

**KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION**

**INVITATION TO TENDER
FOR
BANGKOK AREA TRAFFIC CONTROL SYSTEM PROJECT - STAGE I**

PART D

SPECIAL CONDITIONS OF CONTRACT

SPECIAL CONDITIONS OF CONTRACT

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1.0 STATEMENT OF WORK

1.1 DESCRIPTION OF PROJECT

The Bangkok ATC System Project - Stage I will cover 143 intersections and 3 pedestrian crossings within an area bounded by the Chao Phraya River to the west, Ratchawithi Road to the north, Soi Asok to the east, and Sathon Road to the south. Traffic signals at four (4) of the intersections will be controlled by a single local controller. Therefore, the ATC system will control only 143 local controllers and can be technically considered as a 143-signal system.

Of the 146 intersections and pedestrian crossings, 127 have existing traffic signal installations. The new ATC system will make use of most of the existing intersection installations but will require replacement of all of the existing local controllers. Some of the traffic signal displays will also be modified and improved under this stage of the Project. The remaining 16 intersections will be provided with all new signal installations.

The Stage I Project will include installation of a centralized signal control system covering all above mentioned signals and a traffic surveillance system using vehicle detectors and a closed circuit television (CCTV) system which include field cameras at five (5) locations. The Control Center will be located in the City Hall. Communication between central and field equipments will be via leased voice grade lines from the TOT using a one line-one field station configuration.

1.2 CONTRACTOR'S RESPONSIBILITY

The CONTRACTOR shall be responsible for the completion of the Works and the effective and satisfactory operation of the equipment. Works specified in some of the Contract documents but not included in other Contract documents shall be considered as if they had been expressly described in all the documents. This means, for example, the Works shown on the Drawings but not mentioned in the Specifications nor Schedule of Rates and Prices shall nevertheless be deemed to be included in the Works and the Contract Price shall include the cost for such Works.

The CONTRACTOR shall, during the period of the construction of the Works, support the ENGINEER in discussions, negotiations and

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progress reports to other authorities, whenever this is required by the ENGINEER.

1.3 **WORKS TO BE DONE BY THE CONTRACTOR**

Unless specified otherwise in the Contract Drawings or in the Specifications, the CONTRACTOR shall be responsible for furnishing all equipment, material, labor, tools, computer software, and complete all installations necessary to deliver a complete and functional traffic control system and the CCTV system as specified.

The CONTRACTOR shall also be responsible for guarantee period maintenance and furnishing of spare parts, consumables, and maintenance equipment. In addition, the BMA reserves the right to require the CONTRACTOR to provide extended maintenance services for the system after its final acceptance under a separate maintenance contract.

Works to be done by the CONTRACTOR shall include but not be limited to the following:

- (a) Carry out accommodation work for the Traffic Control Center to receive the central equipment.
- (b) Furnish and install the air-conditioning system, fire protection and emergency power supply system for the Traffic Control Center.
- (c) Furnish and install all central traffic control equipment including the main computer system, FEPs, wallmaps, work stations, control desk, central equipment status panel, manual control panel, printers, communication equipment, and other necessary equipment, and cables, terminals, and others necessary to provide central control and monitoring of traffic signals and reception of data transmission from local controllers and detectors.
- (d) Develop and install all traffic control and monitoring software, operating system software, data receiving, processing, and recording software, and communication software.
- (e) Develop and install all traffic control database; conduct traffic surveys as necessary.

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- (f) Furnish and install all detectors, local controllers, linking cables and conduits, poles and signal heads, visors, target boards, power supply equipment (including switch, meter base and wires from meter base to controller), communication equipment, and miscellaneous items to provide computer control and monitoring of traffic signals from the control center.
- (g) Furnish and install cameras, mounting facilities, TV monitors, video recorders, controllers, and communication equipment and wiring for the CCTV system.
- (h) Provide training, documentation and maintenance services.
- (i) Furnish spare parts, consumables, and maintenance equipment

1.4 WORK TO BE DONE BY THE BMA

The following work will be done by the BMA:

- (a) Detailed design of intersection signals including approximate location of traffic signal poles, local controllers, vehicle detectors, and handholes and phasing plans.
- (b) Detailed design of cable network installation plan including approximate location of conduits, handholes, detectors and number of cable pairs.
- (c) Furnish traffic data to be used for initial timing parameter and timing plan preparation.
- (d) Detailed design of layouts for the Traffic Control Center.
- (e) Intersection geometric improvement works.

1.5 ALTERNATIVE LOCATIONS

The Project intersections identified on the Plans include a few intersections which will be created when planned new roads are constructed. These intersections are scheduled to be completed by the time this Contract is to be executed. The signal installation plans as given in the Contract Documents also include intersections that are necessary due to a reversible lane traffic circular scheme to be introduced before this Contract is executed.

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In the event that such intersection is not ready or the traffic circular scheme is not introduced in time for the installation of equipment, or that the installation of terminal equipment at these intersections has become impossible, the CONTRACTOR will be informed in writing and the ENGINEER may decide and direct the CONTRACTOR to install the terminal equipment at alternative locations.

2.0 LANGUAGE AND MEASUREMENTS

2.1 LANGUAGE

The official language for all Contract Documents, correspondence, technical information and data, instruction books, manuals, drawings, standards and test data, literature, pamphlets, shipping marks, addresses, instructions on individual packages, training etc., and any other documents shall be the English language.

2.2 MEASUREMENTS

All weights, measurements and other units shall be for all purposes in the metric system, unless specifically called for otherwise in the Contract Documents. Deviations require the approval of the ENGINEER.

3.0 PERTINENT LAWS IN THAILAND

3.1 COMPLIANCE BY CONTRACTOR AND HIS EMPLOYEES

The Contract shall be governed and construed according to the laws for the time being enforced in Thailand. The CONTRACTOR shall observe all laws and statues either national or provincial, regulations or by-laws of any public authority that are especially applicable to the Works and the employment of workers for the Works. The CONTRACTOR shall give notices to the BMA and pay all fees required under any enactment or regulation or by-laws.

The CONTRACTOR shall also be responsible for all his employees, either foreign or local to observe all laws enforced in Thailand. The CONTRACTOR shall ensure that all foreign employees are not involved in anyway in the politics of Thailand and that if the ENGINEER has satisfied himself that any employee of the CONTRACTOR is deemed unsuitable for the Work, the Engineer shall inform the CONTRACTOR to have the employee replaced.

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3.2 MINIMUM WAGE RATES

In the course of the construction period, the CONTRACTOR shall observe the minimum wage rates or cost of labor regulations as enforced by the Government of Thailand and it is understood that the CONTRACTOR has allowed for any fluctuation of wage rate that may occur in his proposed Schedules of Rates and Prices. The CONTRACTOR shall not be entitled to any claim for any excess labor cost due to any increase in the minimum wage rate.

3.3 SAFETY REGULATIONS

From the commencement of Work until Final Acceptance, the CONTRACTOR shall strictly follow the safety standards of all applicable governmental laws, safety regulations and ordinances in Thailand to prevent accidents.

4.0 EXCEPTION TO EXCEPTED RISKS

The CONTRACTOR shall inform himself of such events as rain, storm, floods, inundation which occur with regularity at the Site.

In respect of Time of Completion and other project milestone dates, the above said events shall not be considered as "excepted risks" as those provided in subsection 9.6 of the General Conditions. The CONTRACTOR shall be responsible for taking adequate steps and precautions to protect the works, equipment, and plant during such an event, and he shall be responsible for any damages to the works due to his negligence in providing such protection.

5.0 TRAFFIC AND ACCESS

5.1 INTERFERENCE WITH TRAFFIC AND ADJACENT PROPERTIES

All operations necessary for the execution of the Works and for the construction of any Temporary Works, so far as compliance with the requirements of the Contract permits, shall be carried out in such a way as not to interfere unnecessarily or improperly with the public convenience or the access to use and occupation of public or private roads and footpaths or of properties whether in the possession of the BMA or of any other person. The CONTRACTOR shall save harmless and indemnify the BMA and the ENGINEER in respect of all claims, demands, legal actions, damages, costs, charges and expenses whatsoever arising out of infractions committed by the CONTRACTOR in this respect.

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5.2 EXTRAORDINARY TRAFFIC

The CONTRACTOR shall use every reasonable means to prevent any of the public routes or structures communicating with or on the routes to the Site from being damaged or injured by any traffic of the CONTRACTOR or any of his Sub-contractors and in particular shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as may inevitably arise from the moving of plant and material from and to the Site shall be limited as far as reasonably possible and so that no unnecessary damage or injury may be occasioned to such public routes and structures. The CONTRACTOR shall be responsible for making good any damage or injury to such routes or structures at his own cost.

5.3 ACCESS TO THE TRAFFIC CONTROL CENTER SITE

The CONTRACTOR shall take steps to ensure access to the Control Center site or building where the center is located. Access areas shall be kept free of obstacles, equipment, tools or other construction materials and in adequate passable condition.

5.4 ACCESS RIGHT TO THE TRAFFIC CONTROL CENTER

In the execution of the Works no persons other than the CONTRACTOR, Sub-contractors and his and their authorized employees shall be allowed on the Control Center site or building except by the written permission of the BMA/ENGINEER, and facilities to inspect the Works at all times shall be afforded to the ENGINEER and his representative and other authorized officials or representatives of the BMA.

The CONTRACTOR shall be fully responsible for making application in good time for all necessary authorities, permits, etc., for his staff and workmen and who shall display such written permits from the BMA at all times when carrying out the Works.

The necessary control methods to ensure compliance with these rules shall be fixed jointly by the BMA, the CONTRACTOR and the ENGINEER.

5.5 OPPORTUNITIES FOR OTHER CONTRACTORS

The CONTRACTOR shall in accordance with the requirements of the ENGINEER, afford all reasonable opportunities for carrying out their

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work to any other contractors employed by the BMA and their workmen and to the workmen of the BMA and of any other duly constituted authorities who may be employed in the execution, on or any contract which the BMA may enter into in connection with or ancillary to the Works.

6.0 PROGRAMMING OF THE WORK

6.1 GENERAL

By signing the Contract, the CONTRACTOR is deemed to have understood and agreed to carry out the Works according to the true spirit, meaning and intent of the Contract Documents.

Should any error or inconsistency appear in the Technical Specifications, drawings or other Contract Documents, or should the CONTRACTOR note any omissions, doubt or contradiction in the same, he shall, before proceeding with the Work, inform the ENGINEER of the same in writing and then proceed with the Work as directed by the ENGINEER.

6.2 WORK PROGRAM

Within thirty (30) days from the date of commencement of work as given in the BMA's "Notice To Proceed", the CONTRACTOR shall submit to the ENGINEER for his approval a detailed and definite work program accompanied by a corresponding progress schedule showing the order of procedure and the method in which he intends to carry out the Works.

The work program shall be divided into five parts as follows:

- (a) System design and approval
- (b) Field installations
- (c) Control Center installations
- (d) Training
- (e) Guarantee period maintenance

The progress schedule shall indicate the time and period of design, procurement, manufacturing, testing, delivery, installation, adjustment, test operation of all the terminal and central equipment including software. Dates of delivery of all major items, completion of major

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tasks and contractual dates shall be basically consistent with the Cash Flow and CPM/PERT submitted prior to execution of the Contract as provided for in Sub-section 6.2 of the General Conditions.

The CONTRACTOR shall present his work program to the ENGINEER and representatives of BMA in a briefing session to be held in conjunction with the System Design Briefing as stipulated in the Technical Specifications.

If at any time it appears to the ENGINEER that the actual progress of the Works does not conform to the approved work program and/or progress schedule, the CONTRACTOR shall produce, at the request of the ENGINEER, a revised work program and progress schedule showing the modifications necessary to ensure completion of the Works within the Time for Completion.

The submission to and approval by the ENGINEER of such program and schedule or the furnishing of such particulars shall not relieve the CONTRACTOR of any of his duties or responsibilities under the Contract.

6.3 PAYMENT SCHEDULE

The CONTRACTOR shall also submit to the ENGINEER as soon as possible after the execution of the Contract, but before the first payment falls due to him, a payment schedule in a form satisfactory to the ENGINEER, showing all the expected payment amounts and due dates for all payments to which the CONTRACTOR is entitled to in accordance with the work program, progress schedule and the terms of payment agreed upon.

7.0 ACCEPTANCE PROCEDURE

7.1 TRIAL OPERATION OF A PORTION OF WORKS

After the tests on completion according to Section 3.0 of the Technical Specifications, Division I - General Requirements, have been performed to the satisfaction of the ENGINEER and BMA, trial operation of the completed portion of Works shall start immediately and shall continue for at least thirty (30) days for that Works. If any fault develops, except minor defects as determined solely by the ENGINEER, the 30-day trial operation shall begin anew after correction of the fault.

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The purpose of the trial operation is to check and assure that the equipment at that portion of Works functions reliably and safely.

Signals in a control sub-area shall be tentatively linked together, and coordination of signal timing shall be maintained. The CONTRACTOR shall submit the proposed timing plans for each sub-area for ENGINEER's approval prior to trial operation.

During the trial operation for a portion of the Works, the CONTRACTOR shall be responsible for the maintenance of the system, including replacement of any faulty parts due to either defective design (and parts) or normal wear and tear. The CONTRACTOR shall also be responsible for correcting damages due to accidents and act of god. No payments will be made for corrective maintenance of any kind and any cause, whether for labor, material, or parts, until the "Certificate of Completion" is issued.

The CONTRACTOR is responsible for keeping a clear record of faults occurred and parts replaced during the trial operation. The record shall be submitted to the ENGINEER immediately after the trial operation period.

The CONTRACTOR shall provide adequate personnel and facilities for a continuous trial operation.

- 7.2 CERTIFICATE OF COMPLETION FOR A PORTION OF WORKS
After trial operation of a completed portion of Works has been performed to the satisfaction of the ENGINEER and BMA, and the corresponding revised Drawings and Documents have been submitted by the CONTRACTOR, the "Certificate of Completion" for a portion of Works shall be issued by the ENGINEER within twenty-one (21) days of receiving the CONTRACTOR'S request for taking over.

Certificates of Completion for portions of Works may be issued only once in a one-month period during the Contract duration.

A "Certificate of Completion" for a portion of Works may be independently issued for each of the following items when the corresponding requirements are met:

- (a) Traffic Signals: For a group of centrally controlled signals which are within a cycle subarea, a "Certificate of Completion" may be issued

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when the signalization and the associated works including detectors are completed and the signals are connected to a front-end processor at the Control Center, and the group of signals have become operational both locally and from the front-end processor.

- (b) **Control Center Accommodation:** A "Certificate of Completion" may be issued for the Control Center accommodation work when the specified work is completed and the center is ready to receive the equipment. The 30-day trial operation provision is not applicable to this portion of the Works.
- (c) **Control Center Support System:** A "Certificate of Completion" may be issued for control center air conditioning, fire protection, and emergency power supply system work. In lieu of the 30-day trial operation, proper operation of the emergency power supply system shall be demonstrated through a simulated condition.
- (d) **Central Traffic Control System:** A "Certificate of Completion" may be issued when the installation of the entire central traffic control system equipment is completed and operational. At least five (5) of the cycle subareas shall be controlled by the control center during the trial operation period.
- (e) **CCTV System Field Installation:** A "Certificate of Completion" may be issued for each completed camera site installation. The CONTRACTOR may request issuance of an "Interim Certificate of Completion" under the provisions of Section 7.3 if proper operation of the camera is demonstrated through a temporary hookup with a portable controller and monitor unit.
- (f) **CCTV System Central Installation:** A "Certificate of Completion" may be issued when all central equipment of the CCTV system is completed and operational and all field cameras are under the control of the system. The CONTRACTOR may request issuance of an "Interim Certificate of Completion" if only some of the field installations have been completed.

7.3 INTERIM CERTIFICATE OF COMPLETION

If the CONTRACTOR shall be prevented from carrying out or finishing the tests on completion or trial operation by reason of any act or omission of the BMA or of another contractor, then, unless in the meantime the Works shall have been proved not to be in accordance

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with the Contract, the ENGINEER may issue an interim certificate of completion. This certificate, however, shall only be issued if the completeness and proper operation of the Works have been demonstrated to the satisfaction of the ENGINEER, and the revised and completed Drawings and Documents have been submitted to the ENGINEER.

The issue of an "Interim Certificate of Completion" shall have the same effect as the issue of "Certificate of Completion" in respect of guarantee period maintenance, liability, and payment except as follows:

- (a) As soon as possible, the required tests on completion shall be conducted and documented as specified and, if the tests are satisfactory, a final Certificate of Completion shall be issued,
- (b) The ENGINEER shall have the power to revoke the Interim Certificate of Completion at any time, prior to the issuance of the final Certificate of Completion, if any fault develops, except minor defects, or if the tests on completion shall be found not in accordance with the Specifications.

7.4 TRIAL OPERATION OF THE WHOLE WORKS

After completion of the whole of the Works, a final trial operation for the entire system shall commence. The duration of the trial operation shall be sixty (60) calendar days. The CONTRACTOR shall provide adequate personnel and all facilities for a continuous trial operation.

During the trial operation, the functional reliability and operational safety of the equipment and plant shall be checked. For these purposes, suitable operational tests covering all functional requirements shall be carried out. The purpose of the trial operation is to prove that the Works are fit for operation. If this is not the case as a result of faults, the 60-day trial operation shall begin anew after remedy of the faults. Repair work of minor importance and adjustments may be carried out during the trial operation without affecting its duration.

During the trial operation the CONTRACTOR shall instruct the personnel of the BMA so that on completion of the trial operation they shall be familiar with all questions and data concerning the operation and maintenance of the Works.

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The operating and maintenance instructions manuals shall be used as a basis for instruction of the BMA personnel and shall be checked, revised and completed during the trial operation.

If the commencement of the trial operation is not possible immediately after the tests on completion and commissioning, all necessary inspections and revisions before starting up shall be made as agreed between the CONTRACTOR and the ENGINEER.

Any parts from other contractors which have been damaged or fouled due to the Work being carried out under this Specifications shall be restored to the original condition.

All unused material for which the CONTRACTOR is responsible shall be removed from the site in accordance with the instructions of the ENGINEER.

The CONTRACTOR shall be responsible for keeping a clear record of faults occurred and defective parts replaced during the trial operation.

- 7.5 **CERTIFICATE OF COMPLETION FOR THE WHOLE WORKS**
After satisfactory trial operation, remedy of faults and submission of all revised Drawings and Documents by the CONTRACTOR, the ENGINEER shall issue the Certificate of Completion for the whole Works within twenty-one (21) days of receiving the CONTRACTOR's request for taking over provided no defects have been uncovered during the said period of time.

The issue of a "Certificate of Completion" shall not relieve the CONTRACTOR of his obligations with regard to the guarantee established in the Contract Documents.

Unless specified otherwise in the Contract Agreement the whole Works shall be completed, as evidenced by the issuance of the Certificate of Completion for the whole Works, within eighteen (18) months of system design approval.

- 7.6 **USE BEFORE TAKING OVER**
If by reason of any default on the part of the CONTRACTOR a "Certificate of Completion" has not been issued, the BMA shall be at liberty to use the Works or any portion thereof for which the certificate

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has not been issued, provided that the works or the portion used as mentioned above shall be reasonably capable of being used and that the CONTRACTOR shall be afforded the earliest possible opportunity of taking those steps which are necessary to permit the issue of the certificate.

7.7 TRANSFER OF WORKS

A "Certificate of Completion" for any portion of the Works marks the moment when property and risk of that portion of the Works are transferred from the CONTRACTOR to the BMA. It also marks the beginning of the Guarantee Period for that portion of the Works.

All "Certificates of Completion" shall be signed by the CONTRACTOR, the ENGINEER, and the BMA. and recorded in writing and the parties to the Contract will receive a copy thereof.

7.8 PROCEEDING IN ABSENCE OF THE CONTRACTOR

The "Certificate of Completion" can be issued without the presence of the CONTRACTOR if he has been duly notified by the BMA. The result of the proceedings shall be communicated to the CONTRACTOR as soon as possible.

7.9 MINOR DEFECTS

Exceptionally, a "Certificate of Completion" may be issued even if the existence of minor defect has been ascertained provided such minor defects will in no way hamper or endanger the operation of the whole Work, and they shall be remedied within a reasonable time to be laid down by the ENGINEER. It is left to the sole discretion of the ENGINEER to determine whether or not a defect is minor. The obligation on the part of the CONTRACTOR to make good all defects shall in no way be affected by the BMA becoming acquainted with them before the Final Acceptance and omitting to make an express reservation of his rights.

7.10 FINAL ACCEPTANCE

On expiry of the Guarantee Period as stipulated in Section 8.0 "Guarantees and Guarantee Period Maintenance" hereof, the Final Acceptance will take place in the presence of the ENGINEER, the

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BMA and the CONTRACTOR, and a Final Acceptance Certificate will be issued according to Section 7.11, "Final Acceptance Certificate."

7.11 FINAL ACCEPTANCE CERTIFICATE

No certificate other than the Final Acceptance Certificate shall be deemed to constitute approval of the Work or other matter in respect of which it is issued or shall be taken as an admission of due performance of the Contract or any part thereof or of additional or varied Work having been ordered by the ENGINEER nor shall any other certificate conclude or prejudice any of the power of the ENGINEER.

The Contract shall not be considered as completed until a Final Acceptance Certificate shall have been signed by the ENGINEER and accepted by the BMA and state that the Works have been completed and maintained to their satisfaction. The Final Acceptance Certificate will be given by the ENGINEER thirty (30) calendar days after the expiration of the Guarantee Period or as soon as thereafter as any works ordered during such period pursuant to Section 8.0, "Guarantee and Guarantee Period Maintenance" hereof shall have been completed to the satisfaction of the ENGINEER and full effect shall be given to this section notwithstanding any previous entry on the Works or the taking possession, working or using thereof or any part thereof by the BMA.

7.12 DELAY IN NORMAL OPERATING CONDITIONS

If it is not possible to subject the CONTRACTOR's whole Work to normal operational conditions immediately following its completion, the CONTRACTOR may make written application for Certificate of Completion as soon as the whole Work has remained free from defects for three months after completion. The duration of the Guarantee Period for Works so completed shall begin with the Certificate of Completion and end after the whole Work has been subjected for at least three months to normal operating conditions, but not later than two (2) years after the issue of the Certificate of Completion.

8.0 GUARANTEES AND GUARANTEE PERIOD MAINTENANCE

8.1 GUARANTEE PERIOD

Unless otherwise stipulated in the Contract, the Guarantee Period for any part of the Works shall begin on the date of issuance of the Certificate of Completion therefor and end twelve (12) months after the date of issuance of the Certificate of Completion for the Whole Works or until all defects, for which the CONTRACTOR is responsible, have been corrected to the satisfaction of the ENGINEER, whichever comes later.

The CONTRACTOR should note that since the Certificate of Completion may be issued for portions of the Works before the completion of the whole Works, portions of the Works could have guarantee periods of longer than twelve (12) months and such extensions as may be required for correcting defects.

8.2 GUARANTEE

Except otherwise specified in the Contract, the CONTRACTOR shall be responsible for making good all defects, uncovered during the guarantee period, resulting from the use of equipments, materials or workmanship not in accordance with the Contract or due to neglect or failure on the part of the CONTRACTOR to comply with any of his obligations expressed or implied under the Contract.

All such defects shall be repaired, replaced, or re-installed to the satisfaction of the ENGINEER and in accordance with the Specifications at the CONTRACTOR's own expense including material, spare parts, labor and whatsoever necessary to ascertain the causes and effect the correction.

8.3 NORMAL MAINTENANCE AND ACCIDENT REPAIR

During the guarantee period, the CONTRACTOR shall also be required to provide normal maintenance and accident repair services for the entire traffic signal and CCTV systems covered under this Contract.

"Normal Maintenance" shall consist of performing diagnostics, replacing consumables, and correcting malfunctions resulting from equipment deterioration and failure under normal operating conditions.

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"Accident Repair" shall consist of repairing damages and malfunctions due to accidents, vandalism, act of God, pavement failure, and other construction activities and shall include cleaning up of debris, erecting necessary warning and safety devices, and hooking up of temporary equipment if required to insure the safety of the public.

The CONTRACTOR shall be responsible for furnishing all labor, spare parts, equipments, and material for the maintenance and repair services.

Compensation for "Normal Maintenance" shall be made on a monthly basis based on the unit prices bid as indicated in the Schedules of Rates and Prices. The unit price paid shall be full compensation for all labor, material, spare parts, tools, and equipment. For any service period of less than one full month, the charge rates shall be prorated based on a 30-day month. Under normal situations where the equipment being maintained is fully operational, the CONTRACTOR shall be conclusively presumed to have undertaken the normal maintenance work and shall be entitled to payment therefor.

The costs of "Accident Repair" shall be determined on a time and material basis. The costs will be paid for under the Contract and be charged to the provisional sum item for accident repair.

The CONTRACTOR shall maintain a comprehensive records of all maintenance and repair activities and spare parts consumptions. The records shall include as a minimum fault reports, spare parts receiving and consumption records, and job order. The records shall be on forms provided by the ENGINEER.

8.4 RESPONSE AND SERVICE TIMES

All guarantee period maintenance, whether normal operation or defect related, and repair services shall be provided on a 24-hour a day, 7-day a week basis. Immediate action shall be taken to safeguard the public at any time a signal installation becomes partly or totally inoperative from any cause whatsoever.

The CONTRACTOR shall provide the ENGINEER a telephone number for receiving service calls. The telephone shall be manned 24 hours a day and 7 days a week. All fault reports must be recorded on the BMA furnished Fault Report Form immediately upon receiving the call.

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The maximum response times, i.e. the elapsed time from receiving notification to arriving at the job site, shall be as follows:

(a) Emergency Signal Repairs:

day (6:00 to 20:00) -- 2 hours
night (20:00 to 6:00) -- 4 hours

(b) Other Repairs -- 24 hours

Emergency Signal Repairs -- The following shall be classified as Emergency Signal Repairs:

- (a) Signal on flash
- (b) Signal blackout not caused by power outage
- (c) Any faults, other than brownouts, which has or will cause two or more local controllers to be dropped off-line
- (d) Failure of the uninterrupted power supply system in the Control Center
- (e) Failure of any equipment which has or will cause the central control system to shut down or rendered inoperative
- (f) Any failure which is determined by the ENGINEER or the Police to pose immediate hazard to the public.

If the fault can not be permanently repaired immediately, a temporary repair or remedial measure sufficient to safeguard the safety of the public shall be effected by the CONTRACTOR and the ENGINEER shall be so notified. Permanent repairs shall be completed as soon as possible, and in all cases within 72 hours of notification unless extended in unusual circumstances, such as lack of a foreign spare part, by the ENGINEER.

Failure to meet the response time requirements by the CONTRACTOR shall be sufficient cause for the BMA to authorize repairs to be completed by others and deduct the costs of such repair from payments due to the CONTRACTOR. Repetitive failure shall be sufficient cause for the BMA to cancel the Contract. Failure to effect permanent repairs within the specified time period shall also entitle the BMA to assess the CONTRACTOR liquidated damages as specified in Section 8.7 "LIQUIDATED DAMAGE FOR GUARANTEE PERIOD MAINTENANCE AND REPAIR".

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The required response and repair times as specified above shall be extended under conditions of storm, flooding, and inundation. As soon as the condition is cleared, the specified times shall apply.

8.5 FAULT REPORT AND JOB ORDER

Each and every maintenance and repair work, except inspection and replacement of locally available consumables, must be documented on the BMA Fault Report Form and BMA Job Order Form by the CONTRACTOR. A copy of completed job order forms must be submitted with the progress payment request. No payment will be made without submitting the same. The Fault Reports shall be kept in a log book and shall be made available to the ENGINEER or BMA upon request at any time.

8.6 WORK HOUR

Work hour for accident repair shall be classified as either Regular Time or Over Time. Regular Time hours shall be from 7:00 AM to 7:00 PM from Monday through Saturday except National Holidays. All other work hours shall be classified as Over Time.

8.7 LIQUIDATED DAMAGES FOR GUARANTEE PERIOD MAINTENANCE AND REPAIR

The CONTRACTOR shall be assessed liquidated damages for failure to effect permanent repair within the specified time limit. Liquidated Damages shall be deducted from payment due to the CONTRACTOR.

The amount of liquidated damage under various failure conditions shall be as specified below:

- (a) Shutdown of a front-end processor -- B1,500 per day
- (b) Signal on flash or totally inoperative -- B1,000 per day per signal
- (c) Signal operating in the fail-safe fixed-time mode -- B500 per day per signal
- (d) Detector failure -- B200 per day per unit

8.8 LIMITATION OF RESPONSIBILITY

The CONTRACTOR will not be held responsible for maintenance or repairs required because of acts of other contractors engaged by the

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BMA or loss or damage resulting from wars, riot, etc. as identified under Section 7.3, "Exclusions," of the General Conditions of Contract.

8.9 REMEDIES FOR WORKS AFFECTING EFFICIENCY

If any replacement or renewals carried out by the CONTRACTOR are of a character which may affect the efficiency of the Works or any portion thereof, the ENGINEER may give the CONTRACTOR notice within one month of such replacement or renewal requiring that tests be made.

If the test results indicate that the replacement or renewal is not in accordance with the Specifications, the costs of the tests as well as correcting the deficiency shall be borne by the CONTRACTOR, otherwise, the tests shall be done at the cost of the BMA.

9.0 UNIT PRICES

9.1 UNDERSTANDING OF UNIT PRICES

The Schedule of Rates and Prices shall be understood to include all costs and provisions required for the correct execution of the contractual Work in compliance with the time schedule. Therefore, the unit prices shall include not only costs for supply for material and equipment, but also wages, salaries and accommodation for the CONTRACTOR's employees and labors. They also include, without being limited to, the following:

- (a) Cost of transportation to the Site and costs for provision and maintenance of the complete construction plant necessary for the execution of the Works as well as cost of equipment for transportation, machines, scaffoldings, shutterings, dewatering, temporary casings, removal of surplus soil within the vicinity of the Site, Site offices, including all expenses for the setting up of workshops, storage areas, warehouses, etc., used by the CONTRACTOR, but not provided by the BMA.
- (b) Cost of required fuel, water and electric power during construction and storage of materials and equipment.
- (c) All additional costs due to any kind of difficult working conditions.

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- (d) Separation allowances, ambulance, expenses for medical treatment, hospitals, travelling allowances, hotel and travelling expenses, holiday salaries and all other allowances for employees and labors.
- (e) Costs of the premium for all required insurance policies including marine insurance.
- (f) Cost of freight for all materials and all other handling and transportation of labor, materials, supplies, equipment, plant, etc.
- (g) Cost of the required means for protection against accidents and fire.
- (h) All expenses for royalties, licenses, liabilities and the like in connection with the Works.
- (i) Services for normal and/or specified material tests (including laboratory tests).
- (j) Cost of field surveys.

The list of materials, equipment and installation works on the "Schedule of Rates and Prices", identifies major equipment or work components of the system for payment purposes. The listing is not intended to be a complete specification of all materials which shall be furnished by the CONTRACTOR in order to complete the work. Computer interface devices, input/output controllers and associated software if any, and miscellaneous items which are not specifically mentioned or identified but are required to make the system operational and meeting the functional requirements shall be furnished and installed by the CONTRACTOR. (Miscellaneous items may include, but shall not be limited to, equipment enclosures, harnesses, terminal facilities, mounting hardware, relays, wire, conduit, fittings, etc.) These items shall be considered as incidental items whose costs are included as part of the various contract items and for which no separate payments will be made.

9.2 PROJECT MANAGEMENT COSTS

The monthly tender price for Project Management shall include the cost of establishing and maintaining the CONTRACTOR's field office, costs of transporting and maintaining necessary on-site supervisory staff, and

PART D : SPECIAL CONDITIONS

all other management related costs such as record keeping, meetings, preparation of progress reports, update of progress schedules, etc.

9.3 MEASUREMENTS OF WORKS

Underground conduit installation shall be measured from center of handhole to center of handhole, or to outer surface of poles, cabinets, or terminating buildings. No separate measurement or payment shall be made for the installation of couplings or terminating elbows.

Installation of communication and detector feeder cables in underground conduit shall be measured from center of handhole to center of handhole, or to outer surface of poles, cabinets, or terminating buildings. Slacks and terminating sections inside poles, handholes, cabinets, and buildings shall not be included in the measurement and no separate measurements or payment shall be made therefor.

In estimating the required quantities for cables, 3 meters for each handhole and termination points have been added to handhole to handhole measurements to account for the required slacks and wastage due to splicing and other cable cuts during installation. The CONTRACTOR shall avoid excessive slacks and wastage and shall be required to furnish additional cables at his own expense if additional cables are required as a result of excessive slacks and wastage.

Compensation for splices and terminating connections necessary to complete cabling and wiring installations shall be included in the tender prices for the various cable installation and wiring items in the Tender schedule and no separate measurement or payment shall be made therefor.

Loop coil installation shall be measured in unit of loop regardless of the size of the loop. Compensation for installing the loop coil conductors between the loop and the terminating handhole and for installing the terminating conduit shall be included in the tender prices for the loop coil installation items and no separate measurement shall be made therefor.

9.4 USE OF PROVISIONAL AND ALTERNATIVE ITEMS

All sums set out in the Schedule of Rates and Prices which are stated to be provisional or alternative shall be used only at the direction and

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discretion of the ENGINEER and if not used either wholly or in part shall, as to the amount not used, be deducted from the Contract Price.

10.0 TERMS OF PAYMENT

10.1 GENERAL

All payment under this Contract will be paid in Thailand Baht as quoted in the Schedule of Rates and Prices, irrespective of the actual currency by which the equipment were acquired.

All request for payment shall be verified and certified by the ENGINEER. Pre-requisite for the issuing of the certificates for progress payments by the ENGINEER is that the invoices are drawn up in such a form that they can be checked and that the succession of the items and their designations are the same as in the Schedule of Rates and Prices. Computation of quantities, measurements, drawings and other evidence shall be attached to the request for payment if requested by the ENGINEER. Modifications and supplements shall be specially labelled and drawn up separately with reference to the Contract Agreement.

10.2 PARTIAL PAYMENTS

10.2.1 ADVANCE PAYMENT

Upon receiving a written request from the CONTRACTOR, which shall be submitted as a Contract Document, the BMA shall make a lump sum advance payment to the CONTRACTOR in an amount equal to twenty percent (20%) of the total Contract Price. The advance payment shall be made only upon the submission by the CONTRACTOR and acceptance by the BMA of a standby letter of credit of equivalent value from a reputable commercial bank acceptable to the BMA.

The advance payment shall be repaid, by the CONTRACTOR by deducting ten percent (10%) from his progress payments, with the first repayment to be made when the contract value of the work executed and materials and equipments delivered shall equal to or have exceeded twenty percent (20%) of the Contract Price or six (6) months after the date of Notice to Proceed, whichever comes

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first and further refund shall be done thereafter at each payment until fully repaid. The CONTRACTOR may reduce his standby letter of credit or guarantee instrument by the amounts refunded.

10.2.2

PROGRESS PAYMENT FOR SUPPLY AND DELIVERY OF IMPORTED GOODS

A sum equivalent to thirty percent (30%) of the contract value of imported equipment and software shall be paid by BMA to the CONTRACTOR upon the safe arrival of the equipment and software at the specified installation site or storage yard and duly inspected by the ENGINEER against the documents forwarded to BMA by the CONTRACTOR prior to shipment, and title of the shipment properly transferred to BMA. The documents to be forwarded to BMA prior to shipment shall include:

- (1) master of consolidated and detailed packing list duly signed by the inspector,
- (2) bill of lading and/or airway bill,
- (3) factory test results, inspection certificates and inspection reports, and reports on supervision of loading,
- (4) certificate and list of measurement and/or weight,
- (5) commercial invoice duly stamped by the consular office,
- (6) authenticated export declaration,
- (7) marine insurance policy with all risk coverage, including theft pilferage and non-delivery and warehouse to warehouse clause for at least 110% of the contract value of the shipment and in full force and effect until the shipment has arrived at the specified installation sites.

10.2.3

PROGRESS PAYMENTS

Subject to deductions to repay the advance payment and the ten percent (10%) retention as specified in Section 10.3, "RETENTION MONEY," all other outstanding payments for goods, software and equipment fully installed and other services rendered, shall be paid by the BMA to the CONTRACTOR in monthly progress payments. Any supplied material and equipment delivered on the Site but not completely put in place shall not be included in the progress payments.

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10.3 RETENTION MONEY

The BMA shall be entitled to retain ten (10%) percent of the amount due to the CONTRACTOR from the monthly progress payments. The retention money shall be based on the total amount due to the CONTRACTOR prior to any deduction and shall be retained from every monthly progress payment until fifty percent (50%) of the value of the Works, as determined by the ENGINEER, are completed. If, after such fifty percent (50%) completion, the Works are satisfactorily done and on schedule, no additional retention shall be made; otherwise, the ten percent (10%) retention shall continue to be imposed.

The retained payments of goods and services provided by the CONTRACTOR may be released by the BMA after the issuance of Certificate of Completion of the Whole Works provided that the CONTRACTOR posts an irrevocable letter of guarantee of equivalent value in favor of the BMA in a bank acceptable to the BMA. Otherwise, the said retention money shall be paid upon final acceptance of the Works.

10.4 FINAL PAYMENT

Upon issuance of the Final Acceptance Certificate of all Works, the CONTRACTOR shall submit to the BMA his final invoice based on measurements and surveys of the complete Work duly certified by the ENGINEER. The BMA will pay the CONTRACTOR the balance of said invoice within sixty (60) days after the date the final invoice has been accepted by the BMA.

Prior to final payment, the CONTRACTOR shall obtain and furnish to the BMA satisfactory evidence that the Work is fully released from all claims, liens and demands and shall secure and furnish written consent of his sureties to final payment hereunder.

Acceptance by the CONTRACTOR of the final payment shall relieve the CONTRACTOR and his sureties from their obligations under or in connection with the Contract.

10.5 PARTIAL PAYMENTS AS ADVANCES

All materials and Works covered by partial payments already made shall, thereafter, become the sole property of the BMA, but this provision shall not be construed as relieving the CONTRACTOR

PART D : SPECIAL CONDITIONS

from the responsibilities and obligations under the Contract. All such intermediate payments shall be regarded as payment by way of advance against the final payment only, and not as payments for Work actually done and completed, and shall not preclude the requiring of bad, unsound and imperfect Work to be removed and reconstructed. Such payment shall not be considered nor shall it indicate the accruing of any claim, nor shall it conclude, determine, or affect in any way the powers of the ENGINEER under this Contract as to the final settlement and adjustment of the accounts or in any other way vary or affect the Contract.

10.6 MODIFICATION OF PAYMENT CERTIFICATES

The ENGINEER may by any certificate make any correction or modification to any previous certificate which will have been issued by him and shall have the power to withhold any certificate if the Work or any part thereof is not being carried out to his satisfaction.

10.7 EQUIPMENT AND MATERIAL PROVIDED BY BMA

Where equipment and material are provided to the CONTRACTOR by the BMA for installation under this Contract, such equipment and material shall be used only for this Contract. Should damages, losses or shortages occur in the BMA-furnished equipment or material while it is in the custody of the CONTRACTOR, the value of the damages or material shortage may be deducted from any sums then due or to become due to the CONTRACTOR under the Contract, or otherwise deducted from the security deposit. All equipment and materials supplied to the CONTRACTOR shall remain the absolute property of the BMA, and shall not on any account be removed from the Site and shall at all times be open to inspection by the BMA and the ENGINEER.

Any such equipment or materials unused at the time of Contract completion shall be returned to the BMA along with a notice in writing from the CONTRACTOR provided the CONTRACTOR has obtained written permission from the ENGINEER to return such material.

The CONTRACTOR shall have no claim for compensation for any BMA-furnished material which has not been used or for any wastage in or damage to any such materials.

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- 10.8 **ADJUSTMENT OF PRICES**
Price adjustments are allowed under the Contract. Unless provided otherwise in the Contract, the BMA's regulation on price adjustment shall prevail.
- 10.9 **OFFSET OF OUTSTANDING OBLIGATIONS OF CONTRACTOR**
Any and all payments due to the CONTRACTOR under this Contract may, at the discretion of the BMA, be offset or charged against any and all outstanding obligations of the CONTRACTOR to the BMA under any or all other contracts with BMA or other business transactions between the CONTRACTOR and BMA, subject to the usual pre-audit requirement.

11.0 MAINTENANCE

- 11.1 **EXTENDED MAINTENANCE**
Maintenance of the Works after the end of the Guarantee Period shall be carried out by the CONTRACTOR if the BMA chooses the option to require extended maintenance. The said extended maintenance shall be carried out according to the provisions of Part H, "Maintenance Specifications," of the Tender Document under a separate maintenance contract between the BMA and the CONTRACTOR. The final form and conditions of the extended maintenance contract shall be negotiated prior to expiration of the guarantee period based on the Proposed Rates and Prices for Extended Maintenance submitted by the CONTRACTOR at the time of tender and the Maintenance Specifications.
- 11.2 **PROPOSED RATES AND PRICES FOR EXTENDED MAINTENANCE**
The Tenderer shall prepare and submit the "Proposed Rates and Prices for Extended Maintenance" on the form provided in Annexes of PART B of the Invitation to Tender. The proposed rates and prices will not be used in price comparison for this Contract and will not be included in the Contract Price. However, the BMA reserves the right to negotiate the maintenance prices and, if an agreement can not be reached, to reject a tender.

KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION

**INVITATION TO TENDER
FOR
BANGKOK AREA TRAFFIC CONTROL SYSTEM PROJECT - STAGE I**

PART E

FORM OF AGREEMENT

แบบสัญญาจ้าง (แบบจ่ายค่าจ้างตามปริมาณงานที่ทำได้เป็นรายเดือน)

สัญญาฉบับนี้ทำขึ้น ณ

ตำบล/แขวง.....อำเภอ/เขต.....จังหวัด.....

เมื่อวันที่...เดือน.....พ.ศ.... ระหว่างกรุงเทพมหานคร โดย(๒).....

ตำบล/แขวง.....อำเภอ/เขต.....จังหวัด.....

ซึ่งต่อไปในสัญญานี้เรียกว่า "ผู้รับจ้าง" อีกฝ่ายหนึ่ง โดยมีข้อตกลงกันดังต่อไปนี้

ข้อ ๑ ผู้ว่าจ้างตกลงจ้างผู้รับจ้างให้ทำการ(๔).....

ที่แขวง.....เขต.....กรุงเทพมหานคร ให้ถูกต้องตามแบบรูปและรายการ

ละเอียดท้ายสัญญาทุกประการ เป็นราคารวมทั้งสิ้น.....บาท (.....)

ข้อ ๒ ผู้รับจ้างตกลงรับทำการตามที่กำหนดดังกล่าวในสัญญาข้อ ๑ โดยสัญญาว่าจะจัดหาสิ่งของชนิดดี ใช้เครื่องมือดี และช่างฝีมือดี เพื่อประกอบการตามสัญญานั้นจนแล้วเสร็จ

ข้อ ๓ ในวันที่ทำสัญญานี้ ผู้รับจ้างได้นำหลักประกันเป็น(๕)..... เป็นจำนวนร้อยละ

ประกันการปฏิบัติตามสัญญา หลักประกันดังกล่าวมีอายุประกันหลังจากวันกิจการแล้วเสร็จ

ภายในกำหนดความรับผิดชอบตามสัญญา ถ้าวันแล้วเสร็จตามสัญญาต้องยึดออกไปด้วยเหตุใด ๆ

ก็ตาม ผู้รับจ้างต้องนำหลักประกันมามอบให้แก่ผู้ว่าจ้างให้มีอายุการประกันให้ครบความรับ

ผิดตามสัญญาเสมอไป

หลักประกันที่ผู้รับจ้างนำมามอบไว้ตามวรรคหนึ่ง ผู้ว่าจ้างจะคืนให้เมื่อผู้รับ

จ้างพ้นจากข้อผูกพันตามสัญญาข้อ ๖ วรรคหนึ่งแล้ว และผู้ว่าจ้างมิได้กำลังถูกเรียกร้อง

ให้ชดใช้ค่าเสียหาย หรือถูกดำเนินคดีให้ชดใช้ค่าเสียหายอันเกี่ยวเนื่องกับการจ้างนั้นภาย

ใน ๑๕ วัน นับแต่วันที่ผู้รับจ้างยื่นคำร้องขอคืนหลักประกันสัญญาดังกล่าว

ข้อ ๔ จำนวนเนื้องานแต่ละประเภทที่กำหนดไว้ในแบบรูปและรายละเอียดท้าย

สัญญานี้ ผู้ว่าจ้างและผู้รับจ้างและผู้รับจ้างยอมรับว่าเป็นจำนวนโดยประมาณเท่านั้น จำนวน

เนื้องานที่แท้จริงให้ยึดถือจำนวนเนื้องานที่ผู้ว่าจ้างกำหนดได้ จำนวนเนื้องานที่แท้จริงอาจมากกว่าหรือน้อยกว่าจำนวนเนื้องานที่กำหนดได้ในแบบรูป และรายการละเอียดของแต่ละประเภทงานที่กำหนดไว้ แต่ค่าจ้างทั้งหมดตามสัญญาฉบับนี้จะต้องไม่เกินวงเงิน บาท (.) หากเกินวงเงินดังกล่าวนี้ ผู้ว่าจ้างและผู้รับจ้างจะทำความตกลงกันอีกครั้งหนึ่ง

ผู้ว่าจ้างตกลงจ่ายค่าจ้างและผู้รับจ้างตกลงรับค่าจ้างเป็นรายเดือน ตามผลงานและราคาของแต่ละประเภทงานที่ผู้รับจ้างจัดทำได้โดยสมบูรณ์ การจ่ายเงินนี้ผู้ว่าจ้างจะจ่ายให้ไม่เกินร้อยละเก้าสิบของราคาค่าผลงานที่ขอเบิกในแต่ละครั้ง ส่วนที่เหลือจะหักได้เพื่อเป็นประกันผลงาน หรือผู้รับจ้างจะใช้หนังสือค้ำประกันของธนาคารภายในประเทศตามจำนวนเงินที่หักไว้มาวางไว้แทนก็ได้

งวดสุดท้ายผู้ว่าจ้างจะจ่ายเงินค่าผลงานที่เหลือกับเงินที่หักได้ เป็นประกันผลงาน คืนให้แก่ผู้รับจ้างเมื่อผู้รับจ้างทำงานแล้วเสร็จเรียบร้อยถูกต้องตามแบบรูปและรายการละเอียดท้ายสัญญาทุกประการ

เมื่อผู้ว่าจ้างหรือเจ้าหน้าที่ของผู้ว่าจ้างตรวจผลงานที่ส่งมอบถูกต้องครบถ้วนตามสัญญาแล้วผู้ว่าจ้างหรือเจ้าหน้าที่ของผู้ว่าจ้างจะออกใบรับรองผลการปฏิบัติงานให้ผู้รับจ้างไว้เป็นหลักฐาน

ข้อ ๕ ผู้รับจ้างสัญญาว่าจะทำงานตามสัญญานี้ให้แล้วเสร็จบริบูรณ์ภายใน วัน นับแต่วันทำสัญญาโดยจะเริ่มลงมือทำงาน ณ สถานที่ที่กำหนดภายในวันที่ . . . เดือน พ.ศ. และให้แล้วเสร็จบริบูรณ์ภายในวันที่ (๖) . . . เดือน พ.ศ. ถ้าผู้รับจ้างมิได้ลงมือทำงานภายในกำหนดเวลาดังกล่าวก็ดี หรือมีเหตุให้ผู้ว่าจ้างเชื่อได้ว่าผู้รับจ้างไม่สามารถทำงานให้แล้วเสร็จบริบูรณ์ไปแล้วก็ดี หรือผู้รับจ้างทำสัญญาผิดสัญญาข้อหนึ่งข้อใดก็ดี ผู้ว่าจ้างมีสิทธิจะบอกเลิกสัญญานี้ได้ และมีอำนาจจ้างผู้อื่นทำงานจ้างนี้ต่อจากผู้รับจ้างได้ด้วย

เหตุการณ์ที่ไม่ตั้งใจทำงานให้ได้ผลดี เมื่อผู้ว่าจ้างได้เตือนเป็นหนังสือและผู้รับจ้างได้รับหนังสือเตือนดังกล่าวแล้ว หากผู้รับจ้างยังไม่ลงมือปฏิบัติงานต่อเนื่องภายในกำหนดเวลา เจ็ดวันนับแต่วันได้รับหนังสือเตือน ผู้ว่าจ้างมีสิทธิเลิกสัญญาได้ทันทีโดยไม่ต้องชดเชยค่าเสียหายใด ๆ แก่ผู้รับจ้าง

ในระหว่างที่ผู้รับจ้างปฏิบัติงานอยู่ หากมีอุปสรรคในการดำเนินการ เป็นหน้าที่ของผู้รับจ้างต้องแก้ไขอุปสรรคข้อขัดข้องนั้น รวมทั้งจะต้องออกค่าใช้จ่ายในการดำเนินงานดังกล่าว และจะนำมาเป็นข้อเรียกร้องขอชดเชยค่าใช้จ่ายในการดำเนินงาน และหรือบิณฑกกำหนดเวลาแล้วเสร็จไม่ได้

ผู้รับจ้างต้องรับผิดชอบบริเวณสถานที่ปฏิบัติงานทั้งหมดและต้องหมั่นตรวจสอบระดับตระวังมิให้เกิดข้อบกพร่องซึ่งเป็นอุปสรรคต่อการจราจร ในกรณีที่เกิดการชำรุดเสียหายจะมากหรือน้อยก็ตาม ซึ่งก่อให้เกิดความไม่สะดวกหรือเป็นที่กีดขวางต่อการสัญจรของประชาชนและยานพาหนะ ผู้รับจ้างจะต้องแก้ไขให้หมดไปโดยเร็วและหมั่นบำรุงรักษาให้อยู่ในสภาพปกติตลอดเวลา หากผู้รับจ้างไม่ปฏิบัติให้เป็นไปตามสัญญาข้อนี้ ผู้ว่าจ้างมีสิทธิเลิกสัญญาได้ทันที โดยผู้ว่าจ้างไม่ต้องชดเชยค่าเสียหายใด ๆ แก่ผู้รับจ้าง

การที่ผู้ว่าจ้างไม่บอกเลิกสัญญาตามความในวรรคหนึ่ง หรือวรรคสอง หรือวรรคสาม ไม่เป็นเหตุให้ผู้รับจ้างพ้นจากความรับผิดชอบตามสัญญานี้

ข้อ ๖ เมื่องานแล้วเสร็จเรียบร้อยและผู้ว่าจ้างได้รับมอบงานจากผู้รับจ้าง หรือจากผู้รับจ้างคนใหม่ในกรณีผู้รับจ้างผิดสัญญาและผู้ว่าจ้างใช้สิทธิเลิกสัญญาตามข้อ ๕ ถ้ามีเหตุชำรุดเสียหายเกิดขึ้นแก่งานจ้างนี้ภายในกำหนด(๗)ปีเดือน นับแต่วันที่ได้รับมอบงานโดยให้นับวันที่ได้รับมอบงานเป็นวันเริ่มต้น ซึ่งเหตุชำรุดเสียหายนั้นเกิดจากความบกพร่องของผู้รับจ้าง จะเป็นโดยท้าวไม่เรียบร้อยหรือใช้สิ่งของที่ไม่ดีหรือหาไม่ถูกต้องตามหลักวิชาก็ตาม ผู้รับจ้างต้องรีบทำการแก้ไขให้เป็นที่เรียบร้อยภายในระยะเวลาที่ผู้ว่าจ้างจะกำหนด โดยไม่คิดเอาค่าสิ่งของค่าแรงงานหรือค่าใช้จ่ายอื่นใดจากผู้ว่าจ้างอีก ถ้าผู้รับจ้างบิดพลิ้วไม่แก้ไขซ่อมแซมภายในกำหนด(๗)วัน นับแต่วันที่ได้รับแจ้งเป็น

หนังสือจากผู้ว่าจ้าง โดยให้นับวันที่ได้รับแจ้ง เป็นวันเริ่มต้นหรือแก้ไขซ่อมแซมไม่แล้วเสร็จ
เรียบร้อยภายในเวลาที่ผู้ว่าจ้างมีสิทธิจ้างผู้อื่นให้ทำงานจ้างนั้นแทนผู้รับจ้างได้

ถ้างานที่จ้างเกิดการชำรุดบกพร่องเสียหายขึ้นหลังจากระยะเวลาที่กำหนด
ข้างต้น ผู้รับจ้างยังต้องรับผิดชอบที่บัญญัติไว้ในประมวลกฎหมายแพ่งและพาณิชย์ด้วย

ในกรณีที่ผู้ว่าจ้างใช้สิทธิจ้างผู้อื่นทำงานจ้างแทนผู้รับจ้างตามสัญญาข้อ ๕ และ
ข้อ ๖ วรรคหนึ่ง ผู้รับจ้างบอมจ่ายเงินค่าจ้าง ค่าสิ่งของ ค่าคุมงาน และค่าใช้จ่ายอื่นใด
(ถ้ามี) ตามจำนวนที่ผู้ว่าจ้างต้องเสียไปโดยสิ้นเชิง และผู้รับจ้างยังคงต้องรับผิดชอบตาม
สัญญาข้อ ๑๑ เสมือนหนึ่งงานที่ผู้รับจ้างคนใหม่ที่ทำนั้นเป็นงานจ้างของตน

ข้อ ๑๑ เนื่องจากพันธะซึ่งจะมีต่อกันตามสัญญานี้ ผู้รับจ้างยินยอมให้บรรดางานที่ผู้รับ
จ้างได้ทำขึ้นรวมทั้งโรงงาน สิ่งปลูกสร้าง และสิ่งของต่าง ๆ ที่ได้นำมาไว้ ณ สถานที่
ทำงานจ้างโดยเฉพาะ เพื่องานดังกล่าวในสัญญาข้อ ๑ ให้กรรมสิทธิ์ตกเป็นของผู้ว่าจ้าง
ทั้งสิ้น แต่ถ้ามีอันตรายหรือความเสียหายใด ๆ เกิดขึ้นแก่สิ่งเหล่านั้น แม้จะเกิดขึ้นเพราะ
เหตุสุดวิสัยประการใดก็ตาม ผู้รับจ้างจะต้องเป็นผู้รับผิดชอบในความเสียหายเหล่านั้น และจัด
หามาใหม่หรือแก้ไขให้คืนดี ทั้งนี้ภายในพันธะที่มีอยู่ในสัญญาอันยังไม่ถึงที่สุด เว้นแต่ภายหลัง
เวลาส่งมอบ ซึ่งผู้รับจ้างจำต้องรับผิดชอบเพียงความบกพร่องและเพียงในความเสียหายที่มีขึ้น
ภายในระยะเวลาตามที่กล่าวในสัญญาข้อ ๖

ในกรณีที่ผู้รับจ้างทำงานแล้วเสร็จบริบูรณ์ตามสัญญา ถ้ามีสิ่งของเหลืออยู่เท่าใด
ผู้ว่าจ้างยอมให้ผู้รับจ้างนำเอากลับคืนไปได้

ข้อ ๑๒ สัญญานี้มีแบบรูปและรายการละเอียดดังต่อไปนี้(๘)

- ๑.....
- ๒.....
- ๓.....
-

และให้ถือว่าแบบรูปและรายการละเอียดดังกล่าวเป็นส่วนหนึ่งของสัญญา

ข้อ ๘ ผู้รับจ้างสัญญาว่าจะไม่ทำงานจ้างนี้โดยไม่มีแบบรูปและรายการละเอียดที่ถูกต้องเป็นอันขาดทั้งจะรักษาแบบรูปและรายการละเอียดนี้ไว้ ณ สถานที่ทำงานจ้างให้เรียบร้อย และโดยเปิดเผยเพื่อให้ผู้ว่าจ้างหรือกรรมการตรวจการจ้างหรือผู้ควบคุมงานตรวจดูได้ตลอดเวลา

ข้อ ๑๐ ผู้รับจ้างสัญญาว่าจะไม่เอางานทั้งหมดหรือส่วนใดส่วนหนึ่งแห่งสัญญานี้ไปให้ผู้รับจ้างช่วงอีกทอดหนึ่ง โดยมิได้รับอนุญาตเป็นหนังสือจากผู้ว่าจ้าง แต่ทั้งนี้ผู้รับจ้างยังคงรับผิดชอบงานที่ให้ช่วงไปนั้นทุกประการ

ข้อ ๑๑ ผู้รับจ้างจะต้องควบคุมงานที่รับจ้างนี้อยู่ตลอดเวลาทำงานยังไม่แล้วเสร็จ หรือจะมอบหมายให้ผู้อื่นเป็นผู้ควบคุมงานแทนตนก็ได้ ในกรณีเช่นว่านี้ ให้ผู้รับจ้างแจ้งชื่อผู้ได้รับมอบหมายให้ผู้ว่าจ้างทราบเป็นหนังสือและผู้ควบคุมงานแทนผู้รับจ้างจะต้องเป็นผู้รับผิดชอบแทนผู้รับจ้าง คำสั่งต่าง ๆ ซึ่งได้แจ้งแก่ผู้แทนของผู้รับจ้างถือได้ว่าได้แจ้งแก่ผู้รับจ้างแล้ว

ข้อ ๑๒ ในกรณีที่ผู้รับจ้างตั้งตัวแทนไปควบคุมงานตามข้อ ๑๑ ถ้าผู้ว่าจ้างขอให้เปลี่ยนตัวแทนใหม่ผู้รับจ้างยินยอมเปลี่ยนตัวให้ทันที โดยจะไม่เรียกร้องค่าเสียหายหรือถือเป็นเหตุขี้ตัวนทาการออกไป ถ้าผู้รับจ้างจะเปลี่ยนผู้ควบคุมงาน ต้องแจ้งชื่อผู้แทนให้ผู้ว่าจ้างทราบเป็นหนังสือทุกครั้งด้วย

ข้อ ๑๓ ผู้รับจ้างจะต้องรับผิดชอบต่ออุบัติเหตุ หรือภัยอันตราย ความเสียหายใด ๆ ที่เกิดขึ้นจากการงานของผู้รับจ้างเอง และต้องรับผิดชอบในเหตุเสียหายอันเกิดแก่ทรัพย์สินของผู้ว่าจ้างซึ่งมีอยู่ในบริเวณที่ทำการจ้างนี้ โดยการกระทำของคณงาน ช่าง หรือบริวารของผู้รับจ้างด้วย

ข้อ ๑๔ ผู้รับจ้างจะต้องจ่ายเงินค่าจ้างให้แก่ลูกจ้างของตนตามอัตราค่าจ้างและ

กำหนดเวลาที่ผู้รับจ้างและลูกจ้างได้ตกลงหรือสัญญากันได้

ถ้าผู้รับจ้างไม่จ่ายเงินค่าจ้างให้แก่ลูกจ้างตามวรรคหนึ่ง ผู้รับจ้างยอมให้
ผู้ว่าจ้างเอาเงินค่าจ้างที่ผู้ว่าจ้างจะต้องจ่ายให้แก่ผู้รับจ้าง จ่ายให้แก่ลูกจ้างของผู้รับจ้าง
ได้ และให้ถือว่าเงินจำนวนที่จ่ายไปนี้เป็นเงินค่าจ้างที่ผู้รับจ้างได้รับไปจากผู้ว่าจ้างแล้ว

การที่ผู้รับจ้างไม่จ่ายเงินค่าจ้างให้แก่ลูกจ้างของตนตามวรรคสอง นอกจาก
ยอมให้ผู้ว่าจ้างจ่ายเงินค่าจ้างให้แก่ลูกจ้างของผู้รับจ้างแล้ว ยังให้ถือว่าผู้รับจ้างผิดสัญญา
นี้ด้วย และผู้ว่าจ้างจะบอกเลิกสัญญาเสียทั้งหมดก็ได้

ข้อ ๑๕ ถ้าผู้ว่าจ้างแต่งตั้งกรรมการตรวจการจ้างหรือผู้ควบคุมงานไว้ประจำ ณ
ที่ทำการจ้างนี้ในเวลาที่ผู้จ้างเตรียมการหรือกำลังทำงานจ้างนี้อยู่ก็ดี กรรมการตรวจการ
จ้างหรือผู้ควบคุมงานมีสิทธิจะเข้าไปตรวจการงานได้ตลอดเวลา ผู้รับจ้างหรือผู้แทนของ
ผู้รับจ้างจักต้องให้ความสะดวกและช่วยเหลือตามสมควร

การที่มีกรรมการตรวจการจ้างหรือผู้ควบคุมงานแทนคณะกรรมการตรวจ
การจ้าง หากทำให้ผู้รับจ้างพ้นความรับผิดชอบตามสัญญาข้อหนึ่งข้อใดไม่

ข้อ ๑๖ ก่อนหรือระหว่างทำงานจ้างอยู่ ถ้าปรากฏว่าแบบรูปหรือรายการละเอียด
ต่อท้ายสัญญานี้คลาดเคลื่อนผิดไปอย่างหนึ่งอย่างใด ผู้รับจ้างสัญญาว่าจะปฏิบัติตามคำวินิจฉัย
ของคณะกรรมการตรวจการจ้างหรือผู้ควบคุมงานแทนคณะกรรมการตรวจการจ้าง และถ้า
คำวินิจฉัยนี้ถูกต้องกับรายการอันใดอันหนึ่งที่ปรากฏในแบบรูปแล้ว ผู้รับจ้างต้องถือว่าเป็นอัน
เด็ดขาด ถ้าอันหนึ่งอันใดมิได้ระบุไว้ในรายการละเอียดแต่เป็นการจำเป็นต้องทำเพื่อให้งาน
แล้วเสร็จบริบูรณ์ถูกต้องตามแบบรูป ผู้รับจ้างสัญญาว่าจะจัดทำกรณนั้น ๆ ให้โดยไม่คิด
ค่าใช้จ่ายใด ๆ เพิ่มเติม ทั้งนี้รายการที่คลาดเคลื่อนหรือมิได้ระบุไว้ดังกล่าวจะต้องมิใช่
ส่วนที่เป็นสาระสำคัญ

ข้อ ๑๗ กรณีที่ผู้ว่าจ้างแต่งตั้งกรรมการตรวจการจ้างหรือผู้ควบคุมงานแทนคณะกรรมการ

การตรวจการจ้าง ผู้รับจ้างขอมิให้กรรมการตรวจการจ้างหรือผู้ควบคุมงานมีอำนาจตรวจ และควบคุมงานให้เป็นไปตามข้อกำหนดในสัญญาแบบรูป และรายการละเอียด โดยให้มี อำนาจสั่งเปลี่ยนแปลง แก้ไข เพิ่มเติม หรือตัดทอนกิจการจ้างนี้ได้ เพื่อให้เป็นไปตามข้อกำหนดในสัญญาแบบรูปและรายการละเอียด และถ้าผู้รับจ้างขัดขืนก็ให้คณะกรรมการตรวจ การจ้างหรือผู้ควบคุมงานแทนคณะกรรมการตรวจการจ้างมีอำนาจสั่งหยุดกิจการนั้นได้ชั่ว คราวได้ และความล่าช้าในกรณีเช่นนี้ผู้รับจ้างจะถือเป็นเหตุขอขีตวันทำการออกไปมิได้

ข้อ ๑๘ ผู้ว่าจ้างมีสิทธิที่จะมาการแก้ไขหรือเพิ่มเติมหรือลดงานจากแบบรูปและ รายการละเอียดตามสัญญาได้ทุกอย่างโดยไม่ต้องเลิกสัญญานี้ การเพิ่มเติมหรือลดงาน จะต้องคิดและตกลงราคากันใหม่ และถ้าต้องเพิ่มหรือลดเงินหรือบิดเวลาออกไปอีกก็จะ ได้ตกลงกัน ณ บัดนั้น(๕)

ข้อ ๑๙ ถ้าผู้รับจ้างส่งมอบงานล่าช้ากว่าวันแล้วเสร็จตามสัญญา แต่ผู้ว่าจ้างยังมีได้ บอกเลิกสัญญา ผู้รับจ้างขอมิให้ผู้ว่าจ้างดำเนินการดังต่อไปนี้ คือ

(๑) ปรับผู้รับจ้างเป็นรายวัน วันละ(๑๐).....บาท (.....)

นับแต่วันที่ล่วงเลยกำหนดวันแล้วเสร็จตามสัญญาจนถึงวันทำงานแล้ว

เสร็จบริบูรณ์

(๒) เรียกค่าเสียหายอันเกิดขึ้นจากการที่ผู้รับจ้างทำงานล่าช้า (ถ้ามี)

(๓) เรียกค่าใช้จ่ายในการควบคุมงาน ในเมื่อผู้ว่าจ้างต้องจ้างผู้ควบคุม

งานนั้นอีกต่อหนึ่งนับแต่วันที่ล่วงเลยกำหนดวันแล้วเสร็จตามสัญญา

จนถึงวันที่ผู้รับจ้างส่งมอบงานโดยคิดเป็นรายวัน

วันละ(๑๑).....บาท (.....)

ในระหว่างที่มีการปรับนั้น ถ้าผู้ว่าจ้างเห็นว่าผู้รับจ้างไม่อาจปฏิบัติตามสัญญา ต่อไปได้ ผู้ว่าจ้างมีสิทธิบอกเลิกสัญญาและใช้สิทธิตามสัญญา ข้อ ๒๐ นอกเหนือจากการปรับ

จนถึงวันบอกเลิกสัญญาด้วย

ข้อ ๒๐ ถ้าผู้ว่าจ้างบอกเลิกสัญญาแล้ว ผู้รับจ้างยอมให้ผู้ว่าจ้างดำเนินการดังต่อไปนี้

- (๑) รับผิดชอบประกันสัญญาดังกล่าวในสัญญาข้อ ๑
- (๒) ยินยอมให้ผู้ว่าจ้างเรียกเอาค่าจ้างที่เพิ่มขึ้นเพราะจ้างบุคคลอื่นทำการนี้ต่อไปจนงานแล้วเสร็จบริบูรณ์
- (๓) เรียกเอาค่าใช้จ่ายในการควบคุมงานในเมื่อผู้ว่าจ้างต้องจ้างผู้ควบคุมงานนั้นอีกต่อหนึ่งจนงานแล้วเสร็จบริบูรณ์
- (๔) เรียกค่าเสียหายอันพึงมีจากผู้รับจ้าง

ข้อ ๒๑ เมื่อผู้ว่าจ้างบอกเลิกสัญญาแล้ว บรรดางานที่ผู้รับจ้างได้ทำขึ้นและสิ่งของต่าง ๆ ที่ได้เข้ามาไว้ ณ สถานที่ทำงานจ้างนั้น โดยเฉพาะเพื่องานจ้างดังกล่าว ผู้รับจ้างยอมให้ตกเป็นกรรมสิทธิ์ของผู้ว่าจ้าง โดยผู้รับจ้างจะเรียกร้องค่าตอบแทนและค่าเสียหายใด ๆ ไม่ได้เลย และผู้รับจ้างยอมให้ผู้ว่าจ้างมีสิทธิระงับการจ่ายค่าจ้างที่ค้างชำระสำหรับงานที่หาไปแล้วเพื่อเป็นประกันการชำระหนี้

ในกรณีที่ต้องจ้างบุคคลอื่นทำงานที่ค้างอยู่ให้แล้วเสร็จบริบูรณ์ หากปรากฏว่าเงินค่างานที่เหลือจ่ายไม่สำหรับการทำงานรายนี้เป็นจำนวนเท่าใด ผู้รับจ้างยอมให้ผู้ว่าจ้างหักเงินจำนวนนั้นจากค่าจ้างที่ค้างชำระตามวรรคหนึ่ง และยอมรับผิดค่าใช้จ่ายจำนวนที่ยังขาดอยู่นั้นจนครบถ้วน

หากมีเงินค่าจ้างตามสัญญาที่หักไว้จ่ายเป็นค่าปรับและค่าเสียหายแล้ว ยังเหลืออยู่อีกเท่าใดผู้ว่าจ้างจะคืนให้แก่ผู้รับจ้างทั้งหมด

ข้อ ๒๒ ถ้าผู้รับจ้างหรือบริวารของผู้รับจ้างได้ก่อสร้างโรงงานหรือสิ่งปลูกสร้างใด ๆ ลงในบริเวณที่รับจ้างกีด หรือทำให้เป็นหลุมเป็นบ่อกีด ผู้รับจ้างสัญญาว่าจะจัดการรักษาความสะอาดตลอดเวลาที่ทำงานจ้าง และเมื่องานจ้างแล้วเสร็จจะต้องรื้อถอนสิ่งปลูกสร้างและกลบเกลี่ยพื้นดินให้เรียบร้อย และขนเศษอิฐเศษไม้ และสิ่งที่ทรงรังออกไปให้พ้นบริเวณที่รับจ้าง พร้อมทั้งทำความสะอาดบริเวณที่รับจ้างและสิ่งปลูกสร้างให้เรียบร้อยอยู่ในสภาพที่ผู้ว่าจ้างจะใช้การได้ทันที

ข้อ ๒๓ บรรดาสิทธิเรียกร้องใด ๆ ซึ่งผู้รับจ้างมีอยู่ตามสัญญา ผู้รับจ้างไม่อาจทำ การโอนสิทธิเรียกร้องนี้ให้แก่บุคคลภายนอกได้ เว้นแต่จะได้รับความยินยอมเป็นหนังสือจาก ผู้ว่าจ้าง

ข้อ ๒๔ ในกรณีที่มิเหตุสุดวิสัย หรือเหตุใด ๆ อันเนื่องมาจากความผิดหรือความ บกพร่องของฝ่ายผู้ว่าจ้าง หรือพฤติการณ์อันหนึ่งอันใดที่ผู้รับจ้างไม่ต้องรับผิดชอบกฎหมาย ทำให้ผู้รับจ้างไม่สามารถทำงานให้แล้วเสร็จตามเงื่อนไขและกำหนดเวลาแห่งสัญญานี้ได้ ผู้รับจ้างจะต้องแจ้งเหตุหรือพฤติการณ์ดังกล่าว พร้อมหลักฐานเป็นหนังสือให้ผู้รับจ้างทราบ เพื่อขอขยายเวลาทำงานออกไปภายใน ๑๕ วัน นับแต่วันที่เหตุนั้นสิ้นสุดลง

ถ้าผู้รับจ้างไม่ปฏิบัติให้เป็นไปตามความในวรรคหนึ่ง ให้ถือว่าผู้รับจ้างได้ละสิทธิ เรียกร้องในการที่จะขอขยายเวลาทำงานออกไปโดยไม่มีเงื่อนไขใด ๆ ทั้งสิ้น เว้นแต่ กรณีเหตุเกิดจากความผิดหรือความบกพร่องของฝ่ายผู้ว่าจ้าง ซึ่งมีหลักฐานชัดเจน หรือผู้ ว่าจ้างทราบตั้งแต่ต้น

การขยายกำหนดเวลาทำงานตามวรรคหนึ่ง อยู่ในดุลพินิจของผู้ว่าจ้างที่จะพิจารณา สัญญานี้ทำขึ้นสองฉบับ มีข้อความเป็นอย่างเดียวกัน คู่สัญญาได้อ่านเข้าใจข้อความ โดยละเอียดตลอดแล้ว จึงได้ลงลายมือชื่อพร้อมทั้งประทับตรา(ถ้ามี) ไว้เป็นสำคัญต่อหน้า พยานและเก็บไว้ฝ่ายละฉบับ

ลงชื่อ.....ผู้ว่าจ้าง

(.....)

ลงชื่อ.....ผู้รับจ้าง

(.....)

ลงชื่อ.....พยาน

(.....)

ลงชื่อ.....พยาน

วิธีปฏิบัติเกี่ยวกับสัญญาจ้าง

- (๑) ให้ระบุเลขที่สัญญาในบิลประมาณหนึ่ง ๆ ตามลำดับ
- (๒) ให้ระบุชื่อและตำแหน่งของผู้ลงนามในสัญญา เช่น นาย ก ผู้อำนวยการสำนัก.....
ทำการโดยได้รับมอบอำนาจจากผู้ว่าราชการกรุงเทพมหานคร หรือ นาย ก ผู้อำนวยการ
สำนัก.....ทำการตามข้อบัญญัติกรุงเทพมหานคร เรื่อง การพัสดุ
พ.ศ. ๒๕๒๕
- (๓) ให้ระบุชื่อผู้รับจ้าง
 - ก. บุคคลธรรมดา ให้ระบุชื่อและที่อยู่
 - ข. นิติบุคคล เช่น ห้างหุ้นส่วนนิติบุคคล ห้างหุ้นส่วนจำกัด บริษัทจำกัด ให้ระบุชื่อพร้อม
กับระบุว่า โดย นาย ก กรรมการผู้มีอำนาจผูกพันบริษัท ข ตามหนังสือรับรองของ
สำนักงานทะเบียนหุ้นส่วนบริษัท เลขที่..... ลงวันที่.....เดือน.....
พ.ศ.....
- (๔) ให้ระบุวันที่ต้องการจ้าง
- (๕) "หลักประกัน" หมายถึง หลักประกันที่ผู้รับจ้างนำมามอบไว้แก่กรุงเทพมหานครเมื่อลงนาม
ในเพื่อเป็นการประกันความเสียหายที่อาจจะเกิดขึ้นจากการปฏิบัติตามสัญญา ซึ่งใช้ได้ ๔
ประเภท คือ
 - ก. เงินสด
 - ข. พันธบัตรเงินกู้ของรัฐบาล โดยจะต้องถือปฏิบัติตามวิธีการที่กระทรวงการคลังกำหนด
 - ค. เช็คที่ธนาคารรับรอง (Certified Cheques) หรือเช็คที่ธนาคารเซ็นสั่งจ่าย
(Bankers Cheques) ซึ่งเป็นเช็คลงวันที่ทำใช้เชิคนั้นชำระต่อเจ้าหน้าที่หรือก่อนวัน
นั้นไม่เกินสามวัน ห้ามรับเช็คลงวันที่ล่วงหน้า และเมื่อรับไว้แล้วให้นำส่งฝากทันที
 - ง. หนังสือค้ำประกันของธนาคารภายในประเทศ
- (๖) ให้ระบุวันแล้วเสร็จของงาน

- (๘) ระยะเวลาความรับผิดชอบของผู้รับจ้างในความชำรุดบกพร่องของงานจ้างตามสัญญา ถ้าเป็นสิ่งปลูกสร้างติดกับพื้นดินให้กำหนดหนึ่งปี ส่วนงานจ้างอย่างอื่นจะกำหนดให้ลดหย่อนลงมาเท่าใดให้ผู้ในดุลพินิจของผู้ว่าจ้างที่จะพิจารณา โดยคำนึงถึงลักษณะของงานนั้น ๆ สำหรับระยะเวลาแก้ไขซ่อมแซมจะกำหนดเท่าใด อยู่ในดุลพินิจของผู้ว่าจ้าง
- (๙) ให้ระบุจำนวนรายการว่ามีกี่ฉบับ ฉบับละกี่หน้า เลขที่ของแบบรูปและแผนผัง
- (๑๐) การดำเนินการตามข้อนี้จะต้องเป็นไปตามข้อ ๒๒ และข้อ ๖๑ แห่งข้อบัญญัติกรุงเทพมหานคร เรื่อง การพัสดุ พ.ศ. ๒๕๒๕
- (๑๑) ให้กำหนดค่าปรับผู้รับจ้างไว้ดังนี้
- ก. กรณีผู้รับจ้างทำงานไม่แล้วเสร็จตามสัญญา ให้กำหนดค่าปรับเป็นรายวันในอัตราระหว่างร้อยละ ๐.๐๑ (ศูนย์จุดศูนย์หนึ่ง) ถึงร้อยละ ๐.๒๕ (ศูนย์จุดสองห้า) ของราคาค่าจ้างที่ระบุไว้ในสัญญา ส่วนกรณีจะปรับร้อยละเท่าใด ให้อยู่ในดุลพินิจของผู้สั่งจ่ายที่จะพิจารณา โดยคำนึงถึงราคาและลักษณะของพัสดุที่จ้าง ซึ่งอาจมีผลกระทบต่อการทำงานของผู้รับจ้างจะหลีกเลี่ยงไม่ปฏิบัติตามสัญญา แต่ทั้งนี้การที่จะกำหนดค่าปรับเป็นร้อยละเท่าใดสำหรับการจ้างโดยวิธีสอบราคาหรือวิธีประกวดราคา จะต้องประกาศให้ทราบล่วงหน้าในประกาศประกวดราคา ประกาศสอบราคา ด้วย
- ค่าปรับตามวรรคหนึ่งต้องไม่ต่ำกว่าวันละ ๓๐๐ บาท
- ข. กรณีการดำเนินการจ้างโดยวิธีพิเศษ ตามข้อ ๑๕ (๓) แห่งข้อบัญญัติกรุงเทพมหานคร เรื่อง การพัสดุ พ.ศ. ๒๕๒๕ ให้กีดค่าปรับเป็นสองเท่าของอัตราค่าปรับตามที่กำหนดไว้ข้างต้น
- (๑๒) ถ้าต้องจ่ายค่าคุมงานวันละเท่าใด ให้เรียกค่าคุมงานจากผู้รับจ้างวันละเท่า นั้นตามจำนวนที่ล่วงล่วงเลยกำหนดสัญญาไป แต่สัญญาข้อนี้ไม่รวมถึงค่าคุมงานในกรณีที่ต้องต่ออายุสัญญา ตามข้อ ๖๑ แห่งข้อบัญญัติกรุงเทพมหานคร เรื่อง การพัสดุ พ.ศ. ๒๕๒๕
- (๑๓) ถ้าเป็นสัญญาจ้างที่มีช่างานก่อสร้างให้ตัดสัญญาข้อนี้ออก

KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION

INVITATION TO TENDER
FOR
BANGKOK AREA TRAFFIC CONTROL SYSTEM PROJECT – STAGE I

PART F
FORM OF BOND

แบบหนังสือกำกับของธนาคาร

ธนาคาร.....

วันที่...เดือน.....พ.ศ.....

ข้าพเจ้า ธนาคาร(๑).....
สำนักงานตั้งอยู่เลขที่.....ถนน.....ตำบล/แขวง.....
อำเภอ/เขต.....จังหวัด.....ขอทำหนังสือกำกับให้ไว้
ต่อกรุงเทพมหานคร มีข้อความดังต่อไปนี้

ข้อ ๑ ตามที่ (๒).....
ได้ (๓).....ตาม (๔).....
ลงวันที่...เดือน.....พ.ศ.....ซึ่งจะต้องวางหลักประกันการปฏิบัติตามเงื่อนไขใน...
(.....) นั้น

ข้าพเจ้าขอมุทพินต้นเป็นผู้กำกับ (๒).....
ต่อกรุงเทพมหานคร เป็นเงินไม่เกิน.....บาท (.....)
กล่าวคือ หาก.....ไม่ปฏิบัติตามเงื่อนไข
ใน (๔).....ที่ทำไว้กับกรุงเทพมหานคร หรือปฏิบัติผิดเงื่อนไขข้อหนึ่งข้อใด
ของ.....ดังกล่าว ซึ่งกรุงเทพมหานครมีสิทธิรับหลักประกันหรือเรียก
ค่าปรับ และหรือค่าเสียหายใด ๆ จาก (๒).....ได้แล้ว
ข้าพเจ้าขอมชำระเงินแทนได้ทันทีโดยมิต้องเรียกร้องให้.....
ชำระก่อน

ข้อ ๒ ข้าพเจ้ายอมรับรู้และยินยอมด้วยในกรณีที่กรุงเทพมหานคร ได้ยินยอมให้ผิดหรือ
ผ่อนเวลา หรือ ผ่อนผันการปฏิบัติตามเงื่อนไขใน (๔).....
ให้แก่ (๒).....โดยเพียงแต่กรุงเทพมหานคร

แจ้งให้ข้าพเจ้าทราบโดยมิชักช้าเท่านั้น

ข้อ ๑ ข้าพเจ้าจะไม่เพิกถอนการค้าประกันในระหว่างเวลาที่ (๒).....

เพื่อเป็นหลักฐาน ข้าพเจ้าธนาคาร (๑).....

โดยผู้มีนามข้างท้ายนี้ เป็นผู้มีอำนาจลงนามทำนิติกรรม ซึ่งมีผลผูกพันธนาคาร

ได้ลงลายมือชื่อและได้ประทับตราให้ไว้ เป็นสำคัญ

ลงชื่อ.....ผู้ค้าประกัน

(.....)

ตำแหน่ง.....

ลงชื่อ.....พยาน

(.....)

ลงชื่อ.....พยาน

(.....)

วิธีปฏิบัติเกี่ยวกับหนังสือค้าประกันของธนาคาร

(๑) ให้ระบุชื่อธนาคารภายในประเทศซึ่งเป็นผู้ค้าประกัน

(๒) ให้ระบุชื่อบุคคลที่ธนาคารค้าประกัน

(๓) ให้ระบุว่าจะ เข้าชั้นของประกวดราคา หรือทำสัญญาหรือข้อตกลง

(๔) ให้ระบุว่าจะ ประกาศประกวดราคา หรือสัญญาหรือข้อตกลง เลขที่เท่าใด

**KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION**

**INVITATION TO TENDER
FOR
BANGKOK AREA TRAFFIC CONTROL SYSTEM PROJECT - STAGE I**

**PART G
TECHNICAL SPECIFICATIONS**

PART G: TECHNICAL SPECIFICATIONS

Reference made to Technical Specifications in this Invitation to Tender means the following documents which have been received by the Tenderers and bound in a separate volume entitled "PART G : TECHNICAL SPECIFICATION" prior to submission of the Tenderer's Technical Proposals:

PART G : TECHNICAL SPECIFICATION

Division I : General Requirements

Division II : Traffic Signal System

Division III : CCTV System

Division IV : Traffic Control Center and Storage Yard

**KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION**

**INVITATION TO TENDER
FOR
BANGKOK AREA TRAFFIC CONTROL SYSTEM PROJECT - STAGE I**

**PART H
MAINTENANCE SPECIFICATIONS**

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PART H: MAINTENANCE SPECIFICATIONS

1.0 GENERAL CONDITIONS

1.1 GENERAL OBLIGATIONS

The CONTRACTOR shall, subject to the provisions of the Contract and with due care and diligence, assume full responsibility for the maintenance works in accordance with these maintenance specifications and to the satisfaction of the ENGINEER and his duly authorized representative.

1.2 ENGINEER'S DUTIES AND POWERS

The ENGINEER shall carry out such duties in issuing decisions, instructions or orders as are specified in the Contract. The authority of the ENGINEER may be delegated but only in writing.

1.3 CONTRACTOR'S EMPLOYEES

The CONTRACTOR shall provide and employ its own competent personnel who are skilled in the maintenance of traffic signal system and associated equipment covered under the Contract. The number of qualified employees shall be sufficient to maintain the entire 143 signals, 5 CCTV field installations, and all of the traffic control system and CCTV system and associated equipment in the Traffic Control Center.

1.4 CONTRACTOR'S EQUIPMENT

The CONTRACTOR is required to own or lease equipment necessary in undertaking the maintenance contract.

1.5 ASSIGNMENT AND SUB-CONTRACT

The CONTRACTOR shall not assign, transfer, pledge, sub-contract or make any other disposition of the Contract without the approval of the BMA.

1.6 RESPONSIBILITY FOR DAMAGE CLAIMS

The CONTRACTOR shall indemnify the ENGINEER, BMA and his employees against all losses and claims to any person or property which may arise out of or in consequence of the execution of the maintenance works, except injuries or damage resulting from any act or neglect of the ENGINEER or his authorized representatives.

1.7 CONTRACT RENEWAL

The BMA shall have the right to extend the Contract for one additional year.

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If the BMA elects to extend the Contract, the unit prices for the various items of work shall be adjusted according to Section 2.8.1, "Escalation" of these specifications.

1.8 TEMPORARY SUSPENSION OF WORK

The ENGINEER shall have the authority to suspend the work wholly or in part, by written order, for such period as he may deem necessary due to adverse weather, conditions considered unsuitable for the proper prosecution of work, or for failure on the part of the CONTRACTOR to perform any provision of the specifications of the Contract. The CONTRACTOR shall immediately comply with such order as directed.

1.9 PERFORMANCE BOND AND INSURANCE

To guarantee the faithful performance of the Contract, the CONTRACTOR shall post a performance bond/security equivalent to ten(10) percent of the total annual contract price. The performance bond, in the form of cash, manager's check, cashier's check, bank guarantees, or a combination thereof, shall be posted in favor of the BMA.

Should any surety upon the bond for the performance of this contract become unacceptable to the BMA, the CONTRACTOR shall promptly furnish such replacement security as may be required from time to time up to the sum equal to the amount of the original surety.

The performance bond shall be at least co-terminus with the termination of the Contract.

The CONTRACTOR shall also obtain a general liability insurance in an amount of not less than 5,000,000Baht against claims resulting from accidental injuries or losses to persons or properties in the course of carrying out the maintenance work. All of the CONTRACTOR's vehicles used for this Contract shall be separately insured against liabilities according to the laws of Thailand.

1.10 LAWS

The CONTRACTOR shall comply with all the laws, city and municipal ordinances, and all government regulations, in so far as they are binding upon or affect the parties hereto, the work, or those engaged thereon, and obtain all required licenses and permits, and be responsible for all damages to persons or properties which may occur in connection with the prosecution of the work.

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1.11 **TRAFFIC**

The **CONTRACTOR** shall make suitable and adequate provisions for the safe and free passage of persons and vehicles around the work and such provisions for traffic shall be made to the satisfaction of the **ENGINEER**. No lane closure during peak periods shall be allowed without first notifying the **ENGINEER**.

2.0 SPECIAL REQUIREMENTS

2.1 **GENERAL**

2.1.1 **ABBREVIATIONS AND DEFINITIONS**

BMA -- Bangkok Metropolitan Administration

TED -- The Traffic Engineering Division of the BMA.

CCTV System -- Closed Circuit Television system equipment including 5 field cameras, their mounting, control and communication equipment, and all equipment installed in the Traffic Control Center.

Signal System -- All traffic signal equipment and computer software installed in the Bangkok ATC System Project - Stage I, including all field equipment and equipment located in the Traffic Control Center.

Clean -- Removal of dirt, insects, foreign matters, stains, and touching up of metal surface necessary to prevent rust or corrosion.

Check -- Checking the equipment operation and physical condition and make adjustments or minor repair, clean and oil moving mechanism, secure mounting, and restore water or fuel levels as necessary.

Inspect -- The term "inspect" shall have the same meaning as "check"

Foreign Spare Parts -- Spare parts which are manufactured in foreign countries and are not regularly available in the Kingdom of Thailand.

PART H: MAINTENANCE SPECIFICATIONS

2.1.2 GENERAL REQUIREMENTS

The purpose of this maintenance contract is to keep the signal system and related equipment in operation in the manner originally intended, that is to guide, regulate, warn, and facilitate the orderly movement of traffic with due regard for the safety of life, limb, and property of motorists and pedestrians and to prolong the useful life of the equipment. Therefore, **TIME IS OF ESSENCE**. Repair must be done in a timely manner.

The requirements described herein shall be considered the minimum standards to be followed for the maintenance and repair of all equipment covered under this Contract. Unless otherwise specified, the standards for equipment and equipment performance shall be in accordance with the installation contract documents.

2.1.3 SCOPE OF WORK

Except otherwise specified in this Specifications, the CONTRACTOR shall furnish all labor, tools, shop facilities, equipment, spare parts, and material and perform all work necessary to maintain in good working manner all traffic signal system and associated equipment covered under this Contract.

Maintenance services are required to cover all signal and CCTV systems equipment installed in the Bangkok ATC System Project - Stage I.

The various classifications of maintenance and repair work and related services to be performed by the CONTRACTOR include the following:

1. Preventive Maintenance

The work to be done consists of monthly inspection/cleaning and quarterly or bi-annual checking, cleaning, routine replacement or overhaul of parts as recommended by the manufacturer, and servicing of various system components and related equipment. Minor deficiencies uncovered during the performance of preventive maintenance shall be corrected immediately and all adjustment, tuning, and calibration necessary to keep the equipment in the best operating condition shall be performed. Any problems which require further attention or use of spare part(s) shall be recorded on the TED/BMA Fault Report Form (Annex "H-1") and they shall be corrected according to the provisions for corrective maintenance or accident repair as appropriate.

PART H: MAINTENANCE SPECIFICATIONS

2. **Corrective Maintenance**
The work to be done consists of correcting malfunctions resulting from equipment deterioration and failure under normal operating conditions. However, replacement or servicing of equipment parts which, according to manufacturer's recommendations, should be replaced or serviced at regular intervals (e.g. batteries) shall be considered as within the scope of the preventive maintenance.
3. **Accident Repair**
The work to be done consists of repairing damages to the equipment due to accidents, vandalism, act of God, pavement failures, and construction activities of other contractors and includes clean up of debris, erecting necessary warning and safety devices, and hook-up of temporary equipment if required to insure the safety of the public.
4. **System Modifications**
The work to be done consists of modifying the system to improve the operation or to conform to new operational requirements. The work shall be done as directed by the ENGINEER.
5. **Consultation**
The CONTRACTOR shall designate representatives in his organization whom shall be available to TED staff for consultation at no added expenses to TED/BMA. The scope of consultation shall include cost estimates and explanation of functional and operational characteristics of equipment.
6. **Maintenance and Repair Records**
The CONTRACTOR shall maintain a comprehensive records of all maintenance and repair activities and spare parts consumptions. The records shall include, as a minimum, maintenance check lists, fault reports, spare parts receiving and consumption records, and work orders.

2.1.4 **SIGNAL TURN-OFF AND SIGNAL ON FLASH**
The CONTRACTOR shall notify the TED office in advance of any signal turn-offs or signal on flash necessitated by his operation.

2.1.5 **LIQUIDATED DAMAGES**
Subject to exceptions as provided in Section 2.5.1, "Response and Service Times" and Section 2.7.8, "Spare Parts and Consumables", the CONTRACTOR shall be assessed liquidated damages for failure to

PART H: MAINTENANCE SPECIFICATIONS

effect permanent repair within the specified time limit. Liquidated damages shall be deducted from payment due to the CONTRACTOR.

The amount of liquidated damage under various failure conditions shall be as specified below:

1. Shutdown of the central control system -- B2,000 per day
2. Shutdown of a front-end processor -- B1500 per day
3. Signal on flash or totally inoperative -- B1000 per day per signal
4. Signal operating off-line -- B500 per day per signal
5. Knocked-down pole -- B400 per pole per day
6. Defective vehicle or pedestrian signal lantern, pedestrian push button, detector sensor, detector unit, and damaged communication cable -- B200 per day per item or location
7. Detector Failure -- B200 per day per unit

2.2 PREVENTIVE MAINTENANCE OF CONTROL CENTER EQUIPMENT

2.2.1 SCOPE

Preventive maintenance of the Control Center shall cover all equipment necessary for the operation of the traffic signal and CCTV systems and shall include all associated power supply and air conditioning equipment.

2.2.2 MONTHLY INSPECTION/SERVICING

All Control Center equipment covered under the Contract shall be inspected, cleaned, and adjusted as required, and checked for functional deficiencies either through test operation, use of test programs, inspection of indicator lamps, or other manufacturer recommended procedures.

2.2.3 QUARTERLY AND BI-ANNUAL INSPECTION/SERVICING

Various equipment and/or components and their operations shall be checked and serviced every three(3) or six(6) months. As a minimum, the items identified in the Preventive Maintenance Check Lists in Annex "H-2" shall be performed. Routine replacement or overhaul of equipment or equipment components as recommended by the manufacturer shall be done as part of the quarterly and bi-annual inspection/servicing work.

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2.3 PREVENTIVE MAINTENANCE OF FIELD EQUIPMENT

2.3.1 MONTHLY INSPECTION/SERVICING OF SIGNAL

Each intersection and pedestrian signal shall be inspected monthly. As a minimum, the following shall be performed:

1. Walk the intersection or crosswalk and visually inspect all signal heads and pedestrian push buttons for proper operation, alignment, and damages.
2. Observe and check for proper operation of the signal.
3. Observe and check for proper operation of local detectors if any. For each loop coil, check for pavement or sealant failure. Any damage or pending failure shall be reported immediately to TED.
4. Check all handhole covers and poles for damages.

2.3.2 MONTHLY INSPECTION OF VEHICLE DETECTORS

For the purpose of this maintenance contract, vehicle detectors shall include all loop-coil and ultrasonic vehicle detectors. Each loop-coil detector shall be inspected monthly for pavement or sealant failure. Any damage or pending failure shall be reported immediately to TED.

2.3.3 MONTHLY INSPECTION OF CCTV CAMERAS

Each CCTV camera shall be visually inspected and checked each month for proper operation and mounting. Any damage or pending failure shall be reported immediately to TED.

2.3.3 QUARTERLY AND BI-ANNUAL INSPECTION/SERVICING OF FIELD EQUIPMENT

All cabinets, controllers, lanterns, poles, footings, handholes, detectors, CCTVs, and communication equipment shall be inspected every 3 or 6 months. As a minimum, the items identified in the Preventive Maintenance Check Lists in Annexes "H-3" to "H-5" shall be performed. Routine replacement and overhaul of equipment or equipment components shall be done as part of the quarterly and bi-annual inspection/servicing work.

PART H: MAINTENANCE SPECIFICATIONS

2.4 SCHEDULE AND CHECK LISTS

2.4.1 SCHEDULE FOR PREVENTIVE MAINTENANCE

The CONTRACTOR is required to submit to the ENGINEER a complete schedule for all preventive maintenance work under this contract within two (2) weeks of receiving the Notice to Proceed. The schedule shall be in sufficient detail to indicate which part of the monthly inspections is to be performed in each week and which part of the quarterly and bi-annual inspections is to be performed in each month and the number of maintenance technicians and inspectors to be assigned.

The CONTRACTOR will be required to revise the schedule if the work load and the man-power assignment are unbalanced or unrealistic. Failure to submit an acceptable schedule within six (6) weeks of receiving the Notice to Proceed shall be sufficient cause for suspension of the Contract and/or withholding of payments due to the CONTRACTOR.

2.4.2 CHECK LISTS

The dates of inspection shall be recorded in the Preventive Maintenance Check Lists. The CONTRACTOR is required to submit a copy of all check lists every three months and as requested by the ENGINEER at any time. The CONTRACTOR is also required to keep an up-to-date check list in each controller and detector cabinet, and in the control center.

Failure to maintain or submit the check lists shall be sufficient cause for suspension of the Contract and/or withholding of payments due to the CONTRACTOR.

2.5 CORRECTIVE MAINTENANCE AND ACCIDENT REPAIR

2.5.1 RESPONSE AND SERVICE TIMES

Corrective maintenance and accident repair shall be provided on a 24-hour a day, 7-day a week basis. Immediate action shall be taken to safeguard the public at any time a signal installation becomes partly or totally inoperative from any cause whatsoever.

The CONTRACTOR shall provide TED a telephone number for receiving service calls. The telephone shall be manned 24 hours a day and 7 days a week. All fault reports must be recorded on the TED Fault Report Form immediately upon receiving the call.

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The maximum response times, i.e. the elapsed time from receiving notification to arriving at the job site, shall be as follows:

1. Emergency Signal Repairs:

day (6:00 to 20:00) -- 2 hours
night (20:00 to 6:00) -- 4 hours

2. Other Repairs -- 24 hours

Emergency Signal Repairs -- The following shall be classified as Emergency Signal Repairs:

- 1) Signal on flash
- 2) Signal blackout not caused by power outage
- 3) Any faults other than power outage which has or will cause two or more local controllers to be dropped off-line
- 4) Failure of the uninterrupted power supply system in the Control Center
- 5) Failure of any equipment which has or will cause the central traffic control system to shut down or rendered inoperative
- 6) Any failure which is determined by the ENGINEER or the Police to pose immediate hazard to the public.

If the fault can not be permanently repaired immediately, a temporary repair or remedial measure sufficient to safeguard the safety of the public shall be effected by the CONTRACTOR and the ENGINEER shall be so notified. Permanent repairs shall be completed as soon as possible, and in all cases within 72 hours of notification unless extended in unusual circumstances, such as lack of a particular foreign spare part which the CONTRACTOR is not required to keep inventory as provided in Section 2.7.8, "Spare Parts and Consumables", by the ENGINEER.

Failure to meet the response time requirements by the CONTRACTOR shall be sufficient cause for TED/BMA to authorize repairs to be completed by others and deduct the costs of such repair from payments due to the CONTRACTOR. Repetitive failure shall be sufficient cause for TED/BMA to cancel the Contract. Failure to effect permanent repairs within the specified time period by the CONTRACTOR may also result in being assessed liquidated damages as described in Section 2.1.5 "Liquidated Damages" of these specifications.

PART H: MAINTENANCE SPECIFICATIONS

2.5.2 FAULT REPORT AND WORK ORDER

Each and every corrective maintenance and accident repair work must be documented on the TED Fault Report Form (Annex "H-1") and TED Work Order Form (Annex "H-6") by the CONTRACTOR. A copy of completed work order forms must be submitted with the monthly invoice. No payment will be made without submitting the completed work order forms. The Fault Reports shall be kept in a log book and shall be made available to TED/BMA upon request at any time.

2.6 TRAINING

As part of TED's continuous training program for its staff, The TED office intends to assign staff members to observe the CONTRACTOR's operation from time to time. At no added cost to the TED/BMA, the CONTRACTOR is required to:

1. Notify TED's maintenance section, at least 48 hours in advance, all preventive maintenance work to be carried out;
2. Notify TED's maintenance section just before a field crew is dispatched to perform corrective maintenance or accident repair work; and
3. Answer all technical questions from TED staff regarding maintenance and repair operations.

2.7 MEASUREMENT AND PAYMENT

2.7.1 WORK HOUR

Work hour shall be classified as either Regular Time or Over Time. Regular Time hours shall be from 7:00 AM to 7:00 PM from Monday through Saturday except National Holidays. All other work hours shall be classified as Over Time.

2.7.2 PREVENTIVE MAINTENANCE

The CONTRACTOR shall provide all labor, equipment, and material necessary to effect preventive maintenance as defined in these specifications. Compensation for monthly inspections shall be made monthly and compensation for quarterly and bi-annual inspections shall be made quarterly at the rates therefor based on the appropriate unit price schedule.

PART H: MAINTENANCE SPECIFICATIONS

2.7.3 CORRECTIVE MAINTENANCE OF FIELD EQUIPMENT

The CONTRACTOR shall provide all labor, equipment, material, and spare parts necessary to effect corrective maintenance of all field equipment as defined in these specifications. Compensation for this work shall be made monthly at the rates therefor based on the appropriate unit price schedule.

Under normal situations where the equipment being maintained is fully operational, the CONTRACTOR shall be conclusively presumed to have undertaken the corrective maintenance work and shall be entitled to the monthly payment therefor.

2.7.4 CORRECTIVE MAINTENANCE OF CONTROL CENTER EQUIPMENT

The CONTRACTOR shall provide all labor, equipment, material, and spare parts necessary to effect corrective maintenance of Control Center equipment as defined in these specifications. Compensation for the labor, equipment, and incidental material portion of this work shall be made monthly at the rates therefor based on the appropriate unit price schedule. Under normal situations where the equipment being maintained is fully operational, the CONTRACTOR shall be conclusively presumed to have undertaken the corrective maintenance work and shall be entitled to the monthly payment therefor.

Spare parts and consumables for the corrective maintenance of Control Center equipment shall be paid for on a cost plus basis. Costs shall be based on supplier's invoices and receipts of taxes, duties, and shipping charges paid. The CONTRACTOR's material mark-up shall be the same as that specified for accident repairs.

2.7.5 ACCIDENT REPAIR

Repair of defects and damages due to accidents, vandalism, act of God, and pavement failures shall be billed monthly on a time and material basis.

Except where the work involved an item included in the unit price schedule or for which a cost of repair has been mutually agreed upon between the CONTRACTOR and the TED office prior to commencement of the work, a separate itemized invoice, indicating the actual labor (hours per employment classification), material, equipment units used, spare parts, and applicable rates, shall be prepared for each repair work and submitted to TED. Costs of spare parts shall be

PART H: MAINTENANCE SPECIFICATIONS

supported by supplier's invoices and receipts of taxes, duties, and shipping charges paid.

Where the work involved an item included in the unit price schedule or for which a cost of repair has been mutually agreed upon between the CONTRACTOR and the TED office prior to commencement of the work, the unit price or the agreed upon price therefor, subject to adjustment of foreign spare part cost as provided in Section 2.8.2 shall apply regardless of the actual labor and material used.

2.7.6 SYSTEM MODIFICATIONS

System modifications work shall be billed as extra work. Compensation for this work shall be based on cost estimates provided by the CONTRACTOR to the TED/BMA prior to authorization to proceed. The TED/BMA reserves the right to seek competitive tenders to perform the modification work.

System modification work shall not be done without a written authorization from the ENGINEER.

2.7.7 MAINTENANCE AND REPAIR RECORDS

Compensation for record keeping as required in these specifications is considered included in the various pay items for maintenance and repair work and no separate payment will be made therefor.

2.7.8 SPARE PARTS AND CONSUMABLES

The CONTRACTOR is required to maintain an inventory of spare parts and consumables sufficient to effect the maintenance and repair work as specified in these specifications except that the CONTRACTOR shall not be required to maintain an inventory of:

- (a) foreign spare parts which were not needed during the last 12-month period, and
- (b) a foreign spare part which was needed only once during the last 12-month period and the cost of which is in excess of 50,000 Baht.

The CONTRACTOR will be allowed up to three (3) months, from date of Notice to Proceed, to build up his inventory of foreign spare parts. During this time, the TED/BMA will loan its foreign spare parts, if available, to the CONTRACTOR on an as needed basis in order to complete the work. All on-loan spare parts shall be returned in kind to TED within 60 days or as soon as possible.

PART H: MAINTENANCE SPECIFICATIONS

Beginning the fourth month of the Contract, the CONTRACTOR shall be fully responsible for furnishing all needed spare parts and consumables. Upon termination of the Contract, all unused foreign spare parts shall become the property of the TED/BMA and the CONTRACTOR shall be paid the actual costs of the spare parts plus a ten percent (10%) handling charge. The CONTRACTOR shall provide the TED/BMA with a detailed list of the unused spare parts together with a copy of the supplier's invoices and receipts of taxes, duties, and shipping charges paid.

The CONTRACTOR shall order needed foreign spare parts at least three months in advance. Failure by the CONTRACTOR to effect permanent repair within the specified time limit due to inadequate spare part inventory, except those which are not required to be maintained in the inventory, shall not relieve the CONTRACTOR from being assessed liquidated damages as specified in Section 2.1.5 "Liquidated Damages" of these specifications unless the unavailability of spare parts is due to circumstances which are beyond the control of the CONTRACTOR.

2.8 COST ADJUSTMENT

2.8.1 ESCALATION

One year from the effective date of the Contract and each anniversary thereafter for the duration of the contract, the unit rates paid for maintenance and repair shall be increased or decreased in direct proportion to the increase or decrease in the Consumer Price Index (CIP). The CIP shall be the Metropolitan Bangkok CIP for all wage earners. The CONTRACTOR shall submit to the ENGINEER a minimum of one month prior to the anniversary date a revised unit price schedule and supporting CIP information.

2.8.2 ADJUSTMENT FOR FOREIGN SPARE PART COST

The Unit Cost Rates for Accident Repair in the Rate Schedule shall be adjusted if use of foreign spare part(s) is necessary and there is a ten percent (10%) or more increase in the foreign exchange rate between the time of contract signing and the time the spare part is actually used. The adjustment will be made only if the CONTRACTOR submit in writing a request for adjustment, concurrent with the submittal of the monthly invoice or billing, supported by supplier's invoice and foreign exchange rates data. Likewise, if there is a ten percent (10%) or more decrease in the foreign exchange rate, the TED/BMA shall be entitled to a reduction in the foreign spare parts costs.

PART H: MAINTENANCE SPECIFICATIONS

2.9 CURRENCY CONVERSION

Currency conversion for foreign spare part costs shall be based on published Bank of Thailand reference rates on the date shown on the supplier's invoice.

TED PREVENTIVE MAINTENANCE CHECK LIST

Control Center (Sheet 1 of 2)

| | |
|---------------|--------------|
| Location: TED | Contractor : |
| | Year : |

| MONTHLY INSPECTION | | | | | | | | | | | | |
|--------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

| QUARTERLY / BI-ANNUAL INSPECTION | | | | | |
|--|-------------------|---|---|---|---|
| TASK | Quarter --> | 1 | 2 | 3 | 4 |
| | Date Inspected--> | | | | |
| | Inspected by --> | | | | |
| Computers including communication adopters and controllers | | | | | |
| o Check function by test program | | | | | |
| o Check filters | | | | | |
| o Check power supply | | | | | |
| Disk units and controller | | | | | |
| o Check and clean magnetic heads | | | | | |
| o Check and clean spindle | | | | | |
| o Check function by test program | | | | | |
| o Check and adjust tracking | | | | | |
| Magnetic Tape Units and controllers | | | | | |
| o Check brush of capstan motor | | | | | |
| o Check output level | | | | | |
| Line Printer | | | | | |
| o Clean and oil mechanism | | | | | |
| o Check character drum | | | | | |
| o Check belt | | | | | |
| Typewriters and controllers | | | | | |
| o Check mechanism | | | | | |
| o Check type wheel | | | | | |
| Interface controllers | | | | | |
| o Operation test | | | | | |
| o Check watchdog timer | | | | | |
| Real Time Clock | | | | | |
| o Check supply voltage | | | | | |
| o Check clock accuracy | | | | | |
| o Check battery | | | | | |
| Wall Map/Operator Console/TV Equipment | | | | | |
| o Check operation | | | | | |
| (Continue on Sheet 2) | | | | | |

TED PREVENTIVE MAINTENANCE CHECK LIST

Control Center (Sheet 2 of 2)

| | |
|----------------------|---------------------|
| Location: TED | Contractor : |
| | Year : |

QUARTERLY / BI-ANNUAL INSPECTION

| TASK | Quarter --> | 1 | 2 | 3 | 4 |
|---|-------------------|---|---|---|---|
| | Date Inspected--> | | | | |
| | Inspected by --> | | | | |
| CCTV | | | | | |
| o Check VCR Recording | | | | | |
| TDM Modem | | | | | |
| o Check transmitting and receiving levels | | | | | |
| o Check carrier | | | | | |
| Lead Acid Battery | | | | | |
| o Check Voltage | | | | | |
| o Check physical connections | | | | | |
| CVCF | | | | | |
| o Check charger operation | | | | | |
| o Check switching operation | | | | | |
| Generator | | | | | |
| o Change engine oil | | | | | |
| o Check automatic changeover | | | | | |
| Air conditioning and fire protection systems | | | | | |
| o Check operations | | | | | |
| o Check fire detection and alarm | | | | | |

TED REVIEW

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------|---|---|---|---|---|---|---|---|---|----|----|----|
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

NOTES

TED PREVENTIVE MAINTENANCE CHECK LIST

Intersection / Ped Signal

| | |
|----------------|--------------|
| Street Names : | Contractor : |
| ID No: | Year : |

MONTHLY INSPECTION

| | | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

QUARTERLY / BI-ANNUAL INSPECTION

| | Quarter --> | 1 | 2 | 3 | 4 |
|--|-------------------|---|---|---|---|
| | Date Inspected--> | | | | |
| TASK | Inspected by --> | | | | |
| Controller | | | | | |
| o Check door hinges, seal, lock, mounting | | | | | |
| o Check breakers/voltage/switches/wiring | | | | | |
| o Check clock pulse | | | | | |
| o Check communication signal | | | | | |
| o Check manual/standby operation | | | | | |
| o Check indicator lamps | | | | | |
| o Clean/touch-up cabinet | | | | | |
| Modem | | | | | |
| o Check transmitting/receiving levels | | | | | |
| o Check carrier | | | | | |
| Lanterns | | | | | |
| o Check mounting | | | | | |
| o Clean lenses | | | | | |
| Poles, Arms, Footings, Handholes | | | | | |
| o Check/repair cracks, chips | | | | | |
| o Touch-up scratches, remove rust | | | | | |
| o Clean handhole | | | | | |
| Local Detector/Detector Pre-processor | | | | | |
| o Check door hinges, seal, lock, mounting | | | | | |
| o Check wiring/voltage | | | | | |
| o Check operation, adjust settings | | | | | |
| o Clean/touch-up cabinet | | | | | |

TED REVIEW

| | | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

NOTES

ANNEX H-4

TED PREVENTIVE MAINTENANCE CHECK LIST

System Detector

| | |
|-----------|--------------|
| Location: | Contractor : |
| ID No: | Year : |

MONTHLY INSPECTION

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

QUARTERLY / BI-ANNUAL INSPECTION

| TASK | Quarter --> | 1 | 2 | 3 | 4 |
|---|-------------------|---|---|---|---|
| | Date Inspected--> | | | | |
| | Inspected by --> | | | | |
| Cabinet/Detector Unit | | | | | |
| o Check door hinges, seal, lock, mounting | | | | | |
| o Check voltage/wiring | | | | | |
| o Check operation, adjust settings | | | | | |
| o Check indicator lamps | | | | | |
| o Clean/touch-up cabinet | | | | | |
| Modem | | | | | |
| o Check transmitting/receiving levels | | | | | |
| o Check carrier | | | | | |
| Pre-Processor | | | | | |
| o Check Function/Operation | | | | | |
| Ultrasonic Sensor | | | | | |
| o Check wiring | | | | | |
| o Check mounting | | | | | |
| o Clean/touch-up | | | | | |

TED REVIEW

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

NOTES

ANNEX H-5

TED PREVENTIVE MAINTENANCE CHECK LIST CCTV Cameras

| | |
|-----------|--------------|
| Location: | Contractor : |
| | Year : |

MONTHLY INSPECTION

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

QUARTERLY / BI-ANNUAL INSPECTION

| TASK | Quarter --> | 1 | 2 | 3 | 4 |
|---------------------------|-------------------|---|---|---|---|
| | Date Inspected--> | | | | |
| | Inspected by --> | | | | |
| CCTV Cameras | | | | | |
| o Check control mechanism | | | | | |
| o Check mounting | | | | | |
| o Check wiper operation | | | | | |
| o Clean/touch-up | | | | | |

TED REVIEW

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------|---|---|---|---|---|---|---|---|---|----|----|----|
| Date | | | | | | | | | | | | |
| By | | | | | | | | | | | | |

NOTES

TED MAINTENANCE WORK ORDER

| | |
|-------------|--|
| Assigned to | |
| By | |

| | |
|-------------|--|
| W.O. Number | |
| Date Issued | |

| F.R. Reference | | Location | | | Reported Fault | Priority | |
|----------------|---------|----------|-----------------------------|------------------------------|------------------|------------------|---------------|
| Date | No. | No. | Description/Name | | | | |
| | | | | | | | |
| Date | Time | | Observed Fault Upon Arrival | Diagnostic or Work Performed | Cause of Fault | Compo. Failed | |
| | Arrived | Departed | | | | | |
| | | | | | | | |
| Remarks: | | | | Corre-ctive? | Accident Repair? | Warranty Repair? | Final Repair? |
| Work Crew: | | | | | | | |
| Spare Parts | | | | Checked By: | | | |
| Spare Parts | | | | TED Check By: | | | |
| Description | I.D. | # Used | Source | Description | I.D. | # Used | Source |
| | | | | | | | |
| | | | | | | | |

| F.R. Reference | | Location | | | Reported Fault | Priority | |
|----------------|---------|----------|-----------------------------|------------------------------|------------------|------------------|---------------|
| Date | No. | No. | Description/Name | | | | |
| | | | | | | | |
| Date | Time | | Observed Fault Upon Arrival | Diagnostic or Work Performed | Cause of Fault | Compo. Failed | |
| | Arrived | Departed | | | | | |
| | | | | | | | |
| Remarks: | | | | Corre-ctive? | Accident Repair? | Warranty Repair? | Final Repair? |
| Work Crew: | | | | | | | |
| Spare Parts | | | | Checked By: | | | |
| Spare Parts | | | | TED Check By: | | | |
| Description | I.D. | # Used | Source | Description | I.D. | # Used | Source |
| | | | | | | | |
| | | | | | | | |

| | |
|----------------------|------|
| Date Base Updated By | Date |
|----------------------|------|

**KINGDOM OF THAILAND
BANGKOK METROPOLITAN ADMINISTRATION**

**INVITATION TO BID
BANGKOK AREA TRAFFIC CONTROL SYSTEM PROJECT - STAGE I**

**PART I
SCHEDULE OF DRAWINGS**

PART I: SCHEDULE OF DRAWINGS

Drawings that form part of this Tender Documents for the Bangkok ATC Project are compiled into the following volumes:

- 1. Volume 1 : General Design Plans.**
- 2. Volume 2 : Traffic Signal Installation Plans.**
- 3. Volume 3 : Design Traffic Volume and Signal Phase Plans.**
- 4. Volume 4 : Vehicle Detector Installation Plans.**

The lists of drawings contained in Volume 1,2 and 4 and their respective cross reference sections in the Technical Specification are given in this Schedule.

PART I: SCHEDULE OF DRAWINGS

Volume 1 : General Design Plans

| NO. | PLAN NO. | TITLE | SPECIFICATION SECTION NO. |
|-----|----------|--|---------------------------|
| 1 | 1201 | Traffic Signal Locations | Div.II sec.1.1 |
| 2 | 1202 | Traffic Signal System Configuration Diagram | Div.II sec.1.5 |
| 3 | 1203 | Suggested Sub-areas for Signal System | Div.II sec.2.4. |
| 4 | 1204 | Menu Tree of Work Station | Div.II sec.5.3 |
| 5 | 1205 | Traffic Condition Monitoring Wallmap | Div.II sec.5.4, 11.2 |
| 6 | 1206-1 | Area Covered within Wallmap | Div.II sec.5.4, 11.2 |
| 7 | 1206-2 | Enlarged Stage I Area of Drawing No.1206-1 | Div.II sec.5.4, 11.2 |
| 8 | 1207 | Equipment Monitoring Wallmap | Div.II sec.5.4, 11.3 |
| 9 | 1208 | Control Desk | Div.II sec.12.2 |
| 10 | 1209 | Image of Manual Control Panel | Div.II sec.13.3 |
| 11 | 1210 | Mounting facility of Local controller | Div.II sec.13.10 |
| 12 | 1211 | Traffic Signal Poles and Footing Type A | Div.II sec.14.2 |
| 13 | 1212 | Traffic Signal Poles and Footing Type B | Div.II sec.14.2 |
| 14 | 1213 | | |
| 15 | 1214 | | |
| 16 | 1215 | Signal & Detector Foundation | Div.II sec.14.2 |
| 17 | 1216 | Detector Locations | Div.II sec.15.2 |
| 18 | 1217 | Loop Coil Detector Installation Plan | Div.II sec.15.8 |
| 19 | 1218 | Mounting Facility of Detector Cabinet Type 1 | Div.II sec.15.8 |
| 20 | 1219 | Mounting Facility of Detector Cabinet Type 2 | Div.II sec.15.8 |
| 21 | 1220 | Mounting Facility of Detector Cabinet Type 3 | Div.II sec.15.8 |
| 22 | 1221 | Ultrasonic Detector Installation Plan | Div.II sec.15.9 |
| 23 | 1222 | Mounting Facility of Detector Cabinet Type 4 | Div.II sec.15.9 |
| 24 | 1223 | Mounting Facility of Detector Cabinet Type 5 | Div.II sec.15.9 |
| 25 | 1224 | Grounding System for Local Controller and Detector Cabinet | Div.I sec.4.6 |
| 26 | 1225 | Underground Conduit Installaion Plan | Div.I sec.5.5 |
| 27 | 1226 | Aerial-Underground Cable Connection Details | Div.I sec.5.7 |
| 28 | 1227 | Handhole Design Type C | Div.I sec.5.8 |
| 29 | 1228 | Handhole Design Type D | Div.I sec.5.8 |
| 30 | 1301 | CCTV System Configuration Diagram | Div.III sec.1.2 |
| 31 | 1302 | CCTV Camera Locations | Div.III sec.2.1 |
| 32 | 1303 | CCTV Camera Installation Plan | Div.III sec.2.9 |
| 33 | 1401 | Traffic Control Center Location and Key Plan | Div.IV sec.1.1 |
| 34 | 1402 | Finish Schedule | Div.IV sec.1.1 |
| 35 | 1403 | Plan of Traffic Control Center | Div.IV sec.1.2 |
| 36 | 1404 | Sections and Details of Traffic Control Center | Div.IV sec.1.2 |
| 37 | 1405 | Power Supply Room and Generator Room | Div.IV sec.1.2 |
| 38 | 1406 | Fire Fighting Facilities | Div.IV sec.1.3 |
| 39 | 1407 | Power Feeder Facilities | Div.IV sec.1.4 |
| 40 | 1408 | Lighting Facilities | Div.IV sec.1.4 |
| 41 | 1409 | Power Outlet and Telephone Facilities | Div.IV sec.1.4 |
| 42 | 1410 | Air Conditioning and Ventilation/Others | Div.IV sec.1.5 |
| 43 | 1411 | Air Conditioning and Ventilation Facilities | Div.IV sec.1.5 |

PART I: SCHEDULE OF DRAWINGS

Volume 2 : Traffic Signal Installation Plans

| NO. | PLAN NO. | TITLE | SPECIFICATION SECTION NO. |
|----------------|--------------------|---------------------------------------|---------------------------|
| 1 | 2000-1 | Traffic Signal Locations | Div.II sec.14 |
| 2 | 2000-2 | Symbols for Signal Aspects and others | |
| 3 | 2000-3 | List of Intersections | |
| 4 to 146 | 2001 to 2905 | Traffic Signal Installation Plans | |

Volume 4 : Vehicle Detector Installation Plans

| NO. | PLAN NO. | TITLE | SPECIFICATION SECTION NO. |
|---------------|--------------------|---------------------------------------|---------------------------|
| 1 | 4000-1 | Traffic Signal Locations | Div.II sec.15 |
| 2 | 4000-2 | Symbols for Signal Aspects and others | |
| 3 | 4000-3 | List of Detector Installation Plans | |
| 4 to 88 | 4001 to 4994 | Detector Installation Plans | |

