

Preliminary Works of KMIC SPECIFICATION

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KMIC

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1. General Rules

105 General Provisions

10510 Application of the Specification

1. General Provisions

1.1 Scope of Application

- 1.1.1 This specification is the special specification for construction work implemented by the ordering organization. When the designer prepares the construction specification using this specification, he/she shall modify, supplement or edit the matters related to material, construction method, quality management (such as quality test and inspection), safety management and authority and matter of responsibility for implementation identical to the design of the applicable construction in consideration of special characteristics, regional condition and construction method of the applicable construction.
- 1.1.2 The construction specification shall be prepared for the unit type of construction work in the detailed statement in principle and shall be the standard for determining whether the work ordered by the ordering organization is a work within the scope of contract or a change order and whether the unit construction expense is appropriate.
- 1.1.3 When preparing the construction specification, this item shall state “this specification is the construction specification which stipulate the matters to be followed by the ordering organization and the contractor with regard to [name of construction] ordered by [name of the ordering organization].”

1.2 Order of Application

- 1.2.1 When the design documents are not clear, omitted, erroneous and contradict with each other, the documents shall be applied in the following order:
 - A. The field guide and the questions and answers
 - B. the construction specification and the design drawings
 - C. the quantity statement
- 1.2.2 If there is a contradiction between the general rules of this specification and other specifications than the general rules, the other specifications than the general rules shall be applied first.

1.3 Order of Interpretation

The terms used in this specification shall be interpreted by and in the order of: the

standards of Korea; the standards of Myanmar and the internationally used standards, according to the definitions therein or the meanings for which they are used therein.

2. **Materials**

(None)

3. **Construction**

(None)

10520 Related Laws and Regulations, Etc.

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part describes all regulations that the contractor must understand to seamlessly carry out the construction work for which it executed a contract with the ordering organization.

1.2 Compliance to All Regulations

1.2.1 The contractor must be well-acquainted with the laws and regulations related to the construction work.

1.2.2 The contractor must comply with this at all times.

1.2.3 The contractor shall take full responsibility for any problem occurred because the related laws and regulations are violated.

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

2. Materials

(None)

3. Construction

(None)

110 Construction Management

11010 Construction in General

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the general matters required for the contractor to carry out the construction work.

1.2 Related Parts of Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11020 Consultation and Adjustment

11510 Management of Submissions

20520 Installation of Temporary Facility

20522 Construction Site Signage

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The followings must be submitted according to "11510 Management of Submissions".

1.4.1 Submissions before commencement of construction

- A. Matters to be filled out in the Construction Work Register
- B. The design document review
- C. The earth system boundary review

1.5 The Contractor's Limit of Liability

1.5.1 The contractor must carry out the construction work without violating the contract documents and follow the demand for correction or the instruction urging for

performance by the ordering organization and the supervisor. Also, when the ordering organization requests for change of design because the design document needs to be changed due to the change of permit or approval, civil complaint, result of negotiation, etc. the contractor must diligently respond to such request.

1.5.2 The contractor must take full responsibility for the act related to the construction work carried out by the person appointed, designated or employed by the contractor for the applicable construction work, such as the site representative, and the person who executed subcontracting agreement or supply agreement with the contractor and the results thereof.

1.5.3 The contractor must keep the inside and the outside of construction site clean to increase the efficiency of use and the efficiency of work at the construction site, increase the quality, prevent accident and environmental pollution and ensure health and hygiene.

1.5.4 When the contractor temporarily suspended the construction work or suspended the construction work to prevent reduction of quality of construction work or occurrence of accident during the construction work, the contractor must protect or repair the portion of which construction work is suspended, the object of construction work and the temporary building material to prevent the quality of the object of construction work from declining.

1.5.5 While the agreement is being performed, the contractor must bear the burden of compensating for the damage to the object of construction work, the articles loaned to someone and a third party.

1.5.6 Any report, notification, request, or bringing up of problem or objection by the contractor to the supervisor shall take effect when it is made in writing.

1.6 Negotiation and Adjustment

1.6.1 The contractor, as it carries out the construction work, must fully negotiate with the ordering organization, the other related contractors and the subcontractors in advance and make adjustments accordingly to prevent conflict between the other construction works related to the applicable construction work and to ensure seamless implementation of construction work.

1.6.2 Regarding the procedure and the method of negotiation and adjustment, “11020 Consultation and Adjustment” shall be followed.

1.7 Investigation of Field Condition and Establishment of Damage Prevention Plan

1.7.1 Investigation of field condition

The contractor shall investigate the field as soon as possible after the commencement of construction work so that the construction work will not be interrupted, and the result thereof must be used as the data when carrying out the construction.

1.7.2 Establishment of damage prevention plan

- A. The contractor must review the contents of the field condition investigation and the construction method in the design document and when there is a possibility of damage occurring in the vicinity of the zone subject to the project, the contractor must establish a damage prevention plan and report the plan to the supervisor.

1.7.3 When the contractor caused any damage to any third party by carrying out the applicable construction work, the contractor shall immediately restore the damages to their original state at its own expenses to prevent any civil complaint.

1.8 Preparation of the Construction Plan

1.8.1 The contractor shall commence construction after preparing the construction plan containing the followings and receiving the supervisor's confirmation. The construction plan must contain the matters additionally required by each Part when necessary.

- A. Summary of work
- B. Construction management organization
- C. Detailed process table (including material, manpower and equipment plans)
- D. Material carry-in and management plan
- E. Test (sample) construction plan: Schedule, location of construction, description of construction, etc.
- F. Construction and quality management plan
- G. Matters that require negotiation and adjustment with other works and work types
- H. Matters that require adjustment and modification of the design document
- I. "The overloading prevention plan" and "the pledge for no-overloading" in the guideline on prevention of overloading by the construction work vehicles
- J. Plan on prevention of abandoning waste in the area that cannot be checked after completion of work (such as PD, AD, etc.) after reclamation, attachment of finish material, etc.
- K. The matters specified in each Part

1.8.2 Time of submission and number of copy

- A. Time of submission: 15 days before commencement of work
- B. Number of copy: 2 copies

1.9 Management of Subcontractors

- 1.9.1 When the contractor subcontracts a portion of the construction work, an entity registered to the applicable construction type as prescribed by the related laws and regulations must be selected as the subcontractor.
- 1.9.2 The contractor must thoroughly have the subcontractor understand the matters decided by the order, approval or agreement of the ordering organization or the supervisor or the matters related to assurance of safety.

1.10 Declaration, Permission and Approval

- 1.10.1 The contractor shall make declarations to relevant organizations to perform the agreement and prepare the design document related to permits and approvals, submit the applications, negotiate with relevant organizations and carry out the works required for commencement and completion of construction.

1.11 Works Related to Completion

- 1.11.1 The contractor must carry out the completion cleaning before the completion of construction and control the access to the inside after the completion cleaning is done.
- 1.11.2 The contractor shall conduct trial operation of the object of construction work, such as the equipment or facility system, and provide operation and maintenance training before completion of construction.
- 1.11.3 The contractor must prepare the documents required for notification of completion to the local government and submit them to the supervisor before the completion of construction.

2. Materials

(None)

3. Construction

(None)

11020 Consultation and Adjustment

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part shall apply to consultation and adjustment required between the ordering organization and the contractor; and the other contractors related to the contractor and the subcontractors to prevent conflict that may arise between the other construction works related to the concerned construction work and to ensure seamless implementation of construction work.

1.2 Definition

1.2.1 Cut and repair

“Cut and repair” means to cut a portion of what had been constructed to check or inspect, collect testing sample, reconstruct and carry out a work similar thereto and to repair the cut portion. However, cut and repair for fabrication, temporary assembly, erection or installation of facility, equipment, etc. shall be excluded.

1.3 Submissions

The followings shall be submitted according to “11510 Management of Submissions”.

1.3.1 The submissions before commencement of work

- A. Meeting minutes from the commencement of work meeting
- B. Results of the commencement of work meeting and action plan
- C. Cut and repair work plan

1.4 Prevention of Friction Between Works

1.4.1 Consultation and adjustment

- A. The contractor must fully consult and adjust with regard to the work of which detail interferes with other works to prevent friction between the contractors of other works related to the concerned work and ensure the work is carried out seamlessly.
- B. The contractor must report to the supervisor when the contractors of other works related to the concerned work request for temporary use of the roads and the fabrication yard for their works.

- C. The contractor shall consult with the relevant contractors before commencing the works related to the concerned work about the detailed work plan, work limits, temporary facility installation plan, order of work and methods of protecting and repairing the structures.
- D. The contractor shall check whether the requirements of facilities and the characteristics of operating equipment related to the concerned work are appropriate and adjust with regard to installation, connection and operation of the equipment.

1.4.2 Responsibilities of the contractor

- A. The contractor must fully cooperate with establishment and operation of the comprehensive process management plan implemented by the supervisor for seamless promotion of works with the contractors related to the concerned work.
- B. The contractor shall faithfully carry out what had been discussed between the works and the implementation plan of the ordering organization and take responsibility for reconstruction, modification or supplementation work caused because the contractor neglected to do so.
- C. The contractor shall prepare the mutual adjustment drawing which indicates the order of work and installation with regard to the mutual adjustment work of materials that need to be fabricated outside the construction site.

1.5 Cut and Repair

1.5.1 Restriction of work

- A. No cut and repair work shall be done to the portion of which structural bearing force or safety can be reduced, persisting period can be reduced, energy performance can be reduced or element of maintenance can be increased.
- B. There shall be no noticeable trace of cut and repair work. Any noticeably wrong cut or repair work shall be demolished as ordered by the supervisor and reworked thereafter.

1.5.2 Prior approval

- A. When carrying out cut and repair work, any work that affects the followings must be carried out after submitting the work plan to and acquiring the approval of the supervisor in advance.
 - 1) Structural integrity of the material
 - 2) Integrity of the material that is exposed to weather elements or is wetproof
 - 3) Effect, maintenance or safety of material
 - 4) Work that affects the appearance

5) Work of the ordering organization or other contractor

B. Contents to be included in the work plan

The work plan for prior approval must contain the followings.

- 1) Reason why it has to be cut and repaired
- 2) Description and method of cut and repair work
- 3) Impact of the cutting work to the structural safety of the existing work
- 4) Expected result of work, such as operational problem and change of appearance
- 5) List of used materials and the constructor
- 6) Expected period of work
- 7) Impact to other works or facilities
- 8) Detailed structural drawing and the structural calculation sheet (in case of major structural portion)

1.5.3 Protection

The contractor shall make appropriate supportive or protective arrangements so that the area of work or other areas will not be damaged during cut and repair work and make protective arrangements so that the portion of work exposed to outside will not be affected by the weather conditions. Also, the contractor shall make arrangements so that there will be no inconvenience to use of and passage to the nearby areas.

2. Material

2.1 Repair Material for the Cut Area

The material used to repair the cut area in "1.5 Cut and Repair" shall be the equivalent to or better than the material that had been originally used so that the repaired portion will be able to satisfy the performance level required by the design document and have a similar appearance to and go well with the material used in the adjacent area.

3. Construction

3.1 Items to be Checked

- 3.1.1 The contractor shall establish major items to be checked and manage those items so that all objects of work will be reasonably adjusted and protected during the work period.

3.2 Cut and Repair

- 3.2.1 The contractor shall hire skilled workers required for cut and repair work.
- 3.2.2 The contractor shall not cause the period of this construction work to be delayed because of cut and repair work.
- 3.2.3 The contractor shall cut and repair without damaging the nearby work or the related work, and the cut area must be repaired strongly and without trace.

3.3 Cleaning

- 3.3.1 The contractor shall repair other works damaged by cut and repair work to their original conditions and clean the area and the path of work.

1 1 5 Management of Submissions

11510 Management of Submissions

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

- A. This Part shall apply to general management of the submissions, such as preparation and submission process for documents to be submitted by the contractor to the ordering organization for approval.
- B. When any certain Part especially demand for the submissions, detailed requirements shall be separately stated in the applicable Part.

1.2 Related Parts of Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11020 Consultation and Adjustment

12020 Management of Materials

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Type of Submissions

The type of submissions that must be submitted to the ordering organization by the contractor for implementation of works shall be specified in the applicable Part of the specification.

1.5 Submissions

The followings shall be submitted according to "11510 Management of Submissions".

1.5.1 Submissions to be submitted before commencement of work

- A. Commencement report submissions

- 1) When normally commenced the work
 - 2) Submissions when commencement is delayed
 - 3) Submissions when commenced in part
 - 4) Submissions at the early stage of commencement
 - B. Daily work log
 - C. Process status report
 - D. Submissions management register
- 1.5.2 Submissions related to submission, report, approval and permit
- A. Construction work plan
- 1.6 Submission Process, Etc.
- 1.6.1 General issues
- A. The contractor shall check the submissions to be submitted to the ordering organization and decide the date of each submission according to the schedule under the Work Progress Schedule.
 - B. For the contractor to receive approval on the submissions, the contractor must submit written information which successfully proves that the submissions are identical to the matters especially demanded by the contents of agreement and each Part of specification, and the contractor shall not commence the work before the submissions are approved.
 - C. Each submission submitted by the contractor shall be prepared by applying the result of reviewing the contents of design document and the field condition and by including the contents consulted and adjusted with the relevant organizations, such as other contractors in the concerned work zone, material suppliers, workers and local governments.
 - D. The contractor must submit the submissions well in advance, so that the supervisor will have time to review and approve the submissions.
 - E. All submissions submitted by the contractor must be checked by the supervisor in advance, and a submission that had not been checked by the supervisor shall not be acknowledged. This shall apply identically to the submission of changed submissions.
 - F. The contractor shall share the approved submissions with the other contractors in the concerned work zone, material suppliers, workers and local government to prevent any error when carrying out the work.
 - G. The finally approved submissions must be submitted to the supervisor when the work is completed, and the ownership of the submitted information shall belong to

the ordering organization.

- H. Any delay caused because the submissions were not approved or the timing of the submissions did not match cannot be the cause of extension of work period, and the contractor may not additionally ask the ordering organization to pay for the cost of preparing and submitting the submissions.

1.6.2 Documents to be submitted

- A. The documents submitted to the ordering organization by the contractor shall include the followings. The same shall apply when they are changed.
 - 1) Name, address and telephone number of the contractor
 - 2) Number of the submitted document and the date when it is sent
 - 3) Name and ID number of agreement
 - 4) Name, address and telephone number of the supplier, the manufacturer and the subcontractor
 - 5) Identification of the product by the manual, model number, type number, serial number or lot number
 - 6) Confirmation of information including the contract plan and the specification
- B. Standards, etc.
 - 1) The physical size of document shall be arbitrarily chosen by the contractor according to the contents thereof. However, the cover page shall be written vertically in A4 standard size (210mmX297mm), and the contents shall be resized to fit the A4 size and bound in the left before they are submitted.
 - 2) Date of submission shall be indicated for each document and serial number shall be indicated in each page of each document submitted. A list of furnished document shall be prepared and date of preparation shall be indicated for each document and serial number shall be indicated in each page of each document.

1.6.3 Due date of submission

- A. All submissions that the contractor must submit to the ordering organization must be submitted no later than 15 days before commencement of applicable work type unless specified otherwise.
- B. Unless specified otherwise, the ordering organization shall inform the result of submissions that require approval to the contractor within 15 days from the date of submission, and the contractor may not proceed with follow-up work if it is not approved by the supervisor.
- C. The submissions must be prepared in consideration of additional time that may be required for reexamination because the submitted document may be returned or not approved and there may be additional requirements.

1.6.4 Furnishing and management

- A. The contractor shall receive the design documents and drawings, the information related to the work and the contract documents from the ordering organization simultaneously to the commencement of work, give the management number to them and prepare a register for management thereof.
- B. The contractor must thoroughly manage the confidentiality of the design documents, the written information and the contract documents so that they will not be disclosed to anyone other than those related to the work. When any of them needs to be provided to someone outside, such provision must be approved by the supervisor.
- C. The contractor must designate a place for storage of design documents and store the design documents in such place. The contractor must prepare and keep a list of the stored design documents.
- D. Any document that needs to be furnished at all times shall be furnished at the field office or the field testing lab at all times, so that it can be browsed by the ordering organization and the supervisor at any time during the construction period.

1.7 Submissions Management Register

- 1.7.1 To manage the expected and actual submission dates of major submissions, the contractor shall prepare the submissions management register within 60 days from the date of commencement of work, receive an approval from the supervisor and submit the register when the contractor submits the Work Process Schedule.
- 1.7.2 The contractor must check if all submissions required to carry out the works are indicated in the submissions management register when creating the submissions management register and keep maintaining the submissions management register until the time of completion.

1.8 Submissions Related to Commencement Report

- 1.8.1 When commenced the work normally
 - A. The commencement report
 - B. Photographs of the field before commencement
 - C. The construction engineer deployment plan
 - D. The calculation statement
 - E. The indemnity insurance certificate (for the applicable work)
 - F. The joint contract performance plan and the joint supply and demand operation

agreement

- G. Other matters determined by the ordering organization for diligent performance of contract.

1.8.2 When commencement of work is delayed

- A. The original date of commencement
 - 1) The delayed commencement report (including the cause of delay and expected date of commencement)
 - 2) Evidences for delay of commencement (status of obstacles, etc.)
- B. When actually commenced the work
 - 1) Documents to be submitted when normally commenced the work

1.8.3 When partially commenced the work

- A. The original date of commencement
 - 1) The partial commencement report (including the cause of partial commencement and the expected date of commencing the portion that had not been commenced)
 - 2) Status of partial commencement
 - 3) Evidences related to the partial commencement (status of obstacles, etc.)
 - 4) Documents to be submitted when normally commenced the work (excluding the commencement report)
- B. When the portion not commenced is actually commenced
 - 1) The documents to be supplemented when the portion not commenced is actually commenced

1.8.4 Time of submission and number of copies

- A. Time of submission
 - 1) When normally commenced: the originally expected date of commencement
 - 2) When the commencement is delayed or when partially commenced
 - A) When the commencement is delayed: the actual date of commencement
 - B) When partially commenced: the originally expected date of commencement
- B. Number of copies to be submitted: 2 copies

1.9 Submissions at the Early Period of Commencement

- 1.9.1 Within 15 days from the date of commencement (including the partial commencement) (However, in case of the delayed commencement, within 15 days from the date of actual commencement)
 - A. The field staff organization chart
 - B. The subcontracting implementation plan

- 1.9.2 Within 60 days from the date of commencement (including the partial commencement) (However, in case of the delayed commencement, within 60 days from the date of actual commencement)
- A. The miles of planned construction milestones (CPM)
 - B. The quality test plan or the quality management plan
 - C. The comprehensive safety management plan
 - D. The environment management plan
 - E. The manpower and equipment dispatch plan for each process
 - F. The request for procurement of materials to be disbursed
 - G. The process table for opening of road for the work (complex)
 - H. The general construction confirmation plan
- 1.9.3 Time of submission and number of copies
- A. Time of submission: the designated date
 - B. Number of copies to be submitted: 2 copies

1.10 Submissions Related to Process Management

- 1.10.1 The miles of planned construction milestone
- A. Documents to be submitted
 - 1) CPM method
 - 2) Times of commencement and completion per work type and per stage of major process in the work type (activity)
 - 3) Relationship (pre-implementation, post-implementation, simultaneous implementation, etc.) per work type and per stage of major process in the work type
 - 4) The critical path or the list of works for major processes
 - 5) Weekly progress table and the bar chart – process table
 - 6) The submissions management register
 - B. Indication of the upper and the lower limits of progress rate
The upper and the lower limits of progress rate must be indicated in red color on the progress rate accumulation curve (S-Curve) in the miles of planned construction milestone.
- 1.10.2 Time of submission and number of copies
- 1) When normally commenced and partially commenced: within 60 days from the date of commencement
 - 2) When the commencement is delayed: within 60 days from the date of actual commencement
 - 3) Number of copies to be submitted: 2 copies

- B. The contractor may not commence the work before the miles of planned construction milestone is approved.

1.10.3 The daily work log

The contractor must report the daily work log to the ordering organization by 8:30 a.m. every day except for the off day (when the work is carried out in the off date, including the off date).

1.10.4 The process status report

- A. Monthly process

The contractor shall report the monthly process to the ordering organization of a month by the 5th day of the following month.

1.11 Submissions related to manpower and equipment deployment plan for each process

1.11.1 When submitting the commencement report, the plan containing the followings must be submitted.

- A. Assembly of equipment that are not directly used for the works but required to carry out the works and transportation of such equipment to the field
- B. Organization and preparation of the work zone of the contractor
- C. Complete combination of the equipment required to carry out the works under the order of work
- D. Organization of manpower in preparation for the actual commencement of work
- E. All preparations required to start the design work for the work item of which price is paid under the contract
- F. Removal and withdrawal of tools, machines, equipment, and remaining materials and consumables at the time of completion of the works

1.11.2 Time of submission and number of copies

- A. Time of submission

- 1) When normally commenced and partially commenced: within 60 days from the date of commencement
- 2) When the commencement is delayed: within 60 days from the date of commencement

- B. Number of copies to be submitted: 2 copies

1.12 Shop Drawing

1.12.1 Preparation method

- A. The shop drawings must be prepared in detail based on the execution drawing,

expressing the details per work type and format and reflecting the field conditions.

- B. The shop drawings of various structures must be prepared by applying the field conditions and construction plan per work type to the possible extent, so that no problem will occur when they are used for construction.
- C. When preparing the shop drawing and the details related to the main rebar (the length of rebar or location of lap splice, etc.) need to be changed, the change must be reviewed and confirmed by a professional engineer, because a problem related to stability may occur.
- D. The shop drawing for the portion that overlaps with the construction plan may not be prepared upon discussion with the supervisor.
- E. The contractor must prepare the shop drawing including the contents of consultation and adjustment as prescribed by “11020 Consultation and Adjustment”, when the work is related to other works.
- F. The approval of shop drawing prepared by the contractor does not reduce the contractor’s obligation to guarantee the accuracy and mutual conformity of the measurements and details.

1.12.2 Object of submission

The applicable Part shall apply to the object for which shop drawing must be prepared and the items to included therein.

1.12.3 Time of submission and number of copies

A. Time of submission

The shop drawing must be prepared and submitted under the responsibility of professional engineer of the related area no later than 15 days before the commencement of the applicable work (for the simple matter that does not require technical review, no later than 7 days and off days and holidays shall be excluded, and the contractor may not commence the work before the shop drawing is approved.

- B. Number of copies to be submitted: 2 copies

1.13 Information on Material and Product

1.13.1 Catalogue of material suppliers

- A. The contractor must prepare the catalogue of material suppliers and submit it to the supervisor.
- B. The catalogue shall be prepared using the form provided by the supervisor. The contractor shall submit the catalogue well in advance, so that the supervisor may inspect and test the materials supplied by the supplier listed in the catalogue.

- C. In case the inspection and test are conducted not at the time when the materials are used for the works, but at other time, such inspection and test does not guarantee the delivery inspection of the materials used by the works thereafter.

1.13.2 Product Data

- A. The contractor shall comply with “12020 Management of Materials” with regard to the matters not stated herein and with regard to the product data for selection of material.
- B. For the contractor to make the material selection review or quality guarantee for the use of materials for the work, the contractor must report the product data of the material to the ordering organization or acquire approval thereof from the ordering organization.
- C. The contractor must check whether the material for work satisfies the requirements of the design documents and whether it is appropriate for the finish material used for the quality standards, before reporting the product data or requesting for an approval.
- D. When the contractor submits the product data, a written request must be made. the written request must include: the contract name; the number of contract plan; the number of related Part of the specification; the manufacturer and the brand; the related standard specification; the changes to contract plan or specification; the contractor’s signature or stamp after confirmation; and so on.
- E. The letter of guarantee and the printed materials and the data submitted by the contractor shall include: the location of work; the name of contract; the name of contractor; the manufacturer; the brand; the related standard; and so on..

1.13.3 Time of submission and number of copies

- A. Time of submission: no later than 15 days from the date of use or installation (to add more time when it is necessary for testing and inspection)
- B. Number of copies to be submitted: 1 copy

1.14 Sample

1.14.1 Submission and furnishing

- A. The contractor must select the material for the work after submitting a sample of the material that satisfies the standard indicated in the design documents and acquiring the confirmation from the ordering organization.
- B. The sample of selected material shall be furnished in the office of the supervisor or the contractor until the completion of work, so that it can be used as the standard for receiving inspection for the materials brought it. However, the period of

furnishing of the sample of which furnishing is deemed unnecessary may be shortened or furnishing itself may be omitted upon agreement with the supervisor.

- C. The contractor shall provide the sample stipulated in the contract to the supervisor at free of charge, and may not use the sample stipulated in the contract for the work until the supervisor gives a written approval.
- D. The sample submitted by the contractor shall include: the location of the work; the name of contract; the name of the procurer; the equipment with which the sample was taken; the manufacturer of the product and the brand; the country of origin; time-to-delivery; the date of submission; related standard specification; and so on.
- E. The sample of material delivered from the local supplier must be taken by the supervisor or in the presence of the supervisor.
- F. Provided that the material fails to pass the specified test, the sample taken from the same brand, the same manufacturer or the same supplier may be denied, and the supervisor has an authority to deny the material that had been confirmed before to be inadequate for use.

1.14.2 Time of submission and number of copies

- A. Time of submission: no later than 15 days from the date of use or installation (more time to be added when necessary for testing and inspection)
- B. Number of copies to be submitted: 1 copy

1.15 Submissions Related to Application for Submission, Reporting Permission and Approval

1.15.1 The construction work plan

- A. The contractor shall submit the construction work plan.
 - 1) Name of work
 - 2) Name of the party that is implementing the construction work
 - 3) Type of work
 - 4) Region of work
 - 5) Size of work
 - 6) Period of work
 - 7) Work plan diagram
- B. The contractor shall submit the construction work plan to the ordering organization after getting it confirmed by the supervisor.

1.16 Submissions Related to Examination, Inspection and Design Change

“11512 Examination, Inspection and Design Change” shall apply.

1.17 Review of Submissions

1.17.1 Review by the contractor

- A. All submissions prepared the contractor must be faithfully reviewed before they are submitted to the ordering organization.
- B. The contractor must check each item that had been approved when the ordering organization approved the submissions.

1.17.2 Review by the supervisor

- A. The supervisor shall review whether the data submitted by the contractor agrees with the requirements of the work.

1.18 Responsibility of the Contractor

1.18.1 The submissions submitted by the contractor must have all data required for the review and agree with the submissions for other related works.

1.18.2 The ordering organization’s approval of the submissions does not reduce the obligations of the contractor for any error in the drawing and the related calculated data.

1.18.3 The contractor shall share the approved submissions with the field office of the supervisor and the persons related to the work.

1.19 Change

No change of submissions shall be allowed until the supervisor inspects it and approves of it in writing.

2. Material

(None)

3. Construction

(None)

11512 Examination, Inspection and Design Change

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part shall apply to the amount of work completed, application for completion inspection, arrangement for defects, inspection and standard for calculation of the amount of work completed.

1.2 Related Parts of the Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11510 Management of Submissions

12010 Quality Management

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Definitions

1.4.1 Progress Inspection

"Progress Inspection" refers to a partial inspection conducted to pay for the price before completion of construction work, which is carried out in the form of the Informal Progress Inspection and the Formal Progress Inspection.

1.4.2 Preliminary Completion Inspection

"Preliminary Completion Inspection" refers to the inspection conducted in the same way as completion inspection is conducted before the completion date of the construction work.

1.4.3 Completion Inspection

"Completion Inspection" refers to an inspection conducted to all parts of the construction work when it is completed.

1.4.4 Defect Inspection

“Defect Inspection” refers to an inspection conducted when the defect guarantee period is expired or when the defect is occurred before the expiration of defect guarantee period and the defect repair is completed.

1.5 Submissions

The followings shall be submitted as prescribed by “11510 Management of Submissions”.

1.5.1 Submissions before the commencement of work

- A. The Progress Inspection Application
- B. The Completion Inspection Application
- C. The Design Change Approval Application
- D. The Completion Due Date Postponement Application

1.6 Progress Inspection

1.6.1 When the contractor partially completes the performance of contract and wishes to be inspected so that it can apply for the progress payment, it must submit the Progress Inspection Application to the ordering organization via the supervisor.

1.6.2 Progress schedule for the completed portion

When asking for the progress payment, “the planned progress” and “the actual progress shall be indicated below the process due date indicated in the horizontal bar chart among the progress schedules and such horizontal bar chart shall be attached to the progress payment request form.

1.6.3 The progress payment request form shall be filled out without omitting any item therein, such as the signature or the stamp of the person who filled out the form, etc. Also, what has been entered in the form must correspond with the contents of the statement of completed portions, the progress schedule and the work progress report.

1.7 Preliminary Completion Inspection

1.7.1 The ordering organization shall conduct the Preliminary Completion Inspection as prescribed by ‘13010 Completion of Construction’.

1.7.2 The contractor must be present at the ordering organization’s Preliminary Completion Inspection.

1.8 Completion Inspection

- 1.8.1 When the contractor completes the performance of entire contract and wishes to be inspected so that it can request for the completion payment, it shall submit the Completion Inspection Application to the ordering organization via the supervisor.

1.9 Request for Design Change

- 1.9.1 The contractor may request for change of design under the contract terms and conditions.
- 1.9.2 The supervisor may demand the contractor to provide a proposal for change when the supervisor deems it necessary, and the proposal must include the details of change backed up by the revised or supplemented drawings and specifications, the change of contract period, the contract price, etc.
- 1.9.3 Adjustment of contract price due to change of design shall be made according to the contract terms and conditions.
- 1.9.4 Ordering of design change
- A. Upon approval of the proposed design change by the ordering organization, the supervisor may order the contractor to start the changed work.
 - B. Such order must state the changed items and the method of deciding the change of contract price or contract period. The changed work must be started immediately.
- 1.9.5 Implementation of the Design Change Order
- The Design Change Order issued by the supervisor shall be signed by the ordering organization's person in charge of contracts or a copy of the Design Change Approval shall be attached to the Design Change Order.

1.10 Adjustment of Completion Due Date

- 1.10.1 When an event that requires adjustment of the completion due date occurs, the contractor shall prepare the Work Period Postponement Application immediately and request the ordering organization for adjustment via the supervisor.
- 1.10.2 The adjustment of contract price according to the adjustment of completion due date shall be made according to "the Ordering Organization's Standard for Adjustment of Contract Price".

1.11 Action for Defect

1.11.1 The contractor is obligated to repair the defects in the object of work from the date when the Completion Inspection is completed and during the period prescribed by the contract.

1.11.2 The contractor must immediately repair the defect upon receipt of the defect repair notice, and submit a written report that includes the cause of and the actions taken regarding the concerned defect to the ordering organization.

1.12 Standards for Inspection and Calculation of Progress

1.12.1 The supervisor shall inspect the works the contractor carried out and all quantities of materials and equipment brought into the field to calculate the progress. Unless stated otherwise, all quantities shall be calculated using the measurements specified in the design document.

1.12.2 Inspection of quantity for the work carried out under the unit price contract shall be conducted as stated below, unless stated otherwise in each Part of the specification.

A. Inspection by weight

Rebar, shape steel, cast steel and other metallic material of which price is paid based on weight and production thereof shall be inspected by using a scale or based on the weight written in the product data, for the type and the quantity of material actually supplied and used.

B. Inspection by volume

Inspection shall be made in the unit of volume written in the statement of contract price. The volume shall be inspected as specified in the contract plan or based on the unit of volume installed or removed as prescribed by the contract plan.

C. Inspection by area

Inspection shall be made in the unit of area written in the statement of contract price. The area shall be inspected as prescribed.

D. Inspection by length

Inspection shall be made in the unit of length written in the statement of contract price. Unless stated otherwise, the portion or work to be inspected shall be measured from the center line of the installed item.

E. Inspection of the total amount item

The total amount item shall be inspected for the entire items, works or the unit of structure as written or stated in the statement of contract price. The partial progress for the total amount item shall be determined by the appropriate distribution method approved by the supervisor.

1.12.3 The contractor shall support the supervisor's inspection by assigning all equipment, workers and the measurement assistants required for the quantity inspection according to the inspection method specified herein and the applicable requirements of "12010 Quality Management".

1.12.4 The amount of completed portion shall include labor, product, tool, equipment, facility and temporary facility, transportation, service and accessorial material, temporary installation or installation, indirect personnel expenses, other miscellaneous expenses, general management expenses and complete compensation for profit.

2. **Material**
(None)

3. **Construction**
(None)

120 Quality Management

12010 Quality Management

1. General Provisions

1.1 Scope of Application

This Part shall apply to the general requirements of quality management required for the implementation of works.

1.2 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.3 Definitions

1.3.1 Total Construction Cost

"Total Construction Cost" refers to the estimated price of construction work that includes VAT, etc., which excludes the compensation cost for acquisition and use of land, etc.

1.4 Submissions

The followings shall be submitted as prescribed by "11510 Management of Submissions".

1.4.1 Pre-commencement submissions

- A. The quality management plan or the quality test plan
- B. The comprehensive construction confirmation plan

1.4.2 Test reports

- A. The quality test application
- B. The quality test register

1.4.3 Government affairs and administrative submissions

- A. The follow-up plan for the issues found after inspection

1.5 Establishment of the Quality Management Plan or the Quality Test Plan

1.5.1 Procedure for establishment of the quality management plan

- A. The contractor shall prepare the quality management plan, etc. to ensure the quality of construction work, submit the plan to the ordering organization no later than 60 days after the date of commencement and acquire an approval. The same shall apply when changing the quality management plan, etc.
- B. The contractor may not carry out the work when the quality management plan is not approved. However, this shall not apply when the contractor acquired a conditional approval with a cure period. The same shall apply when changing the quality management plan, etc.
- C. When the contractor submits the quality management plan, etc., the (intended) detailed statement of quality management expenses must be included.
- D. The ordering organization may review the contents of the quality management plan, etc. submitted by the contractor and demand the contractor to supplement the quality management plan, etc. if necessary. Upon such demand, the contractor shall immediately supplement the plan as demanded and submit the result of supplementation to the ordering organization for approval.

1.5.2 Establishment of the quality management plan, etc.

- A. The quality management plan must be prepared in compliance with 1.2 Criterion of Application.
- B. The quality test plan must be prepared in compliance with the relevant regulations of the ordering organization.

1.5.3 Confirming the performance of the quality management plan, etc.

- A. The ordering organization and the institution that confirms the appropriateness of quality management may inspect whether the contractor is appropriately managing the quality of the construction work according to the quality management plan, etc. the contractor established and submitted 1 or more times a year and until 2 months before the completion. In this case, the contractor must be present at the inspection.
- B. When the ordering organization believes that correction is necessary after inspecting whether the quality management plan, etc. is carried out, the ordering organization may demand the contractor to make corrective action. Upon such demand, the contractor must immediately make the correction as demanded and notify the result of such correction to the ordering organization.

1.6 Installation of the field testing lab

- 1.6.1 The contractor must install a testing lab and testing and examination equipment in the construction field according to the design document and the “general matters per work type” of the specification.
- 1.6.2 When installing the field testing lab, the ordering organization may demand the contractor to install a common lab jointly with the contractor of construction work nearby, and the contractor shall comply with such demand.
- 1.6.3 The contractor shall place the following documents with regard to the quality testing and examination at the field testing lab and fill out and maintain the documents at all times.
 - A. The quality testing plan
 - B. The quality testing register
 - C. The daily testing and examination log per item
 - D. The log of requesting for test to the quality inspection service provider
 - E. The table of actions made against the materials that failed the quality test
 - F. The quality test outcome table
 - G. Other data related to quality testing
- 1.6.4 Operation and calibration of testing equipment in the field
 - A. The contractor must immediately replace the equipment in the field testing lab which is broken or requires repair.

1.7 Quality Test and Examination

- 1.7.1 Application of the quality testing standards
 - A. The contractor must apply the quality testing standards to ensure quality of the construction work and test and examine the quality in compliance with the testing standards.
 - B. When applying the standards for quality testing and examination, the contractor shall apply the contents of regulation when the contents of each Part in specification contradict with each other.
 - C. When collecting the sample from a material, the quality of the sample shall represent the quality of entire material, unless decided otherwise.
 - D. Even if a material does not require any quality test and examination, a quality test and examination shall be conducted when the supervisor demands for a test because the supervisor believes it is necessary.

1.7.2 Location of quality test and examination

- A. The contractor shall conduct a quality test and examination in the field of construction work, if it is appropriate for the quality test and examination to be conducted in the field of construction work.
- B. If it is not appropriate for a material to be tested in the field testing lab, the material can be tested and examined for quality at its manufacturing plant, and the supervisor shall be allowed to be present so that he/she can confirm the test and examination by him/herself.

1.7.3 Recording of quality test and examination result

- A. The contractor shall fill out “the quality inspection register” according to the quality testing performance report issued by the quality testing service provider, attach the original copy of the quality testing performance report thereto, acquire the confirmation of the supervisor and place them in the field testing lab at all times.
- B. When the construction engineer who carries out the role of quality management conducts the quality test at the field testing lab, the contractor must fill out the daily test and examination log, acquire the confirmation of the supervisor and place the log in the field testing lab at all times.
- C. The contractor shall prepare “the quality test result table” when completed the quality test or examination and submit it to the ordering organization when submitting the application for inspection or completion inspection for the concerned construction work or when applying for the Preliminary Completion Inspection.
- D. The contractor shall be responsible for quality test and examination and quality management work similar thereto, unless it is stipulated that the ordering organization or the designated entity related to the work is responsible.

1.8 Role of the Supervisor

The supervisor shall carry out his/her business to carry out the contracted works and to ensure and improve the quality.

1.9 Responsibility of the Contractor

1.9.1 Consultation and adjustment

- A. The contractor and the quality testing service provider must consult and adjust the order of work, so that the construction work will not be delayed because of execution of the quality test and examination required for the construction work and the businesses similar thereto.

- B. The contractor is responsible for scheduling of the quality test and examination, the preparation of testing sample and the businesses similar thereto.
- C. The fact that the supervisor conducted his/her inspection does not reduce the responsibility of the contractor to carry out the works as required by the contract.

2. **Material**

(None)

3. **Construction**

(None)

12020 Management of Materials

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part shall be applied to management of materials used to carry out the works, such as selection, transportation, handling, storage and protection.

1.2 Related Part in the Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

12010 Quality Management

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Definitions

1.4.1 Replacement Material

"Replacement Material" refers to a material of which replacement can be requested by the contractor to the ordering organization to carry out the works because of a cause which is not the fault of the contractor (suspension of production, problem with purchasing, etc.).

1.4.2 Multiple Application Material

"Multiple Application Material" refers to the multiple materials (construction methods) of which identical or similar performance or function is proven at the time of creating the design documents, and the material that the contractor can select and apply freely in the field.

1.5 Submissions

The followings must be submitted according to "11510 Management of

Submissions”.

1.5.1 Submissions before commencement of work

- A. The Application for Use of Replacement Material
- B. The Application for Use of Multiple Application Material (Construction Method)

1.6 Selection of Material

1.6.1 All materials for the work provided by the contractor must satisfy the quality standard specified in the applicable Part of the specification or the contract drawings and documents.

1.7 Application of Replacement Material

1.7.1 The contractor shall apply the Replacement Material only to the material for which the Replacement Material is specified by the applicable Part of the specification or the contract and must acquire the supervisor’s approval.

1.7.2 When asking for Replacement Material, the contractor must submit the following information which will show that the applicable Replacement Material satisfies the applicable Part of the specification or the contract.

- A. The grounds on which the contractor determined that the Replacement Material satisfies or surpasses the level of quality of the material applied to the design documents
- B. Provision of warranty for the Replacement Material under the same conditions as those provided for the material applied to the design documents
- C. The contractor shall replace the material for the work to be completed at its cost
- D. Renunciation of claim for additional cost or extension of work period due to the use of Replacement Material
- E. Ex-post settling up to the ordering organization or the supervisor for the review or re-design related to the re-approval by the relevant organization

1.7.3 Replacement of material shall not be accepted when the Replacement Material is specified or implied at the time when the shop drawing or the product data is submitted without submitting any separate written request for approval; or when the contract needs to be amended because the Replacement Material is accepted.

1.7.4 Time of submission and number of copies

- A. Time of submission: when a cause arises
- B. Number of copies to be submitted: 2 copies

1.8 Application of Multiple Application Material (Construction Method)

1.8.1 The contractor may apply the Multiple Application Material (construction method) to the material that had been indicated as the Multiple Application Material (construction method) in the applicable Part of the specification or the contract drawings and documents. When using the Multiple Application Material (construction method), the contractor must fill out an application and get it approved.

1.8.2 Time of submission and number of copies

A. time of submission

1) No later than 15 days before the date when the material is used or installed

2) In case of a material for which the construction plan is submitted, when the construction plan is submitted

※ When test and examination are required, to add the test and examination period

B. Number of copies to be submitted: 2 copies

1.9 Transportation and Handling

1.9.1 The contractor must transport and handle the material after fully acquiring the product data of the manufacturer.

1.9.2 The contractor must pay attention during transportation and handling of the material so that no change that affects the quality, such as deterioration, damage, pollution, distortion, discoloration, etc. will occur.

1.9.3 When bringing the materials into the field, the contractor must check if the materials satisfy the requirements of quality standard, if the correct amount of materials are brought in and if the materials are damaged.

1.10 Storage and Protection

1.10.1 The contractor shall store and protect the materials brought into the field according to the product data of the manufacturers.

1.10.2 The contractor shall pay attention during storage of the material so that no change that affects the quality, such as deterioration, damage, pollution, distortion, discoloration, etc. will occur.

1.10.3 The material for which the quality test and examination must be conducted while

it is used as prescribed by “12010 Quality Management” must be stored separately until the quality test and examination is completed so that it will not be mixed with the material that had already been brought into the field and tested and examined for quality.

- 1.10.4 In principle, the materials brought into the construction field shall be stored in the storage. The materials to be stored in the outdoors shall not come in direct contact with the ground by placing a support sheet, etc. on the ground.
- 1.10.5 The contractor must store the flammable materials separately from other materials, and establish and implement a fire prevention plan.
- 1.10.6 When storing the materials, the contractor shall place the materials so that they can be easily accessed for inspection and regularly check if the materials are stored in fair condition without being damaged.
- 1.10.7 The contractor may not take the inspected material or the materials that passed the test brought into the construction field out of the construction field without the approval of the supervisor. The material that failed to pass the test shall be taken out of the construction field immediately as prescribed by “12010 Quality Management”.
- 1.10.8 The contractor must make sure that the construction field is thoroughly secured to prevent any theft of or damage to the materials that had been brought in and the work-in-progress.

1.11 Handling of Defective Ready-mixed Concrete and Asphalt Concrete

- 1.11.1 The contractor must immediately return any of the following defective materials.
 - A. When the result of slump measurement failed to satisfy the specification for the applicable work
 - B. When the result of air measurement failed to satisfy the specification for the applicable work
 - C. When the result of chloride ion (Cl⁻) measurement failed to satisfy the specification for the applicable work
 - D. When the ready-mixed concrete passed the time prescribed by the specification for the applicable work after it was produced
 - E. When the measured temperature of the asphalt concrete failed to reach the specified temperature for the applicable work
 - F. When the result of Marshall stability test failed to satisfy the specification for the applicable work

- G. When the asphalt content and result of extraction and particle size test failed to satisfy the specification for the applicable work
 - H. When the material is deemed impossible to be used because of separation of material, etc.
 - I. When it is deemed inappropriate to be used in terms of quality management, such as the likelihood of future defect by the use of defective material, etc.
- 1.11.2 The contractor shall collect “the affirmation of destruction of defective material” from the manufacturer of the applicable material as prescribed by 1.3 Criterion of Application and keep the affirmation, so that the returned material will not be used in other construction fields.

2. **Material**
 (None)

3. **Construction**
 (None)

1 25 Safety and Environment Management

12510 Safety and Hygiene Management

1. General Provisions

1.1 Scope of Application

This Part presents the requirements for general matters required for effective implementation of safety and hygiene management in the field of concerned work.

1.2 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.3 The Contractor's Obligations for Safety

1.3.1 The Contractor's obligations

- A. The contractor shall maintain and improve life, safety and hygiene of the workers by complying with legal requirements for prevention of industrial accident, improving the working conditions and creating an appropriate working environment.
- B. The contractor shall comply with legal requirements when designing, manufacturing, importing or building a facility and give its efforts to prevent industrial accident during the use of such facility.
- C. The person who subcontracts a construction work to others must not attach any condition to the construction method, construction period, etc. which may hinder safe and hygiene execution of work.

1.3.2 Responsibility for management and compensation

- A. The contractor shall establish and implement a safety plan for control, safety, security, hygiene and personal accident of the person the contractor appointed, designated or hired for the concerned work and the person with whom the contractor executed a subcontracting agreement or a supply agreement. When an accident occurs, the contractor shall immediately take all necessary actions.
- B. The contractor must take all necessary actions to prevent damage to the residents, the foot passengers, all facilities, agricultural produce, livestock and farmed fish in

the nearby area.

- C. The contractor must prevent persons irrelevant to the work accessing the construction field or taking unnecessary pictures to maintain safety and security of the work.
- D. The contractor shall compensate for the damage and the loss occurred because it neglected to comply with the above provisions or made mistakes and shall restore the damages and the losses to their original states.

1.4 Preparation of the Safety Management Plan and the Hazard and Risk Prevention Plan

- 1.4.1 The contractor may prepare “the Safety Management Plan and the Hazard and Risk Prevention Plan” altogether and shall submit the report and the results to the ordering organization.

1.5 Establishment of the Safety Management Organization

1.5.1 Roles of the safety management organization

The safety management organization shall be established based on the work management organization and carry out the following roles.

- A. The roles of the safety management organization
 - 1) Securing safety in and around the construction site
 - 2) Checking whether the works are carried out according to the safety management plan
 - 3) Conducting the safety training
- B. Prevention of accident and emergency action
 - 1) Removal of all sorts of risk elements
 - 2) Taking emergency action and restoring the damages at the time of emergency

1.6 Safety Management Activity

1.6.1 Establishment of filed safety inspection system

When commencing the construction work, the contractor shall establish a system that will inspect safety during work considering the field condition and the safety management activity to ensure safety of the workers at the construction site.

1.6.2 Implementation of safety training

The contractor shall implement safety training to ensure safety.

1.6.3 Maintenance of record

The contractor shall record the results of implementation and the description of actions related to the matters related to safety inspection, the events related to safety, the matters related to safety and hygiene training and other matters related to safety and hygiene in the daily safety log and maintain the daily safety log.

1.7 Safety and Hygiene Inspection and Diagnosis

1.7.1 Preliminary diagnosis

- A. The contractor shall endeavor to prevent damage to the nearby area during the construction work.
- B. The contractor shall prepare for the damage-related civil complaint by securing information on the existing deficiencies of the adjacent facilities, such as crack, displacement, etc., before commencing the construction work that accompany vibration and ground deformation, such as bed excavation, foundation work, etc.

C. Self safety inspection

The contractor shall form a group made up of the safety manager, the contractor and the subcontractor and cause the group to conduct self safety inspection everyday during the period of the applicable construction work per type of work.

D. Regular safety inspection

- 1) The contractor shall cause the construction safety inspection organization to conduct regular safety inspection for the subject construction work according to “the subject and the schedule of regular and initial safety inspections”.
- 2) When the contractor intends to request the construction safety inspection organization for the regular safety inspection, it must acquire the approval of the ordering organization on the request form which includes the followings no later than 60 days before the expected date of inspection.
 - A) Timing of request according to the progress of work
 - B) Statement of report submission due date when requesting for the safety inspection (liquidated damages for delay, etc.)
 - C) The inspection report should list the findings by sorting them into ‘the matters that can be corrected immediately’, ‘the matters that require correction by certain date’ and ‘the important matters’, etc.
 - D) The findings shall be clearly stated so that the reader may quickly make corrections or establish plans based on the findings; the number of inspectors and the period of inspection shall be discussed with the inspecting organization so that the inspection can be carried out efficiently and the inspecting organization shall present correction methods that will not require excessive cost.

- E) Matters related to the inspection cost
- F) “The construction work safety inspection guideline” shall apply to the items to be inspected by the inspecting organization
- 3) Handling of the result of inspection
 - A) The contractor must report the results of safety inspection to the ordering organization.
 - B) The contractor must prepare the regular and detailed safety inspection findings follow-up confirmation on the matters found by the safety inspection and submit the confirmation to the ordering organization.
- E. Detailed safety inspection
 - 1) When repair, reinforcement, etc. is required because physical or functional defect is discovered from the construction work after the regular safety inspection, the contractor must request the construction safety inspection organization for the detailed safety inspection.
 - 2) When the contractor intends to request the construction safety inspection organization for a detailed safety inspection, it must prepare a request form that contains necessity, description, scope, selection of the inspection organization, etc. and get it approved by the ordering organization no later than 60 days before the anticipated date of inspection.
 - 3) The detailed safety inspection must be carried out so that the problem found from the regular safety inspection related to the subject of inspection can be identified.
 - 4) The contractor must submit the report when the detailed safety inspection is completed, which contains the followings.
 - A) State of physical and functional defects
 - B) Cause of defect analysis
 - C) Result of structural safety analysis
 - D) Plan for repair, reinforcement or reconstruction
 - 5) The cost of detailed safety inspection shall be paid by the contractor except when the ordering organization is clearly at fault.
- F. Initial safety inspection
 - 1) The contractor must conduct the initial safety inspection of which level is equivalent to or greater than that of the regular safety inspection to acquire the initial value which will become the standard of safety evaluation for the structure in its future inspections and diagnosis and to identify the major maintenance items for the areas where a problem has occurred or is likely to occur before completing (including the temporary use) the construction work.
 - 2) “The subject and time of regular and initial safety inspection” shall apply to the

subject and time of the initial safety inspection.

G. Safety inspection before resumption of work

- 1) When resuming the construction work of the facility which had been abandoned for 1 year or longer due to suspension of the construction work, the contractor must conduct the safety inspection for the applicable facility before resuming the construction work.
- 2) The safety inspection before resumption of construction work must be conducted at the level equivalent to that of the self safety inspection or the regular safety inspection depending on the decision of the ordering organization, and the construction work shall resume after making appropriate arrangements according to the result of inspection.

1.7.2 Inspection of safety management status

A. Safety inspection when resuming the construction work

When resuming the construction work after temporarily suspension of the construction work for less than a year, the contractor must conduct the safety inspection and make appropriate action according to the result of inspection before resuming the construction work.

B. Structural safety inspection

When a problem related to structural safety occurs during the construction work, it must be reported to the ordering organization immediately, and the follow-up work must be carried out after conducting safety inspection by and receiving consultation from the expert. The contractor shall pay for the cost of inspection or for the proof of safety.

- C. The ordering organization may inspect or diagnose the contractor's safety management status to ensure safe implementation of the construction work regularly or at any time and demand for correction of insufficient or inappropriate issue and temporary suspension of the applicable work. The contractor must immediately suspend the applicable work and make corrective action upon such demand.

1.7.3 Submission of the safety management result report

The contractor shall prepare the quarterly safety management result report which includes the followings and submit it to the supervisor.

- A. The safety management organization chart
- B. The safety and hygiene management system
- C. The disaster occurrence status
- D. The status of conducted safety training sessions

E. Other necessary documents

1.7.4 Comprehensive report on safety inspection

When the contractor completed a construction work for which it established the safety management plan and conducted the safety inspection, it must prepare the comprehensive report related to the safety inspection and submit the report to the ordering organization.

1.8 Field Safety and Hygiene Management

1.8.1 Accident handling

A. Accident handling

- 1) Upon occurrence of accident, the general manager of safety shall summarize the description of accident, the result of handling and the future handling plan in writing and report the summary to the ordering organization as soon as possible.

2. Material

(None)

3. Construction

(None)

12520 Environment Management

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the general matters related to environment management, such as the implementation of environmental impact assessment related to the concerned works, environmental preservation, natural environment, living environment, socio-economic environment, mediation of environmental dispute, etc.

1.2 Related Parts of the Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11510 Management of Submissions

12521 Waste Management

20531 Prevention of Erosion and Silting

20532 Silt Protector

20540 Air Pollution Control Facilities

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The followings shall be submitted as prescribed by "11510 Management of Submissions".

1.4.1 Submissions before commencement

- A. The environment management plan

1.4.2 Submissions related to reporting, permit and approval

The contractor shall prepare the following reports or permits according to the applicable laws and regulations before commencement of the concerned work,

report to the head of competent local government or organization subject to consultation and submit the copies of the report and the certificate of completion of report to the supervisor.

- A. The scattering dust generating business report
- B. The preliminary report for noise and vibration generating works
- C. The report or permit on development and use of underground water
- D. The independent septic tank installation report
- E. The wastewater purifying facility installation report

1.5 The Contractor's Obligations on Environment

1.5.1 The contractor shall explain the local residents the purpose and the description of work and strive to seek for their cooperation before commencing the construction work.

1.5.2 Occurrence of environmental accident and reporting of the results

- A. The contractor shall prepare "the environmental accident report" and report it to the ordering organization in any of the following cases.
 - 1) When an administrative disposition is made, a fine is imposed or reported to the judicial authority due to violation of environment-related laws and regulations
 - 2) When a group civil complaint related to environment occurred or when such complaint interrupts the progress of work
 - 3) When the work is reported as the environmental problem by the media

1.6 Preparation of the Environment Management Plan

1.6.1 The contractor shall establish the environment management plan to prevent the environmental pollution caused by the concerned construction work and submit the plan to the ordering organization.

1.6.2 The followings shall be included in the environment management plan.

- A. The field condition inspection
 - 1) Inspection of present condition surrounding the construction work site
 - 2) Inspection of present condition inside the construction work site
- B. The analysis of environmental impact
- C. The environment management organization and its duties
 - 1) The purpose and direction of environment management
 - 2) The environment management organization and its mission
 - 3) The construction management plan per environmental element
 - 4) The environmental facility installation and management plan

5) The field environment management activity plan

1.6.3 The ordering organization may present its opinion on the environment management plan submitted by the contractor, and the contractor shall follow the opinion unless there is a special cause not to.

1.6.4 Time of submission and number of copies

- A. Time of submission: within 60 days from the date of commencement
- B. Number of copies to be submitted: 2 copies

1.7 Implementation of Environment Inspection, Etc.

1.7.1 Environment inspection

To prevent damages and civil complaints caused by environmental pollution and to carry out the construction work without interruption, the contractor shall regularly inspect the environment at least once a week giving the first consideration to the followings.

- A. Establishment and implementation of the environment management plan
- B. Implementation of the environment inspection
- C. Installation and management of facilities designed to suppress the pollutions from construction, such as the scattered dust, noise and vibration
- D. Selection of construction method for minimization of pollution from construction and progress of construction process
- E. Cleanliness of the area surrounding the construction site
- F. Periodic measurement and management of noise and vibration
- G. Management of environment-related documents, etc.

1.8 Implementation of Discussions from the Environmental Impact Assessment

1.8.1 Obligations of the contractor

- A. The contractor shall thoroughly implement what had been discussed in the Environmental Impact Assessment (EIA) when implementing the construction work.
- B. The contractor must prepare a management register to which the discussions related to EIA are recorded, place the register at the construction site, designate a person in charge of managing the register and check and report the status of implementation.
- C. The person in charge of managing the register shall check in advance the contents of discussion and the site where the risk in terms of environment and hygiene is expected, seek for ways to prepare for the risk and discuss with the supervisor.
- D. The person in charge of managing the register shall take photographs of the matter

that needs to be implemented as discussed before, during and after the construction and immediately report to the supervisor in writing.

- E. When it was agreed to conduct the environment inspection at the discussion, the environment inspection must be conducted in the way it was agreed at the discussion.
 - F. When the contractor who must implement the agreements from the discussion is changed, the obligations of the contractor shall be deemed to have been succeeded by the changed contractor.
- 1.8.2 Preparation and placement of the register for management of discussed action items
- A. The contractor shall prepare the register for management of discussed action items, place the register at the construction field office and fill out and maintain the register.
 - B. When the contractor fills out and keeps the register for management of discussed action items, it must preserve the evidence materials on the past implementations, such as photographs, relevant documents, etc.
- 1.8.3 Obligations of the person in charge of management
- A. The discussed issues related to EIA shall be recorded truthfully.
 - B. The person in charge of management shall check the implementation of the discussed issues frequently and report to the supervisor immediately when there is an issue that had not been implemented.

1.9 Environment Management

1.9.1 Common issue

The contractor must take necessary actions to prevent the concerned construction work from causing environmental pollution. Thus, the contractor shall follow the orders of the supervisor for preservation of living environment and thoroughly implement the requirements related to preservation of living environment in the environment-related laws.

1.9.2 Prevention of air pollution

A. Equipment used

To minimize air pollution by the equipment used, the contractor shall positively consider using the fuel that emits small amount of pollutants or the equipment that are powered by electricity or natural gas.

- B. The contractor must make reports according to the relevant laws to suppress damage to the surrounding environment from the scattered dust generated by the vehicles entering into and exiting from the construction site and from the outdoor

aggregate storage, and install facilities or take necessary action to suppress creation of scattered dust. The same shall apply when the contractor intends to change the report and the action in the above.

- C. The facility to suppress the scattered dust shall be installed at a location specified in the design documents according to “20540 Air Pollution Control Facilities”.
- D. The contractor shall implement the followings to generate less scattered dust.
 - 1) Installation and operation of wheel-washing facility that satisfies the facility standard at the vehicle entrance and exit at the construction site.
 - 2) Placement of a cleaner at the vehicle entrance and exit at the construction site at all times to remove fallen rocks and soil, conduct water wash-down and check the condition of washed wheels that passed the wheel-washing facility.
 - 3) Frequent sprinkling the vehicle path in the construction site with water.
 - 4) The waste and garbage from the construction site shall be separately collected and transported to the yard by a designated service provider.
 - 5) The vehicle that transports aggregate, sand, etc. that can generate scattered dust shall have an anti-dust cover and transport its load by loading only up to 0.05 meters below its top part of cargo box.
 - 6) Screen fences shall be installed at the portion that comes into contact with the urban main road.
 - 7) The work site shall be kept tidy and clean at all times and inflow of sand from the road shall be prevented.
 - 8) A manager shall be placed at the construction site, who will prepare a checklist of the above issues, make daily inspection thereof and train the workers and the drivers of vehicles that enter into the construction site as necessary.

1.9.3 Prevention of water pollution

- A. When the contractor intends to install and operate a facility that discharges waste water at the construction site, it shall do so after making the report or acquiring the permit or the approval as required by relevant law.
- B. The contractor shall not dump excreta, animal corpse, garbage or sludge into or wash automobiles in the public waters.
- C. The contractor shall make thorough preparations to prevent increase of turbidity and deposition of sediment in the streams at the time of rainfall, such as installation of temporary drain, grit chamber, predam and coffering that can fully accommodate the generated amount.
- D. The contractor shall cover the earths facility with plastic sheet, place gunnysack wall, etc. to prevent scouring of earths facility at the time of rainfall to prevent scouring.

- E. The contractor shall prevent the ready-mix concrete wash water from entering into nearby streams at the time of rainfall by, for example, installing the ready-mix concrete wash water collection box to prevent unauthorized washing after depositing the ready-mix concrete.

1.9.4 Prevention of noise and vibration

- A. When the contractor intends to install a facility that generates noise or vibration or carry out a work that generates noise or vibration frequently encountered during everyday life, it shall install and operate the facility after making the report or receiving the permit as prescribed in 1.3 Criterion of Application.
- B. The contractor shall engage in the construction after establishing the noise reduction plan in consideration of the construction method, the selection of construction machine, the adjustment of work hours, the working process, etc. to minimize generation of noise or vibration.
- C. The contractor shall carry out the works after closely reviewing the noise reduction plan and making appropriate arrangement when there is a pen for cow, pig, chicken, dog, deer, bear, goat, etc.
- D. The soundproof facility shall be precisely installed according to the design document and the instructions of the supervisor.

1.9.5 Waste

The waste generated from the construction site shall be managed as prescribed by “12521 Waste Management”.

1.9.6 Preservation of soil

- A. The contractor must seek for a way to prevent soil pollution by the facility in the construction site that causes soil pollution when carrying out the construction work.
- B. When the contractor carries out the earthwork, it must conduct a soil survey according to the intended purpose in advance. The soil found to be highly fertile by the survey shall be set aside and kept in a certain location so that it can be reused as the planting soil when carrying out the greening work.
- C. The contractor shall plant trees and cover the surface of the sloped areas as early as possible and avoid raining season as much as possible when transporting earth and sand.

1.9.7 Damage to landscape

- A. The flowering plants and trees designed to reduce damage to natural landscape shall be planted according to the design document.
- B. The contractor shall prevent cement powder, concrete residue, etc will not be

flown into the nearby planting sites.

- C. When planting street trees in the paved areas, the contractor shall prevent the road and the sidewalk from getting dirty or damaged by the earth, sand and garbage generated during the planting work, and the person who carried out the work must take action immediately when any environmental problem or defect is occurred.

1.10 Management of Social and Economic Environments

1.10.1 Common issues

The contractor must take necessary action to prevent the concerned construction work from causing environmental pollution in the nearby residential areas. When the contractor discovered any cultural assets during its work, it shall thoroughly take action to protect those buried cultural assets.

1.10.2 Residence

The contractor shall understand the conditions of residential areas near the roads that the construction vehicles travel and comply with the orders of the supervisor aimed to preserve the living environment of those residential areas, because the actions must be taken to prevent environmental pollution in the nearby residential areas by the operation of construction vehicles.

1.10.3 Cultural assets

When it is possible that the cultural asset is buried in the construction site, the contractor shall make arrangements to prevent damage to the cultural asset during construction and comply with the orders of the supervisor aimed to protect the buried cultural asset.

1.11 Field Environment Management

- A. The contractor shall clean rocks and dirt left after planting, fallen branches and leaves after trimming, pieces of wood pillar and other rubbish and garbage before the completion of work and take leftover material from the work or other waste materials out of the construction site following the due process.
- B. When the contractor determines that a work is making a grave impact to the environment, it shall suspend the work, prepare a report of the current situation (which states the impact to environment, date, weather, location, etc.), submit the report to the supervisor and follow the supervisor's instructions.
- C. The contractor shall supplement the items pointed out by the government office related to environment and the entity entitled to give permits and approvals.

- D. The contractor shall organize all data used for environment management during the construction work (the environment management register, photos and film, situation inspection report, etc.) and submit them to the construction supervisor.
- E. The contractor shall hand over all data related to environment management during the construction work to the facility manager, so that the data can be used for environment management after the construction work.

2. **Material**

(None)

3. **Construction**

(None)

12521 Waste Management

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part shall apply to the management of waste materials left in the construction site and generated during the construction work.

1.2 Related Part in the Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

12520 Environment Management

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Definitions

1.4.1 Wastes

"Wastes" refer to garbager business activity of human being.

1.4.2 Wastes from the place of business

"Wastes from the place of business" refer to the wastes generated by the place of business where the facility that generates wastes is installed and operated.

1.4.3 General wastes from the place of business

"General wastes from the place of business" refer to the wastes from the place of business other than the designated wastes and the construction wastes.

1.4.4 Designated wastes

"Designated wastes" refer to the wastes from the place of business that can pollute the environment, such as waste oil and waste acid, or hazardous wastes that can harm human body, such as the medical waste, etc.

1.4.5 Construction wastes

"Construction wastes" refer to the wastes generated from the construction site (only those generated from the commencement to the completion of construction work).

1.5 Submissions

The followings shall be submitted as prescribed by "11510 Management of Submissions".

1.5.1 Submissions before the commencement

- A. The wastes management plan

1.5.2 Submissions at the time of completion

- A. The construction work records

1.6 The Wastes Management Plan

1.6.1 The contractor must prepare the wastes management plan that contains the followings before the commencement of work and submit it to the ordering organization via the supervisor.

- A. The wastes distribution status investigation report
 - 1) Location map
 - 2) Photos of current situation
 - 3) Quantity of wastes per type
 - 4) Other necessary matters
- B. The plan for storage and treatment of the wastes left in the construction site and the wastes generated during the construction work
- C. The plan for treatment of wastes to be landfilled upon their generation
 - 1) The illegal dumping prevention plan, etc.
- D. Time of submission and number of copies
 - 1) Time of submission: no later than 15 days from the commencement of work
 - 2) Number of copies to be submitted: 2 copies

1.7 Wastes Generated During Construction

1.7.1 The contractor shall discuss with the supervisor about storage of wastes generated during the construction work, method of requesting for and frequency of their treatment, the minimum amount of treatment at one time, etc.

1.7.2 The contractor must request the ordering organization for treatment of generated wastes in advance when the amount of wastes stored exceeds the minimum amount

- of treatment at one time or when it is expected that the period which the wastes can be stored in the field considering the period of treatment will be exceeded.
- 1.7.3 The contractor shall be responsible for administrative issues, such as fine, penalty, etc., occurred by failure to request for treatment of generated wastes, and shall not shift the wastes treatment cost and the administrative issues to its subcontractor.
- 1.7.4 Waste asphalt concrete, waste concrete, etc. shall be dumped separately from other construction wastes and shall be stored so that they will not be mixed with other construction wastes.
- 1.7.5 Sludge from wheel-washing facility
- A. The contractor shall prepare dehydration facility when storing the construction sludge generated from wheel-washing facility and manage the sludge so that it will not pollute the surrounding soil.
 - B. The contractor shall consult with the supervisor about storage of the construction sludge, method and frequency of treatment request, minimum amount of treatment per treatment, etc. when installing the wheel-and-vehicle-washing facility.
- 1.7.6 Installation and management of waste oil storage
- A. The waste oil storage must be installed above the ground according to the applicable drawing, because serious soil pollution is expected when the stored waste oil is leaked.
 - B. The waste oil storage shall have an impermeability layer, so that waste oil leaked by accident will not permeate into the ground.
 - C. The contractor must furnish the waste storage with absorbent paper and net to prepare for emergency restoration. When the soil contamination is expected by the leakage of waste oil, the contractor must immediately restore the leakage to minimize the soil pollution.
 - D. The contractor must appoint a person in charge of managing the waste oil storage and install a signboard that indicates the above person to thoroughly manage the waste oil storage.
- 1.8 Landfilled Wastes**
- 1.8.1 When the contractor discovers landfilled wastes during the construction work, it must immediately report to the ordering organization via the supervisor.
- 1.8.2 The contractor shall investigate type and amount of landfilled waste and collect samples of wastes for component analysis in the presence of the supervisor.
- 1.8.3 The contractor shall prepare and report the landfilled waste treatment plan which

is adequate for the standards and methods of treatment per type of waste in consideration of the component analysis.

- 1.8.4 The contractor shall install drain and appropriate screen wall around the excavated wastes to prevent loss by rainfall, leakage of leachate, etc.

1.9 Prevention of Illegal Dumping

- 1.9.1 The contractor shall thoroughly manage the construction site to prevent illegal dumping of wastes, such as dumping of garbage by the outsiders.
- 1.9.2 When the wastes are illegally dumped in the construction site after the commencement of work, the contractor shall pay for treatment of the illegally dumped wastes.

1.10 Transportation

- 1.10.1 When transporting the wastes to carry out the works in the construction site or to the waste storage, the contractor shall seek for the ways to minimize mixing of, for example, soil.
- 1.10.2 When transporting the wastes inside the construction site, the payload shall be covered to prevent scattering or roll down.

1.11 Storage

- 1.11.1 The wastes shall be sorted by shape and type and stored in the location where the interference with the construction work is minimized and the wastes can be easily separated, collected and taken out.
- 1.11.2 The contractor shall consult with the ordering organization to select the location of waste storage, and the waste storage shall be placed in the location where the interference with the construction work is minimized and the wastes can be easily separated, collected and taken out.
- 1.11.3 The contractor shall install “the construction wastes storage sign” or “the designated wastes storage sign” in the wastes storage, at a location that can be easily seen by the people.
- 1.11.4 The contractor shall thoroughly manage the stored wastes by finishing grading, installing drains and placing covers to prevent the wastes from being blown by the wind or leaking by the rainfall.

1.12 Construction Record

- 1.12.1 The contractor shall accurately record the actual location and laying depth of underground structure that had been buried instead of being removed or the actual locations of various pipes being cut and capped.
- 1.12.2 After having gathered the wastes in certain location, the contractor must record their management number, type, amount, etc.
- 1.12.3 Time of submission and number of copies
 - A. Time of submission: whenever the work is completed
 - B. Number of copies to be submitted: 2 copies

1.13 Responsibilities of the Contractor

- 1.13.1 Among the wastes generated during the construction work, the contractor shall pay for the treatment of wastes generated by the fault of the contractor.

2. Material

(None)

3. Construction

(None)

130 Test and Completion of Construction

13010 Completion of Construction

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part presents the requirements related to: the facility transfer plan; the final site cleaning; procedure of Completion Inspection; adjustment; data related to operation and maintenance; installation of the completion sign; and product warranty that can be directly referred by each product specification; and so on.

1.2 Related Parts in the Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11510 Management of Submissions

11512 Examination, Inspection and Design Change

20520 Installation of Temporary Facilities

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The followings shall be submitted as prescribed by "11510 Management of Submissions".

1.4.1 Submissions before commencement

- A. The completion sign installation plan

1.4.2 Operation and maintenance data

- A. The operation and maintenance guideline – draft
- B. The operation and maintenance guideline – final version

1.4.3 Submissions at the time of completion

- A. The findings from Preliminary Completion Inspection and description of actions taken
- B. The findings from completion decision inspection and preliminary completion inspection and descriptions of actions taken
- C. The findings from the occupant's preliminary inspection and descriptions of actions taken
- D. The as-build drawings and documents
- E. The Completion Inspection conclusion confirmation
- F. The product warranty
- G. The construction cost management plan
- H. The completion cleaning plan
- I. The cause of defect and other actions taken

1.4.4 Submissions for submission, reporting, permit and approval

- A. Copy of completion drawings and documents
- B. The list of completed construction works
- C. The comprehensive table of quality test and examination results

1.5 Implementation of Preliminary Completion Inspection

1.5.1 The ordering organization shall conduct the Preliminary Completion Inspection which corresponds to the Completion Inspection when the progress of construction reaches 90% or above or no later than at least 60 days before the date of completion.

1.5.2 The contractor shall be present when the ordering organization conducts the Preliminary Completion Inspection.

1.5.3 The contractor may submit the Completion Inspection Application after completing the follow-up action for findings from the Preliminary Completion Inspection and must present the findings and the follow-up actions to the inspector at the time of Completion Inspection

1.6 Completion Inspection, Etc.

1.6.1 Completion Inspection

- A. For the contractor to receive the Completion Inspection after completing the construction work, it must fill out the Completion Inspection Application and submit it to the ordering organization via the supervisor.

- B. “11510 Management of Submissions” shall apply to the documents that must be submitted by the contractor to the ordering organization when requesting for the Completion Inspection and procedure of such submission.
 - C. The contractor must remove or take out all wastes and surplus materials generated by the construction work and sand and stone remaining in the temporary building and the soil and stone pit before the Completion Inspection is implemented.
- 1.6.2 Submission of the completion drawings and documents
- A. The contractor shall prepare the completion drawings and documents as prescribed by “11010 Construction in General” and submit them by the completion date.
- 1.6.3 Installation of the completion sign
- A. When the construction work is completed, the contractor must install a sign.
 - B. The contractor must receive an approval on the installation plan, such as the location of installation and contents of the sign, by the supervisor no later than 15 days before the date of installation of the construction work completion sign.
- 1.6.4 The contractor shall finally decide the tool, the part, the spare material, the items similar thereto and the lock system, transfer the keys to the locks to the ordering organization and inform the ordering organization of the noted items.
- 1.7 The Operation and Maintenance Guideline
- 1.7.1 The operation and maintenance guideline shall be printed, bound and submitted in A4 size paper.
- 1.7.2 Operation and maintenance data, name of construction work, subject of each volume (when there are more than one volume) shall be indicated on the cover page of the guideline.
- 1.7.3 The contents of guideline shall be divided using the page dividers.
- 1.7.4 Each volume of the guideline shall have table of contents for each product or system, and have the following three sections.
- A. Section 1
Names, addresses and telephone numbers of the supervisor, the contractor, the subcontractor and the suppliers of major equipment
 - B. Section 2
Operation and maintenance guidelines sorted by system and the specification; names, addresses and telephone numbers of the subcontractors and the suppliers per item; and the followings

- 1) Major design standards
- 2) List of equipment
- 3) List of parts
- 4) The operation guide
- 5) The guide on maintenance of equipment and the system (this shall include: guideline on contingency action, list of remaining parts; copies of various warranty certificates; the wiring diagram; inspection frequency, inspection procedure; construction and fabrication diagram; and the material data and other data similar thereto)

C. Section 3

The construction documents and confirmations including the followings

- 1) Shop drawing and product data
- 2) Resin report of Air and Water
- 3) The confirmation
- 4) The original or copy of product warranty certificate

1.7.5 The operation and maintenance guide shall be prepared in two versions of the draft and the final versions.

1.7.6 The contractor shall submit the draft version of the operation and maintenance guide before the Completion Inspection for the supervisor's review. The contractor may submit the final version after the contractor completes the follow-up actions for the supervisor's findings.

1.7.7 Time of submission and number of copies

A. Time of submission

- 1) The draft version: no later than 15 days before the date of Completion Inspection
- 2) The final version: within 10 days from the date of Completion Inspection

B. Number of copies to be submitted

- 1) The draft version: 1 copy
- 2) The final version: 2 copies of the guide and 1 CD ROM

1.8 Operation and Maintenance Demonstration and Training

1.8.1 The contractor must conduct demonstrations and trainings for the ordering organization and the person in charge of management on the overall issues related to the equipment or the facility system which is the subject of construction, including: start up; shut down; control; adjustment; discovery of problem; emergency operation and maintenance of safety; injection of lubricant and fuel; adjustment of noise and vibration; cleaning; repair; how to request for service;

how to read the maintenance guide; and so on.

1.8.2 The applicable Part of the specification shall apply to the type of equipment and system subject to training and other details.

1.8.3 The venue, time and date of training shall be determined by consulting with the ordering organization.

1.9 Spare Part and Maintenance Product

1.9.1 The spare part and the maintenance product to be provided by the contractor shall be limited to the item and amount stated in the applicable individual Part of the specification, and they must be identical with the products used in this construction work in terms of product name, model number and manufacturer.

1.9.2 The contractor must bring the spare parts and the maintenance products into the construction site or the designated location before the final progress payment.

1.10 Product Warranty and Maintenance

1.10.1 The contractor shall transfer the title of product warranty from the subcontractor, the supplier and the manufacturer, prepare the table of contents and submit it to the ordering organization.

1.10.2 The contractor must submit the product warranty when submitting the Completion Inspection Application.

1.11 Maintenance

1.11.1 The contractor must provide maintenance and repair for the part specified in the applicable Part of the specification during the defect warranty period.

1.11.2 The contractor shall repair or replace the parts when necessary during the maintenance period and use the part that is identical to the originally installed part.

1.11.3 The contractor may not transfer its maintenance obligation to other agent or subcontractor without the prior written approval of the ordering organization.

1.12 Submission of Copies of Completion Drawings and Documents, the Comprehensive Report on Safety Inspection, Etc.

1.12.1 Copies of completion drawings and documents

- A. The contractor must save the copies of the followings to a CD ROM as prescribed by 1.3 Criterion of Application and submit it to the ordering organization within 3

months (90 days) after the date of completion.

- 1) The completion drawings
- 2) The completion statement and the specifications
- 3) The structural calculation
- 4) Other reports on the special issues related to construction

1.12.2 “12510 Safety and Hygiene Management” shall apply to the comprehensive report on safety inspection.

1.12.3 The contractor must submit “the comprehensive table of quality test and examination” to be transferred to the main agent of management when submitting the Completion Inspection Application.

1.13 Transfer of Facilities

1.13.1 The contractor must transfer the facilities to the ordering organization upon completion of the Completion Inspection (or the use approval), be present when the ordering organization transfers the facilities to the main agent of management and cooperate with the ordering organization on the transfer of facilities to the main agent of management.

1.13.2 The ordering organization may demand the contractor to make corrective action when there is a defect or an issue that failed to satisfy the standards at the time of transferring the facilities to the main agent of management. Upon such demand, the contractor must complete the corrective action before the transfer, record the findings and its corrective actions and submit such record to the ordering organization.

1.14 Defect Repair

1.14.1 The ordering organization, the main agent of management, the tenant and the tenants’ council may demand the contractor to repair the defects and the items that fail to satisfy the standards.

1.14.2 Upon receipt of the defect repair notice, the contractor must immediately start the repair and submit the report on the cause of applicable defect and other actions taken to the ordering organization.

2. Material

(None)

3. Construction

(None)

2. Common Construction

205 Preparatory Work

20522 Construction Site Signage

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to construction site signage that is installed to ensure that construction-related people, such as visitors and on-site workers, who visit the construction area, can easily identify the details of the construction and matters to be recognized.

1.2 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.3 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.3.1 Submissions prior to construction commencement

A. Guide facility installation plan

- 1) Construction site guide facility installation plan
- 2) On-site fence installation plan

1.4 Quality Assurance

1.4.1 The contractor shall not install signs in the construction area without the approval of the supervisor.

2. Materials

2.1 Materials for Construction Site Signage

2.1.1 The galvanized steel plate used for construction site signage shall comply with 1.2

Criterion of Application

3. Construction

3.1 Preparation

- 3.1.1 The contractor shall prepare and submit two copies of the “guide facility installation plan” including the following items to the supervisor 30 days before the installation of temporary facilities for guidance and promotion of the construction site.
- A. Types of information facilities to be installed
 - B. Installation period, locations (sections), specifications, materials, and the lighting fixture installation plan, etc.
 - C. Stability reviews considering construction detail drawing, wind pressure, etc.
 - D. Maintenance plan (cleaning, etc.)

3.2 Installation

- 3.2.1 The contractor shall install the construction site guide facilities at the locations designated according to the temporary facility installation plan.
- 3.2.2 The contractor shall install safety and hygiene signs and signs displaying work safety rules in accordance with the relevant laws and regulations, and the locations and types of installation shall comply with the applicable requirements of “12510 Safety and Hygiene Management.”
- 3.2.3 The installed construction site signage must not be twisted or damaged due to weather events such as heavy rain or strong wind.

3.3 Maintenance

- 3.3.1 The contractor shall check the on-site guide facilities from time to time to prevent contamination or damage, and clean them on a regular basis to maintain a clean state at all times. (Especially, leaflets attached to the facilities shall be removed.)
- 3.3.2 The contractor shall continuously conduct regular inspections (on a daily and monthly basis) to prevent fences in the site from falling due to wind pressure.
- 3.3.3 The contractor shall immediately replace or repair any deformed or damaged guide facilities in the site.

3.4 Removal

- 3.4.1 When the supervisor approves the removal of construction site signage after construction completion, the contractor shall immediately remove it.
- 3.4.2 After the construction site signage is removed, the contractor shall cleanly dispose of the leftovers and restore the floor to its original state.

20531 Prevention of Erosion and Silting

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to facilities installed at construction sites to reduce growing turbidity and sedimentation of nearby rivers and oceans due to soil loss caused by rainfall during construction.

1.2 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.3 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.3.1 Submissions prior to construction commencement

- A. Site condition survey results and the plan to address inconsistency
- B. Erosion and silting prevention plan

2. Materials

2.1 Materials for Erosion and Silting Prevention

2.1.1 The texture of straw bags, gunny sacks, etc. shall be suitable for containing sand.

3. Construction

3.1 Confirmation of Construction Conditions

3.1.1 Prior to construction commencement, the contractor shall look into the conditions of the location and section in which installation of erosion and silting prevention

facilities, such as temporary drains, gutters, and coffering dams, is scheduled.

- 3.1.2 The contractor shall confirm the suitability of the design drawings by comparing it with the site condition survey results, and prepare and report an action plan for any inconsistency to the supervisor.

3.2 Preparation

- 3.2.1 Within 30 days after construction commencement and prior to the installation of erosion and silting prevention facilities, the contractor shall prepare and submit the “erosion and silting prevention plan” containing the following items to the supervisor.

- A. Status survey and analysis
- B. Detailed drawings of installation locations, size and cross sections for each facility
- C. Work methods and the equipment input plan, the installation period
- D. Maintenance plan

- 3.2.2 The installation period of the erosion and silting prevention facilities shall be set in consideration of construction details, hydraulic, hydrologic, and structural calculation based on the field conditions, and the empirical safety factor.

3.3 Common Matters

- 3.3.1 The contractor shall conduct the work in a way of minimizing environmental impact of soil runoff, including increase in turbidity, on public waters such as rivers, lakes, and sea waters around the construction site.

- 3.3.2 Facilities to prevent soil erosion shall be installed at the beginning of construction, and maintenance work, such as dredging, shall be conducted from time to time when the facilities are buried or soil is deposited due to rainfall, etc.

- 3.3.3 The front banking section shall be surface-protected with gunny sacks or plastic bags to prevent erosion and silting.

- 3.3.4 Piling of gunny sacks and plastic bags

- A. Straw bags and gunny sacks shall be piled firmly in a certain interval so that the stacked bags do not collapse.
- B. The overlapping parts shall be sufficiently filled with soil to prevent soil runoff, and stacked alternately so that they can strong enough to resist running water.

3.4 Erosion Prevention Facilities

- 3.4.1 In order to minimize soil erosion caused by rainfall, work to stabilize cut/banking slopes generated during construction shall be first conducted, and the parts where erosion is expected shall be covered with gunny sacks or vinyl, while temporary drainage and coffering shall be installed at the upper and lower areas where soil erosion is anticipated.
- 3.4.2 If the natural drainage in the construction area is closed due to the work, the contractor shall take measures to prevent water from flowing into the downstream drains directly from the construction site.
- 3.4.3 Temporarily piled soil shall be protected by covering it with gunny sacks or vinyl to minimize erosion.

3.5 Silting Prevention Facilities

- 3.5.1 The contractor shall install grit chambers, etc. to minimize the inflow of soil into waterways, rivers and sewerage near the construction area in case of rainwater leakage due to rainfall.
- 3.5.2 In order to prevent soil loss and collapse from the slopes of the grit chambers, protective measures shall be taken by covering them with vinyl, piling gunny sacks, etc.
- 3.5.3 In order to improve the sedimentation rate, inclined plates for water may be installed in consideration of the amount of water flowing into the grit chambers, the flow in the chambers, and sedimentation.

3.6 Removal

- 3.6.1 The contractor shall remove the facilities installed on the site to prevent erosion and silting when the concerned work is completed.

20532 Silt Protector

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to silt protectors used to prevent water pollution caused by the diffusion of dirty water generated during river or offshore construction.

1.2 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.3 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.3.1 Submissions prior to construction commencement

- A. Construction plan

1.3.2 Product materials

- A. Silt protector
- B. Anchor
- C. Float
- D. Sample quality certification
- E. Manufacturer qualification

1.3.3 Shop drawing

- A. Silt protector
Product data and design drawing of the silt protectors by size

1.3.4 Sample

- A. Silt protector
Before the products are brought into the site, samples of the silt protectors, anchors, floats, and chains to be submitted by size.

1.3.5 Test report

A. Silt protector

Test report for tensile strength, tensile ductility, tearing strength, mass, permeability coefficient, and shrinkage factor

1.4 Quality Assurance

1.4.1 Trial construction

The installation of the silt protectors shall be tested in advance to review whether they meet the original purpose, such as preventing the diffusion of dirty water, before the actual construction begins.

2. Materials

2.1 Materials for the Silt Protector

2.1.1 Silt protector

- A. The materials of the silt protectors shall have durability and filterability high enough to prevent the diffusion of turbidity in water, even when exposed to water or sunlight.
- B. The silt protectors shall be processed and installed in the shape and size indicated in the design drawing, and the standard values of the materials used are as specified in "Table 1 Test Methods of Silt Protector Materials."

Table 1 Test Methods of Silt Protector Materials

Property	Unit		Standard value	Test methods
Tensile strength	kN/m	Dry	[2.5X2.5 or higher], []	KS K ISO 10319
		Humid	[2.5X2.5 or higher], []	ASTM D4595
Tensile ductility	%	Dry	[25% or less], []	KS K ISO 10319
		Humid	[25% or less], []	ASTM D4595
Tearing strength	N	Dry	[800X800 or higher], []	KS K 0769
		Humid	[800X800 or higher], []	ASTM D 4533
Mass	g/cm ²		[6 or higher], []	KS K ISO 9864
Permeability coefficient	cm/sec		[a X 10 ⁻³ or higher], []	—
Shrinkage factor	%		[0.2 X 0.2 or less], []	—

- C. The content of suspended solids (SS) in turbid water passing through the silt

protectors shall comply with the discharge allowance standards stipulated in the Water Quality and Ecosystem Conservation Act.

2.1.2 Anchor

- A. The anchors for fixing the silt protectors shall be of a type that can sufficiently function according to the design document.
- B. The wire ropes connecting the anchors and the silt protectors shall be of material and size strong enough to withstand currents, tides, and waves, and the same size shall be applied to the clips and shackles used for connection.

2.1.3 The float part shall not be swept inward by currents and waves, be manufactured in a cylindrical shape with excellent restoration and maintenance of buoyancy and be covered with float covers to prevent damage due to collision with other objects.

2.1.4 At the lower end, steel chains shall be attached to maintain a flat shape without wrinkles or bends over the entire silt protectors.

3. Construction

3.1 Confirmation of Construction Conditions

3.1.1 Before carrying out the construction, it is necessary to look into the depth and current of the locations and sections where the installation of silt preventors is planned to examine whether there is any difference between the site conditions and the design.

3.2 Preparation

3.2.1 The contractor shall prepare and report a construction plan including the following items to the supervisor 15 days before construction commencement.

- A. Installation sections and routes
- B. Shape of the opening and safety marking facilities
- C. Detailed drawing of the silt protector and anchor installation
- D. Work methods and sequences (including the fixing of joints and the installation of safety signs)
- E. Required equipment and the equipment mobilization plan
- F. Installation period

3.2.2 The installation period of the silt protectors is set by taking account of the construction details, the structural calculation based on local conditions, and the empirical safety factor.

3.3 Installation of the Silt Protector

- 3.3.1 The contractor shall minimize the environmental impact of soil runoff, including increase in turbidity, on public waters such as rivers, lakes and sea areas.
- 3.3.2 The contractor shall install silt protectors at locations where there is a risk of damage due to suspended soil generated by the construction that flows into the ocean or river.
- 3.3.3 The silt protectors shall be installed along with the planned installation lines, anchors shall be built to make sure that they are not moved or lost due to running water, and the joints shall be connected firmly to prevent separation.
- 3.3.4 The joints in the site shall be reinforced with flies, etc. to prevent leakage of dirty water from the connecting parts, and their materials shall be the same as those of the silt protectors.

3.4 Maintenance

- 3.4.1 After installation, the silt protectors shall be firmly connected and anchored to each other so that they are not damaged or lost by wind, water, and waves, and thoroughly managed and maintained by eliminating shellfish, seaweed, and underwater suspended solids to prevent them from attaching to the protectors and diminishing protectors' function.
- 3.4.2 After the installation of the silt protectors, the contractor shall prepare for the degradation or malfunction due to damage or loss of the silt protectors and their installation accessories through regular patrols and maintenance.
- 3.4.3 In principle, the on-site inspection of the silt protectors shall be conducted once every construction day, and any damage to the protectors found during the inspection shall be immediately reported to the supervisor and restored.
- 3.4.4 If any failure of the silt protectors caused by mismanagement damages the fishing industry, the contractor shall take full responsibility for the damage.

3.5 Removal

- 3.5.1 The silt protectors shall be removed upon the approval of the supervisor when the concerned work is completed.

210 Site Clearance

21020 Clearing and Grubbing

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the removal and disposal of remnants (tree trunks, roots and twigs) generated during the logging of trees and removal of roots, which affect the work performance within the concerned construction site.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

12520 Environment Management

20520 Installation of Temporary Facilities

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Definitions

1.4.1 Obstructing tree

"Obstructing tree" refers to a tree located in the forest or field within the construction project district.

1.4.2 Produced tree

"Produced tree" refers to the obstructing tree that has been logged to be used as a material for daily or business activities.

1.4.3 Tree waste

"Tree waste" refers to a portion of the obstructing tree which has been logged but whose state is remarkably poor to use for daily or business activities, such as tree roots, twigs, leaves, etc.

1.5 Submissions

The following items shall be submitted in accordance with “11510 Management of Submissions.”

1.5.1 Submissions for official administration

- A. Disposal plan of remnants after clearing and grubbing

1.5.2 Submission, report and approval/permission submissions

- A. Report on installation and start of use of tree waste disposal facilities

1.6 Quality Assurance

1.6.1 Disposal plan of remnants after clearing and grubbing

- A. Prior to the disposing of the remnants stemming from clearing and grubbing, the contractor shall prepare and report a disposal plan (including the case of its change) to the supervisor as prescribed by relevant laws and regulations.
- B. The disposal plan for the remnants created by clearing and grubbing shall be devised in a way that can increase the recycling rate as much as possible.
- C. The disposal plan shall include disposal methods, safety plans, environmental measures, and storage yard plans.

2. Materials

(None)

3. Construction

3.1 Clearing and Grubbing

- 3.1.1 The contractor shall remove the trees that obstruct the progress of the work, along with roots, and the scope of the clearing and grubbing work shall be in accordance with the design document.
- 3.1.2 The contractor shall dispose of the remnants left at the site after clearing and grubbing in accordance with the disposal plan, and “12520 Environment Management” shall apply to the pollution control measures to dispose of and store the remnants generated by clearing and grubbing work.
- 3.1.3 The contractor shall collect and store the remnants left after clearing and grubbing in a place designated by the supervisor.

3.2 Disposal of Remnants

- 3.2.1 All lumber produced from logged trees with value as a commodity is the property of KMIC, and therefore cannot be disposed of at the discretion of the contractor without the approval of the supervisor.
- 3.2.2 Lumber with the value as a commodity shall be cut into a suitable length and loaded in a location that does not disturb the construction in a way that prevents it from being stolen or damaged.
- 3.2.3 The contractor shall collect and store the remnants left after clearing and grubbing in a place designated by the supervisor, and the remnants are disposed of according to the design document.

3.3 Refilling

- 3.3.1 Unless there is any future excavation or earthwork plan, any pit made by the removal of tree roots shall be refilled with appropriate soil.
- 3.3.2 The pits shall be refilled in a horizontal layer of 150 millimeters or less with high quality soil, and the soil shall be consolidated to have the same height and density as the adjacent ground.

3.4 Preservation of Existing Trees

- 3.4.1 Among the existing trees that are left at the site, those subject to preservation or to be used after transplantation shall be protected to ensure that their growth is not hampered. In particular, trees to be protected or transplanted shall be preserved from damage by the open-air storage of materials or undue excavation, and excessive number of passengers, vehicle traffic and parking in the nearby areas.
- 3.4.2 If trees and plants designated for protection are damaged, they shall be disposed of in a way approved by the supervisor or replaced with the same tree species of the same size.

215 Excavation and Transportation

21510 Excavation

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the work of excavating the ground using manpower, machinery and gunpowder so as to conform to the elevation determined by the design document.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11010 Construction in General

11510 Management of Submissions

20510 Construction Surveying and Batter Boards

20520 Installation of Temporary Facilities

21030 Removal of Obstructing Structures

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Definitions

1.4.1 Soil

"Soil" refers to a mixture of soil, sand, gravel, and boulder which are excavated effectively with excavation equipment such as bulldozers and excavators.

1.5 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

2. Materials

(None)

3. Construction

3.1 Confirmation of Construction Conditions

3.1.1 Upon construction commencement, the contractor shall conduct a survey of the current condition, such as topography, soil quality, weather, etc. to analyze the impact of construction on the construction area and the surrounding area, and prepare and report countermeasures to the supervisor, if necessary.

3.1.2 Prior to the commencement of excavation work, the contractor shall confirm that the boundary lines, altitude, contour lines and datum plane of the design drawing are consistent with site. In addition, the contractor shall compare and examine the results of the current status survey and cadastral survey for the boundary of the project area to figure out whether the work can be conducted according to the design document.

3.2 Preparation

3.2.1 The contractor shall take protective measures in accordance with "20520 Installation of Temporary Facilities" for facilities recyclable for business such as protected trees and lawns, buildings required to be preserved, facilities such as pipelines, and crops.

3.2.2 Prior to excavation, the contractor shall install drainage facilities, such as temporary drains, to remove stagnant water in the original ground and lower the groundwater level to reduce the water content of the filling materials

3.2.3 If there is any concern about the erosion or collapse of the slope by surface water or water for use during the work, a drainage facility shall be installed on the slope along with the excavation, or a temporary drainage facility shall be installed.

3.2.4 The contractor shall check whether the survey benchmarks and batter boards are properly installed in accordance with "20510 Construction Surveying and Batter Boards."

3.3 Removal of Existing Obstructing Structures

- 3.3.1 On the site, the contractor shall check the locations and depth (floor elevation) of all underground facilities prior to the commencement of excavation, and carefully excavate the area within 1.0 meter from the facility.

3.4 Construction Standards

3.4.1 Common matters

- A. Excavation shall be conducted exactly as specified in the design drawings, and the excavated section shall be finalized according to the specifications and shapes indicated in the drawings and the instructions by the supervisor.
- B. Loose rocks, tree roots, and unstuck soil on the slope and around the top of the slope shall be completely removed.
- C. At the end of the slope, soil shall not be cut off in large quantity at one time, and if there is any concern that the ground surface may be weakened during or after excavation, a professional engineer's review shall be submitted to the supervisor before following the instructions by the supervisor.

3.5 Subgrade in the Excavated Section

- 3.5.1 The subgrade shall be refilled with materials specified in the drawing or approved by the supervisor, and compacted with at least 95% of the maximum dry density.
- 3.5.2 If materials are inadequate for subgrade, it is necessary to report it to the supervisor and follow his/her instructions.

3.6 Treatment of Defective Materials

- 3.6.1 If the materials generated in the excavation section are judged unsuitable for filling, it is necessary to immediately report it to the supervisor and follow his/her instructions.
- 3.6.2 If the materials from the surface of the subgrade layer in the excavated section are unsuitable for the subgrade, the contractor shall submit the soil survey and quality test score sheet to the supervisor and follow his/her instructions.

3.7 Treatment of Surface Water and Water for Use and Protection of Roads during Work

- 3.7.1 If there is any concern about the erosion or collapse of the slope by surface water or water for use during the work, a drainage facility on the slope, or a temporary drainage facility, shall be installed along with the excavation.

3.8 Slope Work

- 3.8.1 The contractor shall form the inclination of the slope according to the design document during the excavation work, but if the slope is unstable because changes in strata and joints, the development of discontinuity in faults, and groundwater leaching, which were unexpected during the design process, are found, the inclination of the slope can be changed after stability analysis and countermeasure review by obtaining a review from an engineer in the relevant field and submitting them to and obtaining an approval from the supervisor.

3.9 Finishing Work

- 3.9.1 The finish surface and slope surface of the excavation work shall be cleared up to match the shape and inclination specified in the design document, and care shall be taken not to loosen the materials below the benchmark.
- 3.9.2 The roadbed of the cut section shall be tested for proof rolling in the same way as that of the banking section.

3.10 On-Site Quality Assurance

- 3.10.1 When soil quality changes during the excavation work, it shall be reported immediately to the supervisor, and the work shall be resumed after receiving an approval from the supervisor.
- 3.10.2 In the case of excavating the ground beyond the cross section specified in the drawing, the spot shall be backfilled to the specified planned altitude as instructed by the supervisor at the expense of the contractor :
- A. Detached houses and multi-family houses: non-compacted
 - B. Pipelines, structure foundations and roads: 95% or more of the maximum dry density
- 3.10.3 Inspection
- A. The contractor shall conduct an inspection on the quality and specifications of the excavated state, and if there is no abnormality, obtain the supervisor's approval by requesting an inspection, and then move to the next step.
 - B. If the work is rejected by the supervisor's inspection, the contractor shall re-conduct or supplement the work at the contractor's expense before requesting re-inspection for approval.
 - C. If the supervisor or the person at the agency performing an inspection test according to the regulations conducts the inspection test to confirm the quality of the excavation work, the contractor shall follow their instructions.

21520 Bed Excavation

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the bed excavation work required to construct the foundations and pipelines of buildings and structures, such as multi-unit houses.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11510 Management of Submissions

21030 Removal of Obstructing Structures

21510 Excavation

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.4.1 Submissions prior to construction commencement

A. Construction plan

B. Materials on consultation with related agencies

1) Submission of consultation contents before the consultation with related agencies

2) Submission of consultation results after the consultation with related agencies

1.4.2 Submissions upon construction completion

A. Structure bed excavation work plan

1.5 Quality Assurance

1.5.1 Consultation with related agencies

- A. When it is necessary to relocate, protect or replace underground facilities, utilities and other structures (hereinafter referred to as "underground facilities") managed by other related agencies prior to the commencement of or during the bed excavation work, the contractor shall promptly report it to the supervisor.
- B. When the client or supervisor needs to consult with the competent authorities regarding the treatment of underground facilities, the contractor shall prepare and submit the underground facility treatment plan including the following matters in consideration of the period required for the consultation.
 - 1) Construction time
 - 2) Locations of obstructions
 - 3) Scale of the facilities to be relocated, protected or replaced
 - 4) Work methods
- C. The contractor may start relocation or protection work for underground facilities after the completion of consultation with relevant agencies.
- D. When there is any direct instruction from the manager of the underground facility, the contractor shall promptly report it to the supervisor for consultation.
- E. In case that the relocation or replacement work of underground facilities is conducted improperly, the contractor shall pay all expenses incurred by this.
- F. Prior to the commencement of the work, the contractor shall look into and fully understand the exact location, size, etc. of all underground facilities in the construction area, regardless of whether they are specified in the design document.
- G. The design document outlines the locations of obstructions, and does not guarantee that the client tells their exact locations or that all facilities are specified or some of them are not omitted in the document.

1.5.2 Consultation before the work

- A. Prior to the bed excavation work, a meeting shall be held by the persons in charge of each work type to review in advance whether there are any overlapped sections among underground facilities (buildings, water pipes, rain pipes, gas pipes, power tubes, and communication lines, etc.) and prioritize the most appropriate work before the work shall be carried out sequentially according to the negotiated work order.
- B. If any problem occurs in underground facilities as the contractor neglects these obligations and conducts the work in the reverse order, the contractor shall bear all responsibility and install appropriate facilities or supplement the existing facilities at the expense of the contractor.

2. Materials

(None)

3. Construction

3.1 Confirmation of Construction Conditions

3.1.1 Measures to replace or protect existing underground facilities in the construction area shall be taken to prevent accidents that damage the facilities during the bed excavation by thoroughly examining the type, installation locations, and buried depth of pipes in accordance with "21030 Removal of Obstructing Structures."

3.1.2 If the removal or relocation of underground facilities (electric power tubes, telephone lines, water supply pipes, gas pipes, etc.) is needed, a request for the removal or relocation is made to the installation manager of the relevant facilities.

3.1.3 Stability review of adjacent structures

When bed excavation is conducted in close proximity to adjacent structures, the contractor shall review in advance whether there is any risk of the structures falling or subsiding due to a drop in the groundwater level or insufficient angle of repose, and report it to the supervisor.

3.2 Preparation

3.2.1 The contractor shall prepare a construction plan including the following matters 15 days before the commencement of the work and obtain an approval from the supervisor.

- A. Matters specified in the Preparation of the Construction Plan of "11010 Construction in General"
- B. Cross-sectional drawings for bed excavation by facility (gradient, width, depth, etc.)
- C. Plan for backfill soil piling and waste soil treatment

3.2.2 The longitudinal and cross-sectional drawings, formation level, contour lines and datum level indicated in the design drawings shall be checked.

3.2.3 The contractor shall review the local work conditions such as soil quality and groundwater level, and ensure the inclination and width of the slope for the bed excavation provide sufficient space for the safety of workers, the installation of the frame and waterproofing of wall surfaces, and the supervisor's inspection.

- 3.2.4 Before commencing the bed excavation for the foundations of structures, equipment, and pipelines, the timbering centering and unwatering machines for the work shall be completely installed with the approval of the supervisor.

3.3 Construction Standards

3.3.1 Common matters

- A. The bed excavation work shall be conducted according to the specified drawings.
- B. If there are existing underground facilities, preliminary excavation is performed by manpower to prevent any damage to the underground facilities that may occur due to mechanical excavation.
- C. Unwatering points and drains shall be installed at least 1.0 meter away from the foundation so that no fluctuations will occur in the foundation ground, and water shall be pumped out by creating a pool.
- D. Disposal of excavated soil
 - 1) The excavated soil suitable for backfilling shall be placed near the bed excavation site, and soil unsuitable or unused for backfilling shall be transported out of the bed excavation site according to the earthwork plan.

3.3.2 Bed excavation for the earth foundation

- A. The bearing capacity and settlement amount of the area where the bed excavation work is conducted for the soil foundation shall meet the allowable bearing capacity and settlement amount specified in the design document.

3.3.3 Bed excavation for structures

- A. When the bed excavation of the structure foundation is completed, the other party of the contract shall notify the supervisor of the result, and ensure the supervisor inspects the excavated depth, the stratum characteristics of the foundation, and the conditions of the excavated foundation surface before conducting foundation work.
- B. When the completed surface of bed excavation is soil or weathered rock, the disturbance of the bottom surface of the excavated ground shall be minimized, and the advance preparation and plan for the final excavation are needed to protect the ground by placing lean concrete as soon as the supervisor's inspection ends after excavation.
- C. When conducting the bed excavation for the foundation of a bridge or culvert structure, a construction drawing shall be prepared by checking the stratum composition and groundwater for the floor and four sides, and a construction report comparing and analyzing them with the design conditions shall be prepared and submitted.

3.3.4 Bed excavation for pipelines

- A. For pipe connection, the area for the lower part of pipe joints shall be excavated according to the specified drawing.
- B. When conducting the bed excavation for sewer pipes, the contractor shall excavate a bell-shaped bed at the pipe connection part as shown in “Fig. 1 Bed Excavation for the Sewer Pipe Connection Parts.”

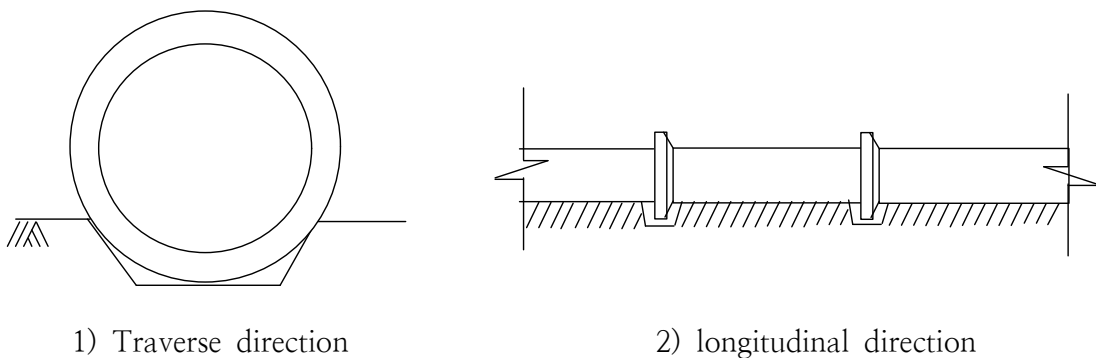


Fig. 1 Bed Excavation for the Sewer Pipe Connection Parts

3.3.5 Unwatering

- A. Unwatering in coffer dams shall be carried out in a way that prevents the loss of concrete materials.
- B. Unwatering shall be conducted not only during the work of placing concrete, but also for at least 24 hours after the placement.
- C. A pond shall be made at an appropriate point in the concrete frame to conduct the unwatering work.

3.4 On-Site Quality Assurance

- 3.4.1 When there is any change in soil quality during bed excavation, the work shall be conducted after reporting it to and receiving an approval from the supervisor.
- 3.4.2 Care shall be taken to ensure that the bed excavation for structures does not impair the stability of the slope, and during the work, changes in geology and water conditions shall be carefully observed, recorded, and reported to the supervisor.
- 3.4.3 If unforeseen underground conditions are found, they shall be reported to the supervisor, and the work shall be suspended in the area until an order is given to resume work.

- 3.4.4 In the case of excavating beyond the cross-section specified in the drawing, this shall be refilled and well compacted with incompressible materials such as lean mix concrete or rubble stones to the planned altitude specified in the drawing to have more than allowable bearing capacity of the structure at the expense of the contractor and as instructed by the supervisor.
- 3.4.5 Inspection
- A. The contractor conducts a survey to confirm the quality and specifications of the excavated state (excavated depth, characteristics of strata, and organized state of the excavated surface, etc.), and if there is no abnormality, obtain the supervisor's approval by requesting an inspection, and then move to the next step.
 - B. If the work is rejected by the supervisor's inspection, the contractor shall re-conduct or supplement the work at the contractor's expense before requesting re-inspection for approval.
 - C. If the supervisor or the person at the agency performing an inspection test according to the regulations conducts the inspection test to confirm the quality of the excavation work, the contractor shall follow their instructions.

21560 Transportation of Soil

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the transport of soil from excavation and bed excavation work to the place specified in the drawing.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

12510 Safety and Hygiene Management

20540 Air Pollution Control Facilities

1.3 Submissions

The following items shall be submitted in accordance with “11510 Management of Submissions.”

1.3.1 Submissions prior to construction commencement

- A. Soil transport route survey review

2. Materials

(None)

3. Construction

3.1 Confirmation of Construction Conditions

- 3.1.1 Prior to the commencement of the work, the contractor shall conduct an on-site survey on the transport route and prepare and submit a “soil transport route survey review” to the supervisor to prevent damage from soil transport.

3.2 Preparation

- 3.2.1 In order to prevent dust scattering when transporting soil, the contractor shall install wheel-washing facilities, vehicle side sprinkling facilities, and dust proof nets in accordance with “20540 Air Pollution Control Facilities.”

- 3.2.2 When soil is transported in the soft ground section, trafficability of construction equipment is secured for smooth operation of transport vehicles and equipment.
- 3.2.3 The contractor shall install a speed limit sign on the main transport route in the construction complex in order to raise drivers' awareness of dust scattering caused by vehicle traffic.

3.3 Construction Standards

- 3.3.1 The contractor shall always place personnel in charge of the environment at the entrance of the construction site to control the washing of vehicles and their wheels when they enter and leave the site, and manage soil to prevent it from being brought out of the site.
- 3.3.2 Vehicles for soil filling work shall not be operated with more than their specified payload.
- 3.3.3 A cover that can seal the cargo bed as firmly as possible shall be installed to ensure that the loading is not visible from the outside and cause no spillage.
- 3.3.4 In order to reduce dust scattering, the contractor shall make sure that the length between the load and the top of the load bed side shall be 50 millimeters or overhorizontally.
- 3.3.5 Passing vehicles shall be operated at a speed of 20 kilometers per hour or less within the construction site to prevent dust scattering.
- 3.3.6 The contractor shall spray water in order to prevent the scattering of dust generated by vehicle transport in the site, and while vehicles are operated, frequent spraying on passageways inside the construction site is needed to prevent dust scattering.
- 3.3.7 The heavy equipment for construction shall pass through the complex as much as possible so that the moving load act as pressure to compact soil.

220 Filling of Soil

22010 Filling of Soil

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the soil filling in roads or premises to conform to the specified drawings using the materials from borrow pits or excavation and bed excavation works in the construction area.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11020 Consultation and Adjustment

11510 Management of Submissions

20510 Construction Surveying and Batter Boards

20520 Installation of Temporary Facilities

21510 Excavation

21520 Bed Excavation

22011 Preparation of Planting Ground

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.4.1 Submissions prior to construction commencement

- A. Review of the maximum thickness of initial filling for soft ground
- B. Disaster prevention plan for temporary filling

1.4.2 Product data

- A. Materials for soil filling on roads
- B. Non-compact soil filling materials

1.4.3 Sample

- A. Test construction plan for the road filling section
- B. Report of the test construction results for the road filling section

1.4.4 Test report

- A. On-site quality control test

1.5 Quality Assurance

1.5.1 Test construction for the road filling section

- A. Prior to the compaction work of the road filling section, the contractor shall prepare a test construction plan containing the following matters for each filling material and obtain approval from the supervisor.
 - 1) Location and time of the test construction
 - 2) Scale of the test construction (400 square meters as standard)
 - 3) Methods of test construction (type of the compactor, number and speed of compactions, thickness of the first-floor compaction, water content of the tested area, etc.)
 - 4) Test items and their frequency
 - 5) Construction management system
- B. Test construction is carried out in the presence of the supervisor, and the result report shall be prepared and approved by the supervisor.
- C. If the soil quality of the site is judged as significantly different from that measured during the test construction, additional test construction may be conducted.
- D. It shall be interpreted that all costs incurred for the test construction of compaction work are included in the contract unit cost of the concerned work type.

1.5.2 Scope of soil filling

Materials shall not be temporarily stacked or placed on sites or areas outside the scope specified in the drawings without written approval of the supervisor.

1.5.3 Treatment of inappropriate materials

If materials unsuitable for soil filling is found, it shall be reported to the supervisor.

1.5.4 Consultation before work

Prior to the commencement of the work, the contractor shall complete all adjustments according to “11020 Consultation and Adjustment” to ensure that soil

filling do not interfere with backfilling underground facilities, such as pipelines and rainwater culverts, installation of structures, road works and installation of auxiliary facilities, planting of trees and grass.

1.6 Transport, Storage and Treatment

1.6.1 Temporary piling of filling and backfilling materials

- A. Materials suitable for filling and backfilling shall be stored separately by type.
- B. Materials shall be temporarily stacked in a location, which is specified in the drawing and does not interfere with the work, and the responsibility of temporarily piling them at a location away from the designated location for the convenience of the contractor shall fall on the contractor.

1.7 Environmental Requirements

- 1.7.1 Road filling shall be stopped during the rainy season when water content cannot be adjusted, or during the winter when freezing occurs.

2. Materials

2.1 General Provisions

- 2.1.1 Materials for soil filling shall not contain harmful substances, such as vegetation, stumps, bushes, tree roots, garbage, and organic soil.

2.1.2 Filling materials for roads

- A. Filling materials for roads shall be capable of securing sufficient compaction when pressured after sprinkling.
- B. Any materials with a liquid limit of 50% or more, a dry density of 1.5 t/m³ or less, a porosity of 42% or more, and a plastic limit of 25% or more shall not be used as filling materials.
- C. When crushed rock is used as a material for filling, it shall be used only in the area of 600 millimeters or less from the finished surface of the road bed filled up ground as long as it does not interfere with the construction of the foundation of structures and underground pipelines, such as water and sewage pipes, communication lines, power tubes, etc.
- D. Frozen materials cannot be used for filling.

2.2 Specific Requirements for Filling Materials

- 2.2.1 The quality standards for road filling materials comply with the 1.3 Criterion of Application.
- 2.2.2 The maximum width of the materials for non-compact filling shall be 300 millimeters or less.
- 2.2.3 Filling on the slope
For the filling body of 1.0 meter in thickness from the finish surface of the filled slope, rocks or crushed rocks over diameter 150mm shall not be used.

2.3 Equipment

- 2.3.1 Equipment used for road filling shall be the same one used for test construction, and in case of changing equipment, test construction shall be carried out again to obtain approval from the supervisor.
- 2.3.2 Places that cannot be compacted by rollers due to their narrow area, such as those adjacent to the structure, or places that may cause damage by applying excessive pressure to the structure during compaction work, shall be uniformly compacted with equipment and methods approved by the supervisor.

2.4 Material Quality Control

2.4.1 Test

Table 2 Material Quality Control Test

Type	Test items	Test frequency	Note
Soil for filling	Particle size	For each borrow pit, whenever materials change	
	Liquid limit and plastic limit		
	Water content		
	Density		
	Proportion of fine grained soil		
	Compaction		
	California bearing ratio (CBR)		

- 2.4.2 If requested by the supervisor for inspection, three samples for each type of material to be used at the location chosen by the supervisor shall be provided.

3. Construction

3.1 Confirmation of Construction Conditions

- 3.1.1 Upon the commencement of the work, the contractor shall conduct a survey of the current condition, such as topography, soil quality, weather, etc. to analyze the impact of the work on the construction area and its surrounding area, and prepare and report countermeasures to the supervisor.
- 3.1.2 Prior to the commencement of filling work, the contractor shall confirm that the boundary lines, elevation, contour lines and datum plane of the design drawing are consistent with the site. In addition, the contractor shall compare and examine the results of the current status survey and cadastral survey for the boundary of the project area to figure out whether the work can be conducted according to the design document, and report the result to the supervisor.

3.2 Preparation

- 3.2.1 The mobilization of equipment and personnel shall be reported before the commencement of filling work.
- 3.2.2 The contractor shall make sure that harmful impurities on the original ground surface are not mixed with the soil excavated from the ground.
- 3.2.3 The contractor shall take protective measures in accordance with “20520 Installation of Temporary Facilities” for facilities recyclable for business such as protected trees and lawns, buildings required to be preserved, facilities such as pipelines, and crops.
- 3.2.4 Prior to filling work, the contractor shall install drainage facilities, such as temporary drains, to remove stagnant water in the original ground and lower the groundwater level to reduce the water content of the filling materials.
- 3.2.5 Installation of batter boards
 - A. The contractor shall check whether the survey control points and batter boards are properly installed in accordance with “20510 Construction Surveying and Batter Boards.”

3.3 Construction Standards

- 3.3.1 Soil filling shall be done up to the planned height specified in the drawing.

- 3.3.2 soil filling shall be done by continue to horizontally evenly pile and uniformly compact soil up to a predetermined height, and the filled layers shall be graded in advance and compacted by sprinkling water and drying, or in other proper way.
- 3.3.3 The contractor shall grade the surface with a grader, etc. for uniform and efficient compaction of the roads, and adjust the water content of soil to be within the allowable range of the optimum water content of the indoor compaction test before compacting.
- 3.3.4 Management of batter boards
 - A. The contractor has a responsibility for maintaining and protecting batter boards from damage, and immediately report any movement detected to the supervisor. In that case, the supervisor may stop the filling work until corrective measures are taken.
- 3.3.5 Filling on wetland and soft ground
 - A. When conducting the filling work in swampy areas, paddy fields, and other wetlands, ditches shall be dug lengthwise and breadthwise, drained sufficiently and dried before the work is commenced.
 - B. Filling on the section for which the soft ground treatment method is designed shall be conducted after the soft ground improvement work is performed according to the design document.
- 3.3.6 The vicinity of the slope to be filled shall be sufficiently compacted to be integrated with the main body of the slope.
- 3.4 **The Lengthwise Boundary between the Filled and Cut Sections**
 - 3.4.1 In case where filling work is conducted on one side of a cross section, and excavation is carried out on the other side of the same cross section, differential settlement is likely to occur due to the difference in the bearing capacity of both sides. Therefore, bench cut shall be applied to the boundary, and the transition parts shall be installed on the inward side adjoining the finished surface of the road bed filled up ground and the cut section from the boundary to the completed subgrade surface.
- 3.5 **The Breadthwise Boundary between Filled and Cut Sections**
 - 3.5.1 Like the lengthwise boundary, differential settlement is likely to occur at the breadthwise boundary, so the cut area shall be connected to the bottom of the filled subgrade surface by cutting it at a moderate inclination from the end of the

cut area to the bottom. At this time, the length of the connecting section shall be in accordance with the design drawings, and the cut section shall be backfilled with the same materials as those of the filling section, and compacted evenly with a predetermined compaction degree.

3.6 Compaction

- 3.6.1 The thickness of the first floor to be spread in the filling section, which requires compaction, is determined by test construction.
- 3.6.2 If the dimension of the material is judged as so large that compaction management by field-density is not suitable, the compaction management shall be done according to the plate bearing test.
- 3.6.3 Compaction equipment used shall be the same one used for test construction in the entire section, and in case of changing equipment, test construction shall be conducted again to obtain approval from the supervisor.
- 3.6.4 Places with the narrow area, such as those adjacent to the structure, or places that may cause damage by applying excessive pressure to the structure, shall be uniformly compacted with small-sized compaction equipment approved by the supervisor.
- 3.6.5 The filled slope shall be compacted with the compaction equipment approved by the supervisor.

3.7 Drainage during Work

- 3.7.1 During filling work requiring compaction, the contractor shall always pay attention to drainage to prevent water from stagnating on the surface, as well as conduct drainage treatment for external influent that flows from the outside into the filled area.
- 3.7.2 Since surface water discharged from water for use or rainfall may erode or collapse the filled slope, a temporary drainage facility shall be installed at the edge of the filled area.
- 3.7.3 During the work, temporary drains or side gutters indicated in the specified drawing shall be installed at the bottom of the filled area for the treatment of water flowing inside from the outside, or vice versa, so that the water can be drained smoothly.

3.8 Work Error Tolerance

- 3.8.1 The subgrade surface shall be even with the finished road surface, and the subgrade surface shall be constructed to ensure that all points on the subgrade surface are within ± 30 millimeters and ± 50 millimeters from the altitudes of the planned subgrade surface and road bed filled up ground, respectively, when measured.
- 3.8.2 The non-compact section shall be constructed within ± 100 millimeters from the planned altitude of each station, and the average tolerance per block shall be within ± 50 millimeters.
- 3.8.3 The filled slope shall be completed within ± 50 millimeters from the specified slope, and shall not invade the base or the subgrade. The finished subgrade surface shall not have bumps of 10 millimeters or more when measuring with a 3-meter straightedge parallel or perpendicular to the road centerline. Measurement is carried out by overlapping the straightedge by half or more from where the previous measurement has been made.
- 3.8.4 The Water content of the filling material shall be kept within $\pm 2\%$ of the water content approved by the supervisor during paving.

3.9 Protection of the Completed Surface

- 3.9.1 Drainage facilities installed along the road shall enable effective drainage, and their functions shall be maintained at all times.
- 3.9.2 Materials shall not be stacked on the finished subgrade surface, and stone debris or foreign matters shall be cleaned.
- 3.9.3 In case where materials are stacked on the completed subgrade surface on which inspection has been finished with the confirmation of the supervisor, the inspection shall be conducted again after removal of the materials, and inspection of the finally finished surface of the area where materials are needed to be stacked shall be carried out after completely removing the materials.
- 3.9.4 If the subgrade surface is unstable due to climate conditions, the operation of vehicles or equipment shall be prohibited.

Appendix 1

Proof-Rolling Test

1. The tire roller used for the proof-rolling test shall have a double-wheel load of 5 tons or more and a tire contact pressure of 0.55 MPa or more (rear tire pressure of 100 to 110 PSI).
2. Adjustment of load and contact pressure shall be approved by the supervisor.
3. The roller is operated in a way that makes it easy to record the number of compactions.
4. The roller runs at a speed of 4 kilometers per hour.
5. When measuring deflection, the Benkelman beam deflection test method is used.
6. Places where deflection of the subgrade surface is confirmed with the naked eye after running tire rollers or dump trucks on the surface are marked with lime powder, etc., and filling work shall be conducted again at the expense of the contractor as instructed by the supervisor.

22011 Preparation of Planting Ground

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

- A. This Part applies to the preparation of the site subject to landscaping specified in the “22010 Filling of Soil” to plant trees, ground cover, flowering plants, etc.
- B. The depth of the planting ground site to be prepared refers to the section of 1.0 meter below from the altitude specified in the clearing plan.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

21510 Excavation

22010 Filling of Soil

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The following items shall be submitted in accordance with “11510 Management of Submissions.”

1.4.1 Submissions prior to construction commencement

- A. Planting ground preparation plan
- B. Plan for the replacement of soil unsuitable for planting

1.4.2 Product data

- A. Soil for planting ground preparation
- B. Data on soil from the outside
 - 1) Confirmation document by the borrow pit that brings in soil
 - 2) Permission to gather

- 3) Permission to take out soil
- 4) Soil test results
- 5) Summary sheet for soil brought in from the outside

1.4.3 Test report

- A. Test of available soil excavated from the ground and soil brought into the site for planting ground preparation
 - 1) The contractor shall determine the suitability of the soil for planting ground preparation through visual examinations and simple tests and submit the results to the supervisor.
 - 2) If a detailed test is necessary or the soil is determined inappropriate as a result of the simple soil tests, measures shall be taken in consultation with the supervisor.
 - 3) The detailed soil test shall be commissioned to a specialized quality test institution and the results shall be submitted to the supervisor.

2. Materials

2.1 Materials for planting ground preparation

2.1.1 Soil as material for planting ground preparation

- A. Soil suitable for plant growth is high-quality soil that is not too large, not too fine, and contains appropriate proportions of sand and clay with some organic matters, and meets the general conditions of soil for planting ground preparation.

2.2 Material Quality Control

2.2.1 Soil and soil depth test

Visual examination and simple tests on the site to determine the suitability and depth distribution of the soil for planting ground preparation shall be conducted, and if the results find that the soil is poor, or the site is a special area, such as a landfill or an offshore landfill, a detailed test shall be commissioned to a specialized institution.

- A. Test items
 - 1) Suitability and depth distribution of soil in the complex to be used for planting ground
 - 2) Soil brought into the site for the use for planting ground
- B. Test time
 - 1) In case that the section for planting ground preparation is a ground cut section:
Upon completion of site clearing

- 2) In case that the section for planting ground preparation is a filling section: before the commencement of filling and excavation work

C. Survey and test

- 1) Samples collected from at least three points per soil test site related to planting ground preparation shall be tested.

3. Construction

3.1 Confirmation of Construction Conditions

- 3.1.1 Prior to the commencement of work, the contractor shall look into the soil cutting/filling plan, planned altitude, soil quality, etc. of the section for planting ground preparation specified in the design document, and establish a planting ground preparation plan and obtain approval from the supervisor.

- 3.1.2 The preparation plan shall be established to include the following matters for each planting ground section.

A. In case of cut section

- 1) When cutting ground according to the altitude specified in the site clearing plan, whether the ground surface and the section 1.0 meter below are suitable for planting ground shall be checked.
- 2) If the soil is determined as suitable for planting ground preparation, the work shall be conducted according to the original plan, but after the completion of the work, the suitability shall be checked at the site.

B. In case of filling section

- 1) The soil transportation plan shall be devised to ensure that the soil up to 1.0 meter below the altitude specified in the site clearing plan can be used to fill the site for the preparation of the planting ground.

3.2 Construction in General

- 3.2.1 Matters not mentioned in this Part comply with the applicable requirements of “21510 Excavation,” “22010 Filling of Soil,” and “22020 Backfilling.”

- 3.2.2 Changes of soil to be unsuitable for tree growth due to excessive compaction by using heavy equipment shall be prevented. In particular, any work shall not be conducted with heavy-duty equipment during or just after rain.

- 3.2.3 Finishing up of the site clearing

- A. The finished surface of the site clearing shall be formed evenly without any bends

and clods (soil mass), provided that caution shall be thrown to the drainage system in accordance with “20531 Prevention of Erosion and Silting” during the work period until the site is taken over.

3.3 Cleaning up of the Site

- A. Remnants generated during planting ground preparation (stones, tree roots, wood chips, garbage, foreign substances, etc.) shall be taken out under the responsibility of the contractor.
- B. The contractor shall restore damaged or spoiled parts due to transport or handling of soil to the original state, and clean contaminated paved areas.

22020 Backfilling

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the backfilling work after constructing the foundations and pipes of buildings, such as multi-unit houses, and structures.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11020 Consultation and Adjustment

21520 Bed Excavation

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.4.1 Product data

- A. Materials for road backfilling
- B. Materials for non-road backfilling

1.4.2 Test report

- A. On-site quality control test

1.5 Quality Assurance

1.5.1 Consultation before work

Prior to the commencement of work, the contractor shall complete all adjustments according to "11020 Consultation and Adjustment" to ensure that backfilling does

not interfere with the bed excavation and installation of buildings, structures, and pipelines.

1.6 Transport, Storage and Treatment

1.6.1 Storage of materials

- A. During the bed excavation work, materials suitable for backfilling shall be stored separately by type. The storage area shall be drained well to prevent the increase in water content of the backfilling material, and protected to ensure that materials are not mixed with foreign substances.
- B. When temporarily stacking materials for backfilling in a construction site, it shall be stored to ensure that their weight does not damage the temporary soil retaining work or the main structure.
- C. Materials for backfilling shall be temporarily stacked in a location, which is specified in the drawing and does not interfere with the work, and the responsibility of temporarily piling them at a location away from the designated location for the convenience of the contractor shall fall on the contractor.

1.7 Environmental Requirements

- 1.7.1 Backfilling shall be stopped during the rainy season when water content cannot be adjusted, or during the winter when freezing occurs.

2. Materials

2.1 Materials for backfilling

- 2.1.1 Materials for backfilling shall not contain harmful substances, such as vegetation, stumps, bushes, tree roots, garbage, and organic soil, and frozen materials shall not be used for backfilling.
- 2.1.2 backfilling of roads
 - A. Materials for road backfilling shall comply with “Table 1 Quality Standards for Backfilling Materials.”

Table 1 Quality Standards for backfilling Materials

Description	Unit	Quality standards	Note
Maximum size	mm	100 or less	
5 mm sieve passing rate	%	25–100	
0.08 mm sieve passing rate	%	0–25	
Plastic index (PI)	%	10 or less	
Corrected CBR (for trial compaction)	%	10 or more	
Content of foreign substances	%	1.0 or less (volume)	

- B. Backfilling materials shall be capable of securing sufficient compaction when pressured after sprinkling.
 - C. Any materials with a liquid limit of 50% or more, a dry density of 1.5 t/m³ or less, a porosity of 42% or more, and a plastic limit of 25% or more shall not be used as backfilling materials.
- 2.1.3 For non-road backfilling materials, high-quality soil from the excavation or bed excavation works shall be screened for use, and be approved by the supervisor before use.

3. Construction

3.1 Confirmation of Construction Conditions

- 3.1.1 Specified boundary lines, elevation, contour lines and datum plane shall be checked.

3.2 Preparation

- 3.2.1 The contractor shall report the mobilization of equipment and personnel before the commencement of work.
- 3.2.2 The backfilled site shall be cleaned of any remnants, such as forms and force works, before starting work.
- 3.2.3 Backfilling work shall not be commenced until the supervisor inspects the structures and pipelines and approves the backfilling work.
- 3.2.4 The contractor shall mark the compaction thickness for the first floor on the wall of the structure before backfilling the structure.

3.3 Backfilling

- 3.3.1 The backfilled area shall be uniformly compacted according to the 1.3 Criterion of Application.
- 3.3.2 The contractor shall not use compaction equipment or methods capable of putting a horizontal earth pressure in excess of the earth pressure at rest, or a vertical earth pressure in excess of the pressure of overload and allowable overload.
- 3.3.3 If the backfilling material is sand, sufficient compaction by watering shall be carried out and the weld shall be reinforced, if necessary.
- 3.3.4 When performing the backfilling work, horizontal loads shall be prevented from damaging parts of the newly installed structures, structural facilities, and pipelines.
- 3.3.5 Backfilling of concrete structures
 - A. When backfilling is unavoidably performed in a state where the concrete is not sufficiently cured, the work shall be conducted with the supervisor's approval after at least 80% of concrete's design-basis strength has been secured, or the curing has been proceeded for more than 14 days, to prevent cracks or damage to the structure by vibration or impact. In addition, the same applies to the case where the one side is backfilled higher than the other part, or that a masonry structure is backfilled.
 - B. When backfilling is carried out on the box culvert and the rigid frame bridge, the contractor shall place and cure concrete on the upper slab to secure 80% or higher of the design-basis strength.
 - C. In case of vibrating compaction for backfilling of the structure, care shall be taken to avoid damage caused by the vibration to the structure.
- 3.3.6 During the flood season when a lot of water comes around pipelines, or in areas where flexible pipes are being installed in underwater sections near rivers, caution shall be thrown to the damage that may occur to pipes during work.
- 3.3.7 When backfilling the area around a waterproof structure, a protective cover, etc., shall be used to protect the structure or waterproofing work in order to prevent any damage caused by displacement or stones or other hard objects mixed with the backfilling materials.
- 3.3.8 After installation of pipes or structures, backfilling shall be carried out as soon as possible to prevent differential settlement caused by the inflow of rainwater, etc.

3.4 Construction Error Tolerance

- 3.4.1 The finished surface shall be located within 30 millimeters from the specified elevation.
- 3.4.2 The Water content of the backfilling material shall be kept within $\pm 2\%$ of the water content approved by the supervisor during paving.

3.5 On-Site Quality Control

3.5.1 Test

Table 2 On-Site Quality Control Test

Work type	Test item	Test method	Test frequency	Note
Backfilling	Compaction		· Every seasonal change	
	Field density		· Independent structure: per 3 stories for each structure · Continuous structure: per 3 stories, per 50 meters · Underground pipelines: per 3 stories, per 100 meters	
	Plate bearing test		· When field density test is impossible to conduct	
	Particle size		· Every soil quality change	
	Water content	Quick water content measurement method	· Frequency of field density test	

3.5.2 Inspection

- A. The contractor conducts a test to confirm the quality and specifications of the work state according to the “quality control plan,” etc., and if there is no abnormality, obtain approval from the supervisor by requesting an inspection, and then move to the next step.
- B. If the work is rejected by the supervisor's inspection, the contractor shall re-conduct or supplement the work at the contractor's expense before requesting re-inspection for approval.
- C. If the supervisor or the person at the agency performing an inspection test according to the regulations conducts the inspection test to confirm the quality of the work, the contractor shall follow their instructions.

225 Aggregate Construction

22510 Aggregate for Construction

1. General Provisions

1.1 Scope of Application

This Part shall apply to the aggregate for construction used for the road foundation, the revetment backfill and concrete.

1.2 Related Part in the Specification

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

11510 Management of Submissions

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The followings shall be submitted as prescribed by "11510 Management of Submissions".

1.4.1 Product data

A. Manufacturer

Measurement of the aggregate that can be manufactured, unit weight of the aggregate, daily maximum manufacturing capacity, manufacturing capacity, location (name of place, lot number and type), etc.

B. Aggregate for pavement

C. Aggregate for the drain filter of a structure

D. Aggregate for concrete

E. Sand for installation of conduit for water supply and sewer

F. The material carry-in statement

The contractor must submit the material carry-in statement to the supervisor immediately when the aggregate taken from a source outside the site is carried in. The material carry-in statement shall contain name of place and lot number of the

place from where the aggregate was taken and type, quantity, etc. of the aggregate, and the material carry-in statement per vehicle that had been carried in shall be submitted.

1.4.2 Test report

A. The quality test result

The quality test result prepared by the field testing lab or the professional quality testing institution

1.5 Quality Warranty

1.5.1 The quality test result

The contractor shall take a sample from the source of aggregate and have the sample tested by the field testing lab or the professional quality testing institution to determine if the aggregate satisfies the applicable requirements, submit the quality test result to the supervisor, acquire the supervisor's approval before using the aggregate for the construction work. The same shall apply when the source of aggregate is changed.

1.6 Transportation, Storage and Handling

When storing the material, the ground of the storage shall be flattened and cleaned so that the material will not be separated and no hazardous material will be mixed.

1.6.1 Storage of aggregate for paving

- A. When the characteristics of materials are noticeably different, the materials shall be separately stored by their type and kept separated so that they will not be mixed.

1.6.2 Storage of aggregate for concrete

- A. The aggregates with different type and granularity, such as the fine aggregate and the coarse aggregate, must be separately stored. The crushed sands of which types of original stones or manufacturing methods are different shall be separately stored.

2. Material

2.1 Aggregate for Pavement

- 2.1.1 The aggregate for pavement shall be made up of solid and endurable crushed stone, gravel, sand, slug or other material approved by the supervisor, or mixture

thereof and shall not contain any hazardous material, such as mud, organic impurities, dust, etc.

2.1.2 Material for sub-base

A. Quality standard

The material must have relatively uniform appearance and quality the quality standards in 1.3 Criterion of Application.

B. Range of granularity

- 1) The granularity of the sub-base material must satisfy the range specified by 1.3 Criterion of Application.

2.1.3 Material for light load pavement

- A. The material for sub-base of concrete block pavement must satisfy the quality standards and the range of granularity for the sub-base material.

2.2 Aggregate for Concrete

2.2.1 Coarse aggregate

A. General matters

- 1) The coarse aggregate or the stone for coarse aggregate shall be hard and strong.
- 2) The coarse aggregate shall not contain more than the harmful amount of salt, and shall be within the permissible limit of the harmful amount of such harmful substances as mud or organic impurities.

B. Durability

- 1) The coarse aggregate must be tested for stability according to 1.3 Criterion of Application.

2.2.2 Fine aggregate

A. General matters

- 1) The fine aggregate or the stone for fine aggregate shall be hard and strong.
- 2) The fine aggregate shall not contain more than the harmful amount of sale, and shall be within the permissible limit of the harmful amount of such harmful substances as mud or organic impurities.
- 3) The fine aggregate for concrete and the crushed fine aggregate must satisfy the quality regulations in 1.3 Criterion of Application.

B. Durability

- 1) The fine aggregate must be tested for stability according to 1.3 Criterion of Application.

2.3 Sand for Installation of Conduit for Water Supply and Sewer

2.3.1 The sand for installation of conduit for water supply and sewer must satisfy the quality standards in 1.3 Criterion of Application.

2.3.2 Inspection

When the supervisor or the responsible person from an institution that carries out the test and examination according to the regulation conducts test and examination to check whether the quality of construction work is secured, the contractor shall follow the relevant order.

3. Construction

(None)

3. Civil Engineering Work

305 Civil Engineering Work in General

30510 Civil Engineering Work in General

1. General Provisions

1.1 Scope of Application

This Part stipulates matters that General Provisions entrusts to general matters for each work, or general matters applied to other civil engineering works.

1.2 Arrangement and Management of Construction Engineers

1.2.1 Arrangement of construction engineers

- A. Arrangement of construction engineers is in accordance with “11510 Management of Submissions.”
- B. Construction engineers in charge shall be arranged based on the construction volume by project size.

1.2.2 Management of construction engineers

- A. Management of construction engineers designated to and deployed at the site by the contractor shall be in accordance with the applicable provisions of “11010 Construction in General.”
- B. An engineer residing at the site is subject to the applicable provisions of “11010 Construction in General” and shall not leave the site arbitrarily without approval of the supervisor.
- C. The resident engineer shall have the qualifications, expertise and experience prescribed in the Construction Technology Promotion Act for the concerned work.
- D. The supervisor may request the contractor to replace the resident engineer in accordance with the applicable provisions of "11010 Construction in General," if the engineer is deemed unqualified for the implementation or management of the work.
- E. When replacing personnel such as a resident engineer, the contractor shall replace them with persons with equal or higher qualifications and grade after obtaining approval of the supervisor.
- F. In case where this specification specifically prescribes the residence of a manager for the work concerned at the construction site for the implementation of the work, a person with sufficient expertise and practical experience for the type of work shall be appointed.

1.3 Temporary Work

- A. Matters on temporary offices, material storage warehouses, and other temporary facilities shall comply with "20520 Installation of Temporary Facilities," "20521 Temporary offices," and "20522 Construction Site Signage."
- B. The contractor shall properly install temporary facilities, such as survey control points, temporary roads and drains, lighting, temporary protective and security facilities necessary for the implementation of the work based on the characteristics of the work, and in case of roads passing through the construction complex, customary roads, agricultural waterways and water supply that interfere with the work, appropriate measures, such as the installation of alternative facilities, shall be taken not to cause any inconvenience to the continued use of the facilities and to prevent civil complaints from occurring.

1.4 Roads and Temporary Drains for Work

- A. The contractor shall maintain the construction road properly.
- B. Roads and temporary drains for work shall comply with 1.5 Criterion of Application of Related Laws and Regulations, Etc., and a road weigher shall be installed after obtaining approval of the supervisor, if necessary.
- C. The contractor shall submit in advance a plan for the construction, improvement, and repair of roads and temporary drains necessary for work to the supervisor for approval.
- D. The contractor shall ensure that the construction, improvement, repair, and maintenance of roads and temporary drains necessary for work do not cause any inconvenience to the general public and compromise public safety. Any damages to or disputes with the third parties caused by the construction and use of roads for construction purposes shall be resolved under the responsibility of the contractor.
- E. At the entrance to the site connected to the outside road, a wheel-washing facility shall be installed to ensure that dirt or other foreign substances can be removed from the vehicle wheels before the vehicle enters the outside road, and the installation and operation of the wheel-washing facility shall comply with "20540 Air Pollution Control Facilities."
- F. The contractor shall install signs when specified in the design document or instructed by the supervisor, and consult with the supervisor regarding the size, material, content and installation locations of the signs.

1.5 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.6 Change of Plan

If there is any change in the plan or the project due to the circumstances of the client, the contractor shall follow the decision to reserve the work or change the plan.

1.7 Construction Site Management

- A. The contractor shall comply with the impact assessments.
- B. The contractor shall secure levee protective materials and equipment to prevent disasters caused by heavy rain, flood, typhoon, etc. during work, take preliminary measures, such as maintenance of street trees, covering of slopes with vinyl, etc. by paying attention to weather forecasts, and take swift actions in case of emergency to prevent damage from spreading.
- C. While conducting work, the contractor shall care not to let the work interfere with the existing facilities over and under the ground near the construction site, and take necessary measures, such as installation of temporary facilities, etc. if the work is likely to cause any harm. If the work damages the existing facilities, the contractor shall restore it to the original state, or compensate for damages at the expense of the contractor.
- D. The contractor shall install and operate sand basins at required locations in order to prevent water contamination in rivers, reservoirs, etc. and the sedimentation of the drainage system during work, and comply with the laws and regulations related to water pollution prevention.
- E. The contractor is responsible for protecting and managing the object resulting from the concerned work at the expense of the contractor until the client finally takes over it, and if the object is damaged or does not meet the standards, measures shall be taken according to the contract or the supervisor's instructions. In addition, the contractor shall be responsible for the quality of the object, excluding exceptions due to force majeure (natural disasters, emergencies, etc.).

1.8 Submissions

1.8.1 General provisions

- A. The type and content of each submission, submission procedure, submission time, and number of copies of submissions shall be in accordance with “11010 Construction in General” and “11510 Management of Submissions.”
- B. In case of works related to each other in the construction process, the submissions of the related works shall be submitted simultaneously according to the submission schedule of the work type that starts first.

1.8.2 Construction photographs

The methods of taking a construction photographs and the areas to be photographed are as follows:

- A. Photograph shooting method
 - 1) When taking construction photographs, a typical cross section shall be shot in close-range and panoramic views so that the construction status can be confirmed, but shall be photographed in the same direction at the same location at each work phase.
 - 2) In the area for which the position, direction, height, length, spacing, and inclination shall be indicated on the photograph, poles, staffs, tape measures, etc. shall be used to display the range and values clearly on the photograph.
 - 3) Design changes, etc., shall be photographed in detail so that the amount or condition of work done can be recognized.
- B. Indication of photograph content

When taking a photograph, a blackboard with the name and details of the work, the date and location of the shooting, and the name of the constructor shall be inserted into the background of the photograph so that the content is clearly displayed.
- C. Organization of photographs
 - 1) Photographs taken shall be organized by each work type and work phase and stored in a photo album (a A4-sized clear file folder).

1.8.3 Construction plan

In principle, the content of the submissions shall be prepared and submitted in accordance with “11010 Construction in General” and “11510 Management of Submissions.”

1.8.4 Shop drawing

- A. The contractor shall prepare and submit two copies of a document that reflects the

details and the shop drawing of the work 15 days prior to the commencement of the work.

- B. The contractor shall request a review by a professional engineer for the parts that require structural and arithmetic calculations and the parts that are important for safety.
- C. The contractor shall put his/her real name and signature or seal on the completed shop drawing, and obtain approval from the supervisor before the commencement of work.
- D. In case that the planned quantity of the shop drawing identified during the designing process is different from the quantity of the actually completed shop drawing, settlement shall be made based on the quantity approved by the client.
- E. The contractor submits and manages the approved shop drawing in accordance with "11510 Management of Submissions."

1.8.5 Report and application documents for approval/permission

This complies with the applicable provisions of "11510 Management of Submissions" and "12520 Environment Management," and in general, the matters that shall be reported and require approval and permission are as follows:

- A. Report of the sewage treatment facility installation and the completion inspection
- B. Consultation on relocation or connection of water and sewage pipes, city gas pipes, underground power lines, ground utility poles, and underground telephone lines, etc.

1.9 Suspension of Work

When falling under each of the following paragraphs, the supervisor may order the contractor to suspend all or part of the work for a necessary period, and the contractor shall follow the order unless there is any special reason. In addition, the supervisor shall take actions in response to the contractor's request for extension of the work period when it is admitted that the concerned work has been suspended due to abnormal circumstances beyond the responsibility of the contractor.

1.9.1 Partial suspension

- A. When it is judged that a defect may occur due to the advance of work to the next step with the non-fulfillment of the reconstruction instruction
- B. When a serious risk is expected at the work safety and consequently significant damage is predicted to property or person
- C. When the correction order is not fulfilled three times or more in the same work type

- D. When the correction order is not fulfilled even though there have been two or more warnings to the same work type
- E. When any change in the object is accompanied by the change of the work plan, such as reconstruction

1.9.2 Full suspension

- A. When the contractor intentionally and significantly delays the progress of work, or continues conducting work without taking appropriate measures in a situation where there is a strong concern about faulty work
- B. When it is judged that failure to execute the partial suspension will affect the entire work process
- C. When severe natural disasters, such as earthquake, tidal wave, and storm, are expected to cause serious damage to the entire construction
- D. When all or part of the work site has not been acquired, or when work is impossible because obstacles in the site have not been removed
- E. When it is deemed impossible to continue work as the progress of other related works has been delayed
- F. When it is deemed impossible to continue work due to war, riot, rebellion, revolution, etc.
- G. When the object of construction is changed, including reconstruction, in most types of works due to the project plan

1.10 Quality Control

1.10.1 Quality test standards

- A. The contractor shall conduct quality tests and inspections in accordance with the quality test standards for securing the quality of construction works.
- B. Materials or test items that cannot be tested by a quality inspection agency may be tested at a factory in the presence of the supervisor.
- C. The quality of the following materials shall be tested and inspected in accordance with the applicable provisions of "12010 Quality Management."
 - 1) Unhardened concrete, asphalt concrete, reinforcements
 - 2) Sewer pipes (hume pipes, polyester resin concrete pipes, vibrated and rolled reinforced concrete pipes, PVC double-wall pipes, glass fiber reinforced plastic pipes), interlocking blocks

1.10.2 The testing lab size and the criteria for the arrangement of construction engineers who perform quality control work

According to the applicable provisions of "12010 Quality Management," the size of

the field testing lab or required for the test and the criteria for the arrangement of construction engineers who perform quality control work are as in the following, and the scope of quality manager's qualification shall comply with the applicable provisions of "11510 Management of Submissions." When calculating the area of the testing lab, the area of the office space in the testing lab is not included.

1.10.3 Standards for the installation of test and inspection equipment

- A. The installation shall be done to meet the standards for installation of test and inspection equipment necessary for quality tests and inspections in accordance with the applicable provisions of "12010 Quality Management."
- B. Equipment that requires calibration, such as a compressive strength tester, scale, thermometer, vernier caliper, micrometer, and airometer, shall be calibrated by an organization approved by the client.
- C. Testing apparatus may be brought sequentially according to the order of each work after the consultation with the supervisor.

1.10.4 Work confirmation

The "confirmation time of major works" according to the applicable provisions of "12010 Quality Management" shall be confirmed.

1.10.5 Field guidance inspection

The field guidance inspection shall be conducted in accordance with the applicable provisions of "12010 Quality Management."

1.11 Construction Surveying

- A. The contractor shall check the cadastral map with coordinates created according to the survey result provided by the client, reflect the result in the work, and attach the result to the completion inspection report.
- B. The contractor shall install and preserve stakes at the cadastral boundary points to specify the boundary, and if any stack is lost, it shall be restored to its original state at the expense of the contractor.
- C. The contractor shall immediately report to the supervisor any difference among the construction surveying results, design drawings and cadastral boundaries.
- D. Structures installed along the boundary line of the site, such as fences, stone structures, and retaining walls, shall be constructed along the boundary determined by the boundary specification survey, and if the responsibility for the relocation of structure falls upon the contractor, it shall be carried out at the cost of the contractor.
- E. For construction carried out after the design is completed by other institutions, the

contractor shall conduct a current status survey before the commencement of work, and if the survey result is different from the design document, report it to the supervisor and take follow-up measures, such as adjustment of the planned altitude, according to the supervisor's actions.

- F. The contractor shall install at least two permanent benchmark drop pits at each site, record their horizontal and vertical data and locations in the construction record document, and provide it to the relevant construction workers.
- G. Construction surveying shall be performed by a qualified surveying engineer, and all responsibility for construction surveying shall fall upon the contractor.
- H. The contractor shall always furnish the field with surveying instruments, such as a light wave rangefinder, plane tables, transits, levels, and tape measures.
- I. For other details, follow “20510 Construction Surveying and Batter Boards.”

2. Materials

2.1 Alternative Materials

Materials used in work shall meet the quality standards if the quality standards are specified in the design document containing this specification, provided that if any material needs to be replaced due to discontinuation of production or problems in purchase, documents proving that the alternative material is equal or better in aesthetics, workability and economic feasibility (delivery performance, specifications, test report, etc.) shall be submitted together with the design drawings to obtain approval from the supervisor before the application of the material.

2.2 Multiple Applicable Materials (Methods)

The contractor can freely choose and apply the materials (methods) whose performance and functions are verified as identical or similar.

3. Construction

(None)

320 Slope Protection Work

32011 Slope Greening

1. General Provisions

1.1 Scope of Application

This Part applies to the greening of slopes generated by excavation and filling work.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

20531 Prevention of Erosion and Silting

21510 Excavation

21520 Bed Excavation

22010 Filling of Soil

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Definitions

1.4.1 Percent purity

It refers to the percentage of the total weight of pure seeds excluding foreign substances, other types of seeds, and pest-damaged, sprouted, damaged, and immature seeds visible to the naked eye.

1.4.2 Germination rate

It refers to the percentage of the total number of germinated or germinable seeds.

1.4.3 Moisture

It refers to the moisture content measured by the 105 °C drying method or the ultraviolet ray-using measurement method.

1.4.4 Materials for slope greening

It refers to the method to protect the applying vegetation covering to the slopes

using plant materials and subsidiary materials.

1.5 Transport, Storage and Treatment

Materials used for planting seeds and turf are protected and stored to avoid rain, dew and direct sunlight.

- A. During rainfall or below or above the specified temperature, work shall not be undertaken unless approved by the supervisor.

2. Materials

2.1 Turf

Planting of turf and installation of sod-fixing sticks shall comply with the 1.3 Criterion of Application.

2.2 Equipment

2.2.1 Equipment used

Equipment used for slope protection shall conform to the construction plan.

3. Construction

3.1 Confirmation of Construction Conditions

- A. Prior to the commencement of work, it is necessary to check whether the survey control points, formation level, and batter boards are the same with those specified in “20510 Construction Surveying and Batter Boards.”
- B. The specified boundaries, elevations, contours and datum level shall be checked.

3.2 Construction in General

- A. The slope protection work shall start as early as possible after the planned slope is formed, but the time of commencement shall be determined in consideration of the vegetation characteristics of turf and to ensure that trees can have sufficient time in taking roots before the rainy season starts.
- B. The vegetation of the slope protection work shall be analyzed by conducting a test construction before the commencement of work, and the most suitable vegetation method for the area shall be selected.

3.3 Planting of Turf

Turf shall be planted in accordance with 1.3 Criterion of Application.

3.4 Work Error Tolerance

The work error tolerance for the slope protection work shall be within ± 50 millimeters from the finished surface.

3.5 On-Site Quality Control

- A. If the work is judged as inadequate by the inspection, the contractor shall re-conduct or take necessary measures at the expense of contractor as instructed by the supervisor.
- B. The turf rooting period is 30 days, and turf that does not show healthy growth within this period shall be replaced at the expense of the contractor as instructed by the supervisor.

335 Road Pavement Construction

33520 Subbase Course

1. General Provisions

1.1 Scope of Application

1.1.1 Summary

This Part applies to the paving and compaction of subbase course over the finished subgrade and anti-freezing layer.

1.2 Related Part of the Specifications

Among the matters related to this construction work, the following Parts shall apply to the matters other than those mentioned in this Part:

21510 Excavation

21560 Transportation of Soil

22010 Filling of Soil

22020 Backfilling

1.3 Criterion of Application

KS (Korean Industrial Standards) shall be applied as a top priority standard for this construction work, however, Myanmar or International standard may be applied depending on site conditions and work circumstances.

KS means official documents published by "Korea Construction Standards Center of the Korea Institute of Civil Engineering and Building Technology" as of bid announcement date.

1.4 Submissions

The following items shall be submitted in accordance with "11510 Management of Submissions."

1.4.1 Material product data

The data for the selection of aggregate suppliers shall be submitted to include their locations, transport distance, material quality test result table, daily output, and production capacity.

1.4.2 Construction plan

The construction plan shall be prepared and submitted by including the matters specified in "1.8 Preparation of the Construction Plan of 11010 Construction in General."

- A. Schedule that includes the construction sections and date
- B. Equipment usage plan and compaction management standards, such as compaction thickness, compaction equipment, number of compactions, compaction speed, and water content required for the work

1.4.3 Shop drawing

Longitudinal and cross sectional drawings of roads and parking lots in the construction complex that are prepared in consideration of the actual finished heights of adjacent buildings and structures

1.4.4 Sample

10 kilograms or more of subbase course materials

1.4.5 Test report

Quality test report prepared in accordance with Article 2.1 and Article 3.6 shall be submitted after the completion of the test.

1.4.6 Delivery note

A delivery note that confirms the supplier, type and quantity of the material shall be submitted upon the arrival of the material.

1.5 Test Construction

- A. Prior to the construction of the subbase course, test pavement shall be conducted in advance with the materials and construction machinery that will be used, and the work shall be commenced after work standards, such as water content, compaction thickness, type of compaction machines, number of compactions, and compaction speed, which are used to figure out the required compaction degree, shall be determined to obtain approval for the standards before the actual construction.
- B. The reference area of test paving is 500 square meters, but it may be adjusted through negotiation with the supervisor within the scope in which the purpose of the test paving can be fulfilled.
- C. The contractor shall submit a test paving plan including the following matters for approval from the supervisor at least 5 days before the test paving is conducted.
 - 1) Location and time of the test paving
 - 2) The scale of the test paving and compaction equipment standards
 - 3) Test paving method (sections to be compacted, number of compactions, compaction thickness, compaction speed, water content for the work)
 - 4) Items and frequency of management test
- D. The sections to be test-paved shall be part of the road to be completed.

1.6 Field Conditions

- A. Work shall not be carried out during the weather conditions that may damage or affect the existing ground and ongoing or completed works.
- B. If it rains during construction, the work shall be stopped immediately, and not be resumed until the site and soil conditions become suitable for compaction. The area damaged by weather conditions, such as a decrease in temperature and rainfall, shall be repaired at the expense of the contractor and without adding any cost to the client in accordance with the specified specifications.

2. Materials

2.1 Aggregate

Aggregates shall conform to "22510 Aggregate for Construction."

2.1.1 General matters

- A. Subbase material with a large particle size is difficult to manage, so it is desirable to limit the maximum particle diameter at 50 millimeters or less, but if it is unavoidable to use material with a large particle size due to local aggregate circumstances, materials with the maximum particle size of 100 millimeters or less and up to half of the thickness of the constructed first floor may be accepted with approval from the supervisor.
- B. When screenings are used as fine aggregates for the subbase course material, the mixing ratio of the screenings shall be 30% or less of the total mixed aggregate weight, and the 0.08-millimeter sieve passing rate of mixed aggregates shall be within 5%.
- C. The amount of the materials that pass through a 0.08-millimeter sieve shall be kept as little as possible within the range that enables compaction and stabilization, since they may weaken or cause freezing when water is contained.

2.2 Equipment

- A. The equipment mobilized for paving and compacting the subbase course shall conform to the "construction plan."
- B. All equipment shall have the performance suitable for quality control and required by this specification, such as compaction weight, thickness, flatness, and gradient, and be maintained in a state that can be used at any time.

3. Construction

3.1 Preliminary Inspection

3.1.1 Confirmation of the bearing capacity of the subgrade

If the subgrade of the cut section or the previously established filling section is weakened for some reason, the soil quality test shall be conducted to check the bearing capacity of the subgrade, and if it is not suitable, appropriate measures, such as replacement or stabilization of the subgrade, change of paving method, and adjustment of pavement thickness, shall be prepared and taken with approval of the supervisor.

3.1.2 Confirmation of infiltrating water

If there is water infiltration from the area adjacent to the road or the subgrade surface, or if damage to the paved layer is expected due to a high groundwater level, appropriate measures shall be prepared to discharge the infiltrating water before construction commencement.

3.1.3 Confirmation of the planned subgrade altitude

The subgrade surface shall be constructed according to the gradient and the planned height specified in the design, but in case of the pavement in an apartment complex, construction shall be commenced with approval of the supervisor after the planned altitude is adjusted in consideration of the actual finished height of the adjacent buildings and structures that have already been built.

3.2 Preparation

3.2.1 Preparation of the subgrade surface

- A. Before starting the pavement of the subbase course, dust, clay, organic substances and other impurities shall be removed from the subgrade surface (anti-freezing layer) to obtain approval from the supervisor.
- B. If the subgrade surface is unsuitable, leveling, re-compaction, or even replacement if necessary, shall be carried out.
- C. The type and weight of compaction machinery and the number of compactions shall be determined in consideration of the properties and water content of the materials to be used.
- D. The subbase course shall be paved on the subgrade surface, which has been completed in accordance with the provisions of “22010 Filling of Soil,” and if the subgrade surface is unsuitable for the work, leveling, re-compaction, or even

replacement if necessary, shall be carried out to prepare the subgrade surface to conform to the specifications.

- E. All works in paragraph A for the construction of the subgrade surface shall be conducted without adding any cost to the client, and paving shall not be carried out without confirmation from the supervisor.
- F. Dust, clay, organic substances and other impurities shall be removed completely from the subgrade before the aggregate is paved.

3.2.2 Adjustment of manhole height

The height of manholes and other structures installed in the paving section before construction shall be adjusted according to their final planned altitude, and the cover shall be put on to prevent the loss of aggregates.

3.3 Paving of Subbase Course

- A. The subbase course shall be evenly laid to ensure the thickness of the first layer after compaction does not exceed 200 millimeters.
- B. Materials for the subbase course shall be paved using a motor grader, an aggregate spreader, or manpower according to the predetermined shape, provided that the thickness of the first layer after compaction shall be 200 millimeter or less.

3.4 Compaction

- A. The subbase course shall be compacted with the approval of the supervisor by using a macadam roller, a tandem roller, a vibrating roller or a tire roller.
- B. Compaction is carried out from the shoulder to the centerline of the road, and to ensure the newly compacted area shall be partly overlapped with the previously compacted areas at regular intervals.
- C. When confirming the field compaction density based on the results of the plate loading test, the bearing capacity factor (K30) shall be managed to be 294 MN/m³ (30 kgf/cm³) or over at a settlement of 2.5 millimeters for asphalt pavement, and the number (K30) shall be managed to be 196 MN/m³ (20 kgf/cm³) or over at a settlement of 1.25 millimeters for the cement concrete pavement.
- D. For compaction around structures, such as side gutters or manholes, care shall be taken to not to damage or move them, and the area, which compaction equipment cannot access for this reason, shall be compacted with appropriate instruments, such as a tamper or a rammer, to obtain the required degree of compaction.
- E. After the compaction of one layer is completed, the next layer shall be paved after inspection by the supervisor.

3.5 Work Error Tolerance

- A. The completed subbase course shall be consistent with the gradient and cross section indicated in the specified drawing, and the difference with the planed altitude shall not exceed ± 30 millimeters.
- B. When measuring the finished surface of the subbase course with a 3-meter straightedge parallel or perpendicular to the road centerline, the concrete pavement shall not have any irregularities of 10 millimeters or more in height. The measurement is carried out by overlapping the straightedge with the previously measured line by half.
- C. Any defects found as a result of the proof rolling are reconstructed at the expense of the contractor according to the instructions by the supervisor.

3.6 On-Site Quality Control

3.6.1 Test

- A. On-site quality control test

Table 1 On-site quality control test

Type	Test item	Frequency	Note
Subbase course	Thickness	· At least once a day	
	Water content	· For each aggregate supplier · Every 500 m ³ after pavement and before compaction	
	Field density	· Housing sites, industrial complexes, road expansion and pavement, etc. – Once every 200 m after completion (as for 2-lane roads)	A quick water content gauge is available
	Plate bearing	· Parking lots, event halls (squares), etc. – Once every 500 m ³	If the field density test cannot be conducted
	Proof rolling	· At least 3 times across all sections after completion (as for 2-lane roads)	See Appendix 1 of “22010 Filling of Soil”

- B. Field density test

If the required degree of compaction is not secured as a result of the on-site density test, the area shall be additionally compacted or reconstructed to conform to the specified specifications. If the field density test is not possible, a plate loading test shall be carried out.

3.6.2 Inspection

- A. The compaction for inspection shall be carried out in the presence of the supervisor. If the specified requirements are not satisfied, the work shall be removed or compacted again according to the instructions by the supervisor at the expense of the contractor.
- B. The thickness of the completed subbase course is measured by cutting it with a cutter or digging a hole. Measurement shall be made at one hole or more for every 3,000 square meters of paved soil, or once a day for less than 3,000 square meters of paved soil. In the section whose measured thickness differs by 10% or more from the design thickness, materials shall be replenished or removed after getting rid of the excess materials and plowing 80 millimeters or over of the surface before rolling the section to have the required thickness and a limited degree of compaction. The construction cost required for this work is borne by the contractor.
- C. The area that is collected with a core boring for thickness test is also restored to its original state at the expense of the contractor.
- D. The flatness is determined by measuring the depth of the lowest spot when putting a 3-meter straightedge in parallel or at right angle to the road centerline, and the measurement is carried out sequentially by overlapping the straightedge by half with the previously measured line.
- E. In case of roads, the planned altitude is measured at intervals of 20 meters along the road centerline.

3.7 Maintenance

- A. The subbase course shall be maintained in good condition during construction.
- B. Damaged parts shall be repaired immediately and approval for the repair obtained from the supervisor.
- C. Test shall be conducted again for approval of the supervisor when construction vehicles have run on the surface of the completed subbase course; when the surface has been left unattended for more than 120 days after completion of the subbase course; or if the supervisor deems it necessary.
- D. If the work is rejected by the test, it will be reconducted at the expense of the contractor in accordance with this specification.