnaire hoping that all the informations would be available for us during our stay in Indonesia. If necessary, unanswered informations can be sent later to the JICA Headquarters in Tokyo through JICA Indonesia Office.

Thank you very much for your kind cooperation.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'Kunitoshi Sakurai', written in a cursive style. The signature is positioned above the printed name.

Kunitoshi SAKURAI (Dr.Eng.)

Leader of the Preliminary Survey Team  
Japan International Cooperation Agency

Attachment.

Attachment

QUESTIONNAIRE

1. Please give us the following information about the background of the request:

- (1) Deficiencies of the existing solid waste management system in Surabaya (operational, administrative, financial and planning);
- (2) Health statistics which show the urgent need for the improvement of solid waste management in Surabaya;
- (3) Damages caused by deficient solid waste management system to other urban systems such as urban drainage system;
- (4) Recommendations made by IBRD in March 1989 through the report of Integrated Urban Infrastructure Development Program (IUIDP); and
- (5) Willingness of concerned organizations, especially that of the Government of Surabaya City, to prepare and implement the Solid Waste Management System Improvement Master Plan in Surabaya.

2. Please give us the following information regarding the Indonesian side organizational structure for the conduct of the Study:

- (1) Whether a steering committee of the Study will be organized or not. If yes, names and positions of its members; and
- (2) Names, positions and specialities of counterpart personnel.

3. In connection with 1.(5) above, please make it clear how Cipta Karya will get the Master Plan implemented by the Government of Surabaya City, once it is prepared, involving the other organizations concerned and acquiring the necessary funds.

4. Please make clear the Scope of the Study about the following basic points:

- (1) Target year of the Master Plan;
- (2) Study area (It is supposed that the administrative area of Surabaya City will be the study area for the Master Plan. It is requested to clarify the boundary of the administrative area.);

- (3) Solid wastes to be covered by the Study and their definitions;
- (4) Services of Dinas Kebersihan Kotamadya Daerah Tingkat II Surabaya to be covered by the Study;
- (5) Minimum service level to be achieved by the target year; and
- (6) Priority service and priority geographical area if phased improvement is required.

5. Please give us the following basic information for the Study:

- (1) Statistics of population and the estimation for the future. Especially, the official population projection of Surabaya City to be used in the Study;
- (2) Development plans to be used as the basis for the Study;
- (3) Actual land use and future land use plans for Surabaya City;
- (4) List of all previous and ongoing plans and studies on solid waste management in Surabaya City; and
- (5) Data on cooperation activities implemented and to be implemented by other bilateral or multilateral aid agencies related to the requested Project (cooperation of IBRD, France, etc.).

6. Please make clear the national solid waste management plan and policy including the following information:

- (1) Solid waste management policies, programs and projects in the 5th Five Year Development Plan (Repelita V, 1989-1994);
- (2) Institutions concerned with solid waste management at national level, their mandates, organizations, staff, budget and activities;
- (3) Laws, regulations, standards and guidelines related to solid waste management;
- (4) Environmental Impact Assessment (EIA) regulations and guidelines, especially those for landfill projects;
- (5) Investment plan for the sector and planning criteria;
- (6) Human resource development program for the sector;
- (7) Public health education and communal participation program; and
- (8) R&D of appropriate technologies for solid waste management.

7. Please give us the following information about the existing solid waste management system in Surabaya:

- (1) Institutional set-up of Surabaya municipal solid waste management

- system (Especially the roles of Kotamadya, Districts, Kecamatans, Kelurahan, RT/RW, private sector and their interrelations);
- (2) Organaization chart of Dinas Kebersihan
  - (3) Rules and regulations of Surabaya municipal solid waste management;
  - (4) Conditions and problems of actual solid waste management system;
    - a. Generation of solid waste
    - b. Composition of solid waste
    - c. Storage at source
    - d. Collection of solid waste
    - e. Street sweeping and public area cleansing
    - f. Transfer station
    - g. Transportation of solid waste
    - h. Treatment of solid waste
    - i. Disposal of solid waste
    - j. Resource recovery including the activities of scavengers
    - k. Inventory of equipment (type, capacity, year of fabrication, number, condition, etc.)
    - l. Inventory of landfills (e.g. name, location, size, land owner, operator, daily landfilling volume, year of beginning, remaining life, condition, etc.)
    - m. Personnel
    - n. Financial condition and user charge system.
  - (4) Inventory of candidate sites for future landfilling purpose;
  - (5) Role of private haulers and privatization policy; and
  - (6) Local industries which produce or are going to produce collection vehicles, communal and/or household storage bins, brooms, pedestrian trash baskets, etc.
8. Please give us the following information about the solid waste management by RT/RW:
- (1) Role of RT/RW in the global solid waste management system;
  - (2) Handcart collection system;
    - a. collection frequency
    - b. capacity of handcart
    - c. number of workers per handcart
    - d. number of trips per handcart per day
    - e. wage of workers
    - f. typical trip length
  - (3) Monetary contribuition of householders to RT/RW under the concept of

solid waste collection (Do they also pay tips to workers ?).

9. Please give us the following information about the incineration plant which is now under construction at Kuptih landfill site:

- (1) Specifications of the plant;
  - a. furnace capacity
  - b. number of furnaces
  - c. land required
  - d. design calorific value of waste
  - e. weighbridge
  - f. reception pit
  - g. number of pit gates
  - h. cranes
  - i. type of furnace
  - j. burner
  - k. gas cooling system
  - l. gas treatment for anti-pollution
  - m. wastewater treatment for anti-pollution
  - n. heat utilization
  - o. draft
  - p. stack
  - q. ash pit
  - r. ash crane
  - s. manpower required
- (2) Construction cost and its financing;
- (3) Estimated operation and maintenance cost and its financing;
- (4) Operation and maintenance plan (Who will operate ? How will the training of plant workers be done ? , etc.);
- (5) F/S report of the project;
- (6) EIA report of the project; and
- (7) Project appraisal report by BPPT.

10. Please give us the following information about the composting plant which was closed in 1984 allegedly because of the difficulty in product marketing:

- (1) Type, size, location and the construction cost of the plant;
- (2) Operator of the plant;
- (3) Yearly change of processed waste amount and compost production;

- (4) Yearly change of operation and maintenance cost and revenue of the plant; and
  - (5) Reasons of the plant closure.
11. Please give us the following information about the Solid Waste Improvement Programme (SWIP) Surabaya:
- (1) Project summaries of Urban I and V Projects;
  - (2) Basic design document of SWIP-Urban V Surabaya and the list of other publications related to SWIP-Urban V Surabaya;
  - (3) Organization structure for the implementation of SWIP-Urban V Surabaya; and
  - (4) Future plan of SWIP-Urban V Surabaya (possibility of IBRD's assistance extension).
12. Please give us maps which show, among others, the following:
- (1) Boundaries of Surabaya City, Districts, Kecamatans and the study area;
  - (2) Areas served with regular collection service;
  - (3) Streets served with regular sweeping service;
  - (4) Actual and planned land use of Surabaya City;
  - (5) Actual road network system with pavement condition information and roads planned to be constructed or improved in the near future;
  - (6) Locations of strategic facilities such as the central office, district offices, garages and landfills; and
  - (7) Proposed sites for future landfilling purpose.
13. Please specify the economic, social and other special conditions to be considered in the Study, if any.
14. Other comments on the Study to be carried out by JICA, if any.

(Thank you once again for your cooperation.)



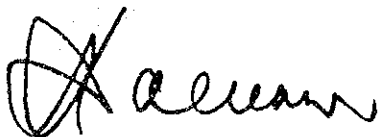


## 付録－ 4. 締結済 Scope of Work



SCOPE OF WORK  
FOR  
THE STUDY ON  
THE SOLID WASTE MANAGEMENT IMPROVEMENT FOR  
SURABAYA CITY  
IN  
THE REPUBLIC OF INDONESIA  
AGREED UPON BETWEEN  
MINISTRY OF PUBLIC WORKS  
AND  
JAPAN INTERNATIONAL COOPERATION AGENCY

MARCH 19, 1991  
JAKARTA, INDONESIA



IR. SOENARJONO DANOEDJO  
DIRECTOR GENERAL OF  
HUMAN SETTLEMENTS,  
MINISTRY OF PUBLIC WORKS



DR. KUNITOSHI SAKURAI  
LEADER,  
PRELIMINARY 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 conduct the Study on the Solid Waste Management Improvement for Surabaya City in the Republic of Indonesia (hereinafter referred to as "the Study"), in accordance with the laws and regulations in force in Japan.

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

The Directorate General of Human Settlements, Ministry of Public Works (hereinafter referred to as "CIPTA KARYA") shall act as the counterpart agency to the Japanese study team and also as the coordinating body in relation with other relevant organizations for the smooth implementation of the Study.

The present document sets forth the Scope of Work for the Study.

## II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. to formulate a master plan for the improvement of the Solid Waste Management (hereinafter referred to as "SWM") of Surabaya City.
2. to conduct a feasibility study for the first priority project based on the master plan.

## III. STUDY AREA

The study area covers Surabaya city and its surrounding urban areas.

#### IV. SCOPE OF THE STUDY

In order to achieve the above objectives, the Study will cover the followings:

##### 1. Basic Study

- (1) Data collection, Review of previous studies and Reconnaissance
  - a. Data on physical condition such as climate, topography, geology, etc.
  - b. National policy and development plan related to the SWM
  - c. Social and economic conditions and statistics
  - d. City development plan and land use
  - e. Road-traffic system
  - f. Legislation and institutional aspects of the city
  - g. Financial condition of the city
  - h. Review of on-going projects related to the SWM
  - i. Present condition of the SWM (technical systems)
    - Discharge
    - Collection
    - Transfer
    - Transportation
    - Treatment
    - Disposal
    - Street sweeping
    - Composting
    - Resource recovery (other systems)
    - Administration
    - Institution
    - Legal
    - Participation of community and private sector
    - Finance
  - j. Environmental pollution related to the SWM
  - k. Social impact of the solid waste problem
  - l. Health condition

##### (2) Field survey

- a. Amount of solid waste and its composition
- b. Geology, water quality and land use in existing dumping area and future landfill site
- c. Public consciousness on the SWM
- d. Preparation of pilot test

##### 2. Analysis of collected data and field survey

- (1) Present condition of the SWM
- (2) Identification of the problems
- (3) Analysis of the problems

### 3. Formulation of the Master Plan(M/P)

- (1) Determination of basic criteria for the formulation of the M/P
- (2) Preparation of alternatives for future system components of the SWM
- (3) Evaluation of the alternatives from the viewpoint of public health, technology, economy, society, institution, environment and finance
- (4) Selection of the best alternatives and formulation of the M/P
- (5) Implementation schedule of the M/P
- (6) Identification of the first priority project

### 4. Feasibility Study(F/S) on the first priority project

- (1) Confirmation of the planning framework
  - a. Target year
  - b. Planning area
  - c. Service level
  - d. System components
- (2) Supplemental basic study
- (3) Conduct of pilot test and its evaluation
- (4) Examination of system components
  - a. Technical examination
  - b. Preliminary design of facilities
  - c. Investigation of necessary equipments
  - d. Planning of institutional and human resources development
  - e. Cost estimation
- (5) Project evaluation
  - a. economic
  - b. social
  - c. environmental
  - d. institutional
  - e. financial
- (6) Project implementation plan

## V. SCHEDULE OF THE STUDY

The Study will be carried out in accordance with the tentative schedule attached in Annex.

## VI. REPORTS

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

1. Inception Report:  
Thirty(30) copies at the beginning of the first work in Indonesia.
2. Progress Report(1):  
Thirty(30) copies at the end of the first work in Indonesia.
3. Interim Report(1):  
Thirty(30) copies at the beginning of the second work in Indonesia.
4. Progress Report(2):  
Thirty(30) copies at the end of the second work in Indonesia.
5. Interim Report(2):  
Thirty(30) copies at the beginning of the third work in Indonesia.
6. Progress Report(3):  
Thirty(30) copies at the end of the third work in Indonesia.
7. Draft Final Report:  
Thirty(30) copies within three(3) months after completion of the third work in Indonesia.

The Government of Indonesia will present their comments to JICA within thirty(30) days after the receipt of the Draft Final Report.

8. Final Report:  
Sixty(60) copies within two (2) months after JICA's receipt of the said comments on the Draft Final Report.



VII. UNDERTAKINGS OF THE GOVERNMENT OF INDONESIA

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

- (1) to secure the safety of the JICA study team,
- (2) to permit the members of the JICA study team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees,
- (3) to exempt the members of the JICA study team from taxes, duties and any other charges on equipment, machinery and other materials brought into Indonesia for the conduct of the Study,
- (4) to exempt the members of the JICA study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the JICA study team for their services in connection with the implementation of the Study,
- (5) to provide necessary facilities to the JICA study team for the remittances as well as utilization of the funds introduced into Indonesia from Japan in connection with the implementation of the Study,
- (6) to secure permission for entry into private properties or restricted area for the conduct of the Study,
- (7) to secure permission for the JICA study team to take all data and documents (including photographs) related to the Study out of Indonesia to Japan in accordance with the Indonesian regulations,
- (8) to provide medical services as needed. Its expenses will be chargeable on members of the JICA study team.

2. The Government of Indonesia shall bear claims, if any arises, against the members of the JICA study team resulting from, occurring 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 wilful misconduct on the part of the members of the JICA study team.

3. CIPTA KARYA shall, at its own expense, provide the JICA study team with the followings, in cooperation with relevant organizations:

- (1) Available data (including maps) and information related to the Study
- (2) Counterpart personnel
- (3) Non-technical assistant personnel
- (4) Suitable offices with necessary equipment and furniture in Surabaya and also in Jakarta
- (5) Credentials or identification cards
- (6) Appropriate number of vehicles with drivers

#### VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

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

#### IX. CONSULTATION

JICA and CIPTA KARYA will consult each other in respect of any matter that is not agreed upon in this document and may arise from or in connection with the Study.

 KS

## ANNEX

## TENTATIVE STUDY SCHEDULE

MONTH DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	PHASE-I (W/P STUDY)								PHASE-II (F/S STUDY)										
WORK IN INDONESIA																			
WORK IN JAPAN																			
REPORT PRESENTATION																			

IC/R: Inception Report      IT/R: Interim Report      F/R: Final Report  
P/R: Progress Report      DF/R: Draft Final Report

## 付録－ 5. 締結済 Minutes of Meetings



MINUTES OF MEETINGS  
FOR  
THE STUDY  
ON  
THE SOLID WASTE MANAGEMENT IMPROVEMENT  
FOR  
SURABAYA CITY  
IN  
THE REPUBLIC OF INDONESIA

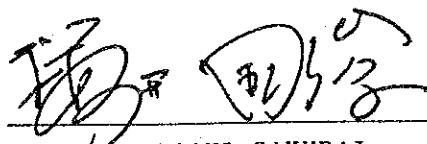
MARCH 19, 1991  
JAKARTA, INDONESIA



---

Ir. SOENARJONO DANOEDJO

DIRECTOR GENERAL OF  
HUMAN SETTLEMENTS,  
MINISTRY OF PUBLIC WORKS,  
THE REPUBLIC OF INDONESIA



---

Dr. KUNITOSHI SAKURAI

LEADER  
PRELIMINARY STUDY TEAM,  
JAPAN INTERNATIONAL  
COOPERATION AGENCY

In response to the request of the Government of the Republic of Indonesia, the Japanese Preliminary Study Team (hereinafter referred to as "the Team") was sent to Indonesia by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), to discuss, with the authorities concerned of the Republic of Indonesia, the Scope of Work for the Study on the Solid Waste Management Improvement for Surabaya City in the Republic of Indonesia (hereinafter referred to as "the Study").

The members of the Team headed by Dr. Kunitoshi SAKURAI stayed in Indonesia from March 10 to 20, 1991. During their stay in Indonesia, the Team carried out field reconnaissance in the Study Area, received available information and held a series of interviews with officials and local technicians.

The Team also had discussions with the Directorate General of Human Settlements, Ministry of Public Works (hereinafter referred to as "CIPTA KARYA"), on the Scope of Work to be undertaken by both CIPTA KARYA and JICA for the successful execution of the above-mentioned Study. A list of those who attended these discussion meetings is shown in the Annex.

The main items which were discussed by the Team and CIPTA KARYA are as follows:

- I. The items agreed upon between the Japanese and Indonesian sides:
  1. The Team proposed a draft Scope of Work, which was discussed in detail and agreed upon.
  2. Both sides confirmed that there are ongoing strong efforts by CIPTA KARYA and Surabaya City at national and local government levels respectively for the improvement of municipal solid waste management, and that the Study will constitute a significant contribution to these efforts.
  3. The JICA Study Team shall pay a due attention to the historical development of solid waste management in Surabaya

City including the intensive promotion of public participation in solid waste management as well as the improvement efforts based on the financial assistance of the World Bank.

4. In the case of the basic study, the Study Area consists of Surabaya City and its surrounding urban areas while the Master Plan formulation covers as the Study Area the whole area under the jurisdiction of Surabaya City. The Master Plan Study Area shall include, however, the future landfill sites and their environs even in the case of their siting outside Surabaya City. In that case, the amount of the waste to be brought into by other local governments will be taken into account in the planning of final disposal sites.
5. The type of solid wastes to be studied is limited to those wastes which are handled by the Cleansing Department (Dinas Kebersihan) of Surabaya City. They include household waste, cottage industry waste, market waste, street sweeping waste, commercial waste, and the household and office waste generated by industries. Although non-hazardous industrial wastes and sludges generated by other municipal services are not included in Study wastes, general recommendations on their management shall be worked out in the Study.  
  
In addition, Indonesian side requested that the Study would make recommendations on the coordination to be achieved between hazardous waste management system to be established by the Environmental Impact Management Agency (BAPEDAL) and the Provincial Government of East Java and the municipal solid waste management system of Surabaya City, although hazardous solid wastes generated by industries are not included either in the Study wastes. The Team took note of this request.
6. The target year of the Master Plan is set for the year 2010.
7. The selection of the first priority project shall be done through a series of meetings between Japanese and Indonesian



sides, and it will be finalized at the time of submission of Interim Report(2). With the objective of confirming and improving the technical, institutional and financial feasibility of the first priority project, a pilot test shall be carried out at the Feasibility Study stage as mentioned in IV.4.(3) of the Scope of Work. The contents of the pilot test shall be discussed and agreed upon later by both sides at the time of the submission of Inception Report, Interim Report(1) and Interim Report(2).

8. The identification of future landfill site(s) shall be completed by Surabaya City by the time of submission of the Progress Report (2). The identification shall be conducted following the guidelines of site selection to be submitted by the JICA Study Team together with the Inception Report. These guidelines shall be prepared taking into account the existing CIPTA KARYA's guidelines.
9. Basic study on environmental pollution related to the existing solid waste management, which is mentioned in IV.1. (1).j of the Scope of Work, shall be carried out taking into account the existing Indonesian guidelines on Preliminary Environmental Evaluation Report (PEL) and Environmental Evaluation Study (SEL). As for the new facilities to be proposed by the Study, serious efforts shall be made by the JICA Study Team to evaluate environmental impacts to be caused by them, taking into account the guidelines on Preliminary Environmental Information Report (PIL) and Environmental Impact Analysis (ANDAL).
10. To guarantee the smooth conduct of the Study and promote technology transfer through on-the-job training, CIPTA KARYA shall designate the following counterpart:
  - (1) Two co-leaders who will work as the counterpart to the JICA Study Team Leader (part time, one from CIPTA KARYA and the other from Surabaya City).

- (2) Two officers ( one from CIPTA KARYA on part time basis and the other from Surabaya City on full time basis).
- (3) Other staffs of Surabaya City (ad-hoc basis).
11. CIPTA KARYA shall organize and preside a steering committee which would consist of the representatives of the Directorate for Programme Development, the Directorate for Environmental Sanitation of CIPTA KARYA, Surabaya City and other organizations concerned from central and local governments in order to guarantee the efficient and effective conduct of the Study. CIPTA KARYA shall also organize and preside a technical committee made of technical staffs of the organizations concerned. This technical committee shall assist the steering committee on technical matters.
12. Dinas Kebersihan of Surabaya City shall put into practice, if necessary and convenient, the interim recommendations of the Study by its own resources even before the end of the Study.
- II. The approach proposed by the Team concerning the treatment and final disposal method in the Master Plan:
1. With the objective of overcoming the ever increasing difficulty in the acquisition of lands for landfills, Surabaya City is constructing a 200 ton/day incinerator. This is a highly laudable initiative for better solid waste management.
  2. Experiences in Japan show, however, that the adaptation of incineration technology to local conditions such as waste characteristics will require at least 10 years of try and error efforts. As such Surabaya City is requested to carry out this important but time consuming work of adaptation patiently using the 200 ton/day plant as a pilot plant and getting the technical advice of the Agency for the Assessment and Application of Technology (BPPT).

3. Therefore, the basic approach of the Master Plan is to dispose of all the wastes except the wastes destined for the 200 ton/day incinerator by landfilling and upgrade its method gradually from actual open dumping to sanitary landfilling. Once the time is ripe technically and financially, the Master Plan can be modified with little difficulty for the construction of the second and the third incinerators. This modification will not make the landfills unnecessary but prolong their life alleviating the burden on Surabaya City in the acquisition of future landfill sites. If something happens to the pilot incineration plant during the adaptation period, the landfills still will be able to accommodate the wastes originally destined for that plant. It can be said, therefore, that the Master Plan will be very flexible.

III. The items raised by CIPTA KARYA:

1. To pursue technology transfer as stated in VIII.2 in the Scope of Work, CIPTA KARYA requested JICA to hold a seminar in Surabaya in conjunction with the submission of Draft Final Report.
2. CIPTA KARYA also requested JICA to train four Indonesian counterpart personnel in Japan under the Japanese Technical Cooperation Scheme.
3. CIPTA KARYA stated that they would do the best to provide the JICA Study Team with the vehicles mentioned in VII.3.(6) of the Scope of Work. Because of the expected difficulty, however, they requested JICA to consider the self-provision of necessary vehicles.

IV. The discussions held on the topic of solid waste analysis:

1. The Team clarified that it is JICA's policy to use the locally available analytical facilities as much as possible. As such the Team requested CIPTA KARYA to facilitate the use

of some analytical equipment of its Water Supply and Environmental Sanitation Training Center in Bekasi by the JICA Study Team. The Team also clarified that, in the case of locally not available equipment, the JICA Study Team will bring them into Indonesia and leave them in Bekasi Training Center after the Study, if Indonesian side requests.

2. CIPTA KARYA requested JICA to hold a short seminar on solid waste analysis in Bekasi Training Center within the framework of the Study. CIPTA KARYA suggested the Study's second work in Indonesia as the timing of the seminar.

Annex: List of Attendants

Annex

List of Attendants

1st meeting: CIPTA KARYA, March 11, 1991

(Indonesian Side)

Mr. Soeratmo Notodipoero

Secretary of Directorate General CIPTA KARYA

Mr. Darmawan Saleh

Director of Environmental Sanitation (PLP)

Mr. Priyono Salim

Head of Sub Dit. of Foreign Aid Administration (ABLN)

Mr. Boediman Arif

Head of Sub. Dit. of Solid Waste, PLP

Mr. Jacob Ruzuar

Chief of Technical Planning Section, Sub Dit. of Solid Waste

Mrs. Dwi Meinita

Staff of Sub Dit. of Foreign Aid Administration, Bina Program

Mr. Hideo Azuma

JICA Expert on Solid Waste Management, PLP

(Japanese Side)

Dr. Kunitoshi Sakurai (Team Leader)

Environmental Health Development Specialist, JICA

Mr. Shigenobu Ohbayashi (System Planning)

Senior Researcher, Department of Sanitary Engineering,  
Institute of Public Health, Ministry of Health and Welfare

Mr. Kazumi Ohkawa (Administration of Waste Management)

Sub-chief of Waste Control Section, Public Cleansing  
Department Environmental Bureau, Sapporo City

Mr. Toshiyuki Ezuka (Coordinator)

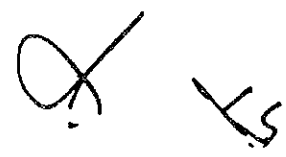
Staff, 2nd Development Study Division, Social Development  
Study Department, JICA

Mr. Teruyoshi Kumashiro

Staff of JICA Jakarta Office

2nd meeting: Surabaya City, March 12, 1991

(Indonesian Side)

Handwritten signature and initials in the bottom right corner of the page.

Mr. Benjamin Hilly : BAPPEDA, TKII  
Mr. Jacob Ruzuar : CIPTA KARYA, PLP  
Mr. Eddy Indrayana : Head of Cleansing Department, Surabaya City  
Mr. Rayas Satyyadharma: Cleansing Department, Surabaya City  
Mr. Cholik : ditto  
Mr. M. Anshar : BAPPEDA TKI  
Mr. Fatchul Muiz : Public Works TKII  
Mr. Farich Amin : East Java Province, PLP  
Mr. Magenda Aridiwinata: Project Manager, East Java Province, PLP  
Mr. Hideo Azuma : JICA Expert, PLP

(Japanese Side)

Dr. Kunitoshi Sakurai  
Mr. Shigenobu Ohbayashi  
Mr. Kazumi Ohkawa  
Mr. Toshiyuki Ezuka

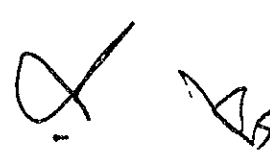
3rd meeting: CIPTA KARYA, March 16, 1991

(Indonesian Side)

Mr. Boediman Arif : PLP  
Mr. Jacob Ruzuar : PLP  
Mr. Rezeki : Bina Program  
Ms. Saptorini : Bina Program  
Mrs. Dwi Meinita : Bina Program  
Mr. Hideo Azuma : JICA Expert, PLP

(Japanese Side)

Dr. Kunitoshi Sakurai  
Mr. Shigenobu Ohbayashi  
Mr. Kazumi Ohkawa  
Mr. Toshiyuki Ezuka

Handwritten signature and initials in the bottom right corner of the page.



## 付録－6．収集資料リスト





収集資料リスト

(国内収集分)

(資料名)	(形態)	(備考)
1. インドネシア共和国セクター別基礎資料 (JICAインドネシア事務所・国総研、 1990.9) 18章 水道・環境衛生 25章 環境	A4、日本語	
2. 集団研修「環境アセスメント」カントリーレポート Mr. Danna Adyana K. (人口環境省)	A4、英語	
3. 開発途上国環境保全計画策定支援調査 インドネシア共和国 (エックス都市研究所、平成2.3)	A4、日本語	
4. (1) Public Participation as a Variable in the Metropolitan Solid Waste Manage- ment System of Surabaya, Indonesia (2) Financial Aspects of Solid Waste Manage- ment in the Context of Metropolitan Management in Bundung (3) Participation and Non-conventional Arrangement in Solid Waste Management (International Expert Group Seminar on Policy Responses toward Improving Solid Waste Management in Asian Metropolises, February 1991, Bundung)	A4、英語	国連地域開発センタ ー、インドネシア 公共事業省共催 バンドン会議
5. Solid Waste Improvement Programme (SHIP)- URBAN V, Surabaya (CIPTA KARYA, 1989.1)	A4、英語	

(現地収集分)

1. The Preparation of a National Solid Waste Management Strategy (Ministry of Public Works, Directorate General of Human Settlements, Directorate of Enviromental Sanitation, 1988.12.8) A 4、英語
2. Penyelenggaraan Kebersihan Dalam Kotamadya Daerah Tingkat II Surabaya (Perda Kotamadya Dati II Surabaya, Nomor 6 Tahun 1986) インドネシア語 スラバヤ市 清掃条例
3. Susunan Organisasi Dan Tata Kerja Dinas Kebersihan Kotamadya Daerah Tingkat II Surabaya (Nomor 4 Tahun 1980) インドネシア語 スラバヤ市 清掃局組織規定
4. Kajian Pola Paembinaan Mitra Pasukan Kuning Kotamadya Dati II Surabaya(dreaft) (Dinas Kebersihan) インドネシア語 スラバヤ市 スキャベンジャー トレーニング計画  
A 4
5. Kebijakan dan Upaya Penanganan Pemulung di Surabaya (Dinas Kebersihan Surabaya, 1989-1990) インドネシア語 スラバヤ市 スキャベンジャー 対策  
A 4
6. Waste Management in Surabaya A 4、英語
7. Surabaya, The fast growing city of Indonesia A 4、英語
8. PETUNJUK TEKNIS, Analisis Mengenai Dampak Lingkungan Proyek Persampahan 1990 (Departemen Pekerjaan Umum) インドネシア語 EIA Technical Guideline for SWM Projects  
A 4  
(英語訳済)

- |  |                          |                                   |
|--|--------------------------|-----------------------------------|
| 9. Pedoman Pengelolaan Persampahan<br>Aspek Pembiayaan Dan Peranserta Masyarakat<br>(CIPTA KARYA, 1990.2)  | インドネシア語<br>A 4           | SWMガイドライ<br>ン（財政、運営）              |
| 10. Pedoman Pengelolaan Persampahan<br>Aspek Institusi Dan Hukum<br>(CIPTA KARYA, 1990.2)  | インドネシア語<br>A 4           | SWMガイドライ<br>ン（組織）                 |
| 11. PERSAMPAHAN<br>Petunjuk Penyusunan Perencanaan Teknis Dan<br>Manajemen<br>(CIPTA KARYA)  | インドネシア語<br>A 4、横長        | SWMガイドライ<br>ン（要約）                 |
| 12. Pembangunan Bidang/PERSAMPAHAN<br>dalam PELITA V<br>(CIPTA KARYA)  | インドネシア語<br>A 4、横長        | 第5次開発5ヶ年<br>計画のSWM分野<br>戦略        |
| 13. Tata Cara Pemilihan Lokasi<br>Tempat Pembuangan Akhir Sampah<br>(DPU, 1991.2)  | インドネシア語<br>A 4<br>(英語訳済) | 公共事業省最終処<br>分場サイト選定ガ<br>イドライン     |
| 14. IUIDP SURABAYA/Preparation of Integrated<br>Urban Infrastructure Development Project<br>in Surabaya City, Solid Waste Sector<br>Report<br>(CIPTA KARYA, Kotamadya Surabaya, Draft<br>1991.1) | A 4、英語                   | 世銀プロジェクト<br>のアップレーザルレ<br>ポートとして準備 |
| 15. Housing and Human Settlements Development<br>in REPELITA V (1989/90-1993/94)<br>(CIPTA KARYA, 1989.4.1)  | A 4、英語                   |                                   |
| (地図)   |                          |                                   |
| 1. スラバヤ市街地図 (1:20,000)   | 青焼き                      |                                   |
| 2. スラバヤ市地質図 (1:50,000)   | 色刷り                      |                                   |





JICA

