

Guidebook for Qualified Erosion Control Professional (QECP)

(First Edition)

Prepared by:

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And

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In consultation with

Public Utilities Board



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ROLES OF QUALIFIED EROSION CONTROL PROFESSIONAL (QECP) AND OTHER STAKEHOLDERS IN EROSION AND SEDIMENTATION CONTROL AT CONSTRUCTION SITES

(<http://www.ies.org.sg> / <http://www.aces.org.sg/aces/index.htm>)

PREAMBLE

The earth control measures (ECM) are for the management of soil erosions, containment and treatment of silty discharges due to the impact of **rainwater**. ECM are not meant for the treatment of wastewater due to construction activities (such as slurry from tunneling, pipe-jacking and bore-piling works) which shall be treated to comply with the requirements under Environmental Pollution Control Act (Chapter 94A).

“Qualified Erosion Control Professional” (QECP) means a Professional Engineer who is registered under the Professional Engineers Act Chapter 253, has in force a practicing certificate issued under the Act, and has satisfactorily completed a specialized professional course in erosion and sediment control. (Note: QECP is registered with the Institution of Engineers Singapore, and Association of Consulting Engineers Singapore after having passed the course.)

(A) PURPOSE

The Qualified Erosion Control Professional (QECP), working together with the other stakeholders, is instrumental in the successful implementation of Earth Control Measures (ECM) at construction worksites. The QECP must be knowledgeable of the process and scope of activities, techniques involved in a project’s life cycle from inception to completion. The QECP will then be able to provide the best management practices for earth control measures during the various phases of the project.

This guideline is to assist the QECP in identifying the principal roles a QECP, and other stakeholders, for each of the major phases of a project’s life cycle. While these tasks are not exhaustive, they represent the essential tasks/activities necessary to effectively manage the ECM in a typical construction project. (Note: It is not the intention of this guideline to describe in detail earth control measures.)

(B) DUTIES OF STAKEHOLDERS DURING A PROJECT DEVELOPMENT PROCESS

The essential QECP duties throughout a typical project development process are summarized in the table below:

Project Development Process	ROLES	
	QECP (Engaged by Owner / Developer)	Owner / Developer / Qualified Person
(I) Planning & Design	<ol style="list-style-type: none"> 1. Conduct site assessment (topographical, soil information, construction work and schedule, etc), plan, design and submit preliminary ECM to PUB for comments and record 2. Advise Owner / Developer / Qualified Person to : <ol style="list-style-type: none"> a. include ECM specifications (incl the preliminary ECM plan for project and allow for costs) in accordance to PUB's comments / requirements and best management practices b. refer to ECM website @ www.pub.gov.sg/ECM 	<ol style="list-style-type: none"> 1. Qualified Person to advise the Owner/Developer to engage QECP for all projects in the early stage (i.e. during DC Clearance). 2. Developer to engage QECP for preliminary ECM & specifications 3. Developer to endorse BP for compliance with ECM as specified in Code of Practice on Surface Water Drainage (Latest Edition)
(II) Tender	<ol style="list-style-type: none"> 1. Stipulate ECM requirements according to site conditions of the project and allow tenderers to price for them in the tender document 2. Provide advice / evaluation on submitted preliminary ECM plan and method statements received from tenderers 	<ol style="list-style-type: none"> 1. Developer / Qualified Person to evaluate preliminary ECM plan in tender submission 2. Qualified Person to submit successful Contractor's particulars to PUB

Project Development Process	ROLES	
	QECP (Engaged by Contractor) <i>(May or may not be the same QECP of Developer / Owner above)</i>	Contractor
<p>(III) Before Commencement of Works</p>	<ol style="list-style-type: none"> 1. Prepare a detailed ECM plan (basing on information provided on topography, soil, construction work and schedule, site facilities, etc) for all phases of the project for submission to PUB. ECM submission guideline is at Annex A. QECP may be required to make presentation to PUB. 2. Advise Contractor to submit ECM plan to PUB and obtain Clearance Certificate to commence works requiring ECM 3. Advise Contractor on setting up of a monitoring and control system at site, including: <ol style="list-style-type: none"> a. appointment of and brief Environmental Control Officer or trained person in ECM on the ECM plan and checklist (sample at Annex B) b. monitoring the installation of ECM to QECP's specifications and ensuring its effectiveness c. scheduling of maintenance of ECM and inspections 	<ol style="list-style-type: none"> 1. Engage QECP for detailed ECM 2. Provide information on topography, soil, construction work and schedule, site facilities, etc to QECP 3. Submit ECM plan prepared and endorsed by both QECP and Contractor to PUB 4. Obtain Clearance Certificate to commence works requiring ECM from PUB (sample at Annex C) 5. Engage ECO or trained person in ECM 6. Implement QECP's endorsed ECM plan before commencement of works <ol style="list-style-type: none"> a. <u>Erosion Control</u> <ul style="list-style-type: none"> o Minimise exposure of bare surface by paving up, erosion control blankets or scheduling works in phases, etc b. <u>Sediment Control</u> <ul style="list-style-type: none"> o perimeter silt fence o perimeter cut-off drains o silt trap o storage tanks / ponds o treatment system etc

Project Development Process	ROLES	
	QECP (Engaged by Contractor) <i>(May or may not be the same QECP of Developer / Owner above)</i>	Contractor
(IV) During Construction	<ol style="list-style-type: none"> 1. Advise Contractor on the effectiveness of the site monitoring and management system 2. Review ECM in tandem with progress of works 3. Oversee the keeping of ECM inspection records 4. Require Contractor's ECO or trained person in ECM to submit weekly reports for checking and compilation 5. Inform PUB of any non-compliances of ECM plan 	<ol style="list-style-type: none"> 1. Monitor and maintain the ECM to ensure effectiveness 2. Engage QECP to: <ol style="list-style-type: none"> a. set up site monitoring and management system for ECM b. review ECM in tandem with progress of works and implement the revised ECM accordingly 3. Submit weekly reports of ECM at site to QECP 4. Provide continuous monitoring and recording system at discharge points before public drain 5. Cover up the active work surfaces with canvas sheet during rain or at the end of the workday 6. Make available to PUB Officers at all times of visits the followings: <ol style="list-style-type: none"> a. QECP endorsed ECM plan (latest revision) b. Records of inspections by QECP and ECO c. Continuous record
(V) Before Completion	<ol style="list-style-type: none"> 1. Ensure ECM is removed only after completion of all works 	<ol style="list-style-type: none"> 1. Provide / establish finishing surfaces (close turfing, concrete paving, road surfaces, etc) 2. Obtain QECP's approval before ECM is removed

(C) QECP'S (Qualified Person) LEGAL REQUIREMENTS

The legal requirements of QECP (Qualified Person) as specified in Section 35 of the Sewerage and Drainage Act, Cap 294 are highlighted below:

Every Qualified Person appointed to supervise any works shall –

- Exercise due diligence in supervising and inspecting the works to ensure that those works are carried out in accordance with the Act
- Notify the Board of any contravention of the provisions of the Act
- Maintain records
- Carry out such inspection of the works as the Board may require
- Submit to the Board such reports as may be prescribed

Any Qualified Person who contravenes any of the requirements shall be guilty of an offence.

Qualified person's plan, declaration, certificate, report which is false or altered or tampered with shall be guilty of an offence

QECP / Qualified person becomes unwilling or unable to carry out his duties shall notify PUB in writing within 14 days of the date of termination of appointment. The Clearance Certificate to commence works that require ECM shall automatically lapse upon the termination of appointment. A fresh Clearance Certificate must be obtained by the Contractor before works may resume at the site.

-----*End*-----

Annex A

ECM Submission Guidelines for QECP

GUIDELINES FOR EARTH CONTROL MEASURES (ECM) SUBMISSIONS BY QECP

“**Qualified Erosion Control Professional**” (**QECP**) means a Professional Engineer who is registered under the Professional Engineers Act Chapter 253, has in force a practicing certificate issued under the Act, and has satisfactorily completed a specialized professional course in erosion and sediment control. (*Note: QECP is registered with the Institution of Engineers Singapore, and Association of Consulting Engineers Singapore after having passed the course.*)

(A) INTRODUCTION

The aims of these guidelines are to provide the Qualified Erosion Control Professional (QECP) with the **minimum requirements** for ECM submission. QECPs should explore and adopt the best management practices to plan, design and supervise the implementation of the ECM to meet the legal requirements.

The QECP shall ensure that all aspects of earthworks are effectively taken care of and the preparation of ECM plan integrated into all phases of project development process, viz planning, design and construction phases of the project. **For detailed requirements of ECM, the QECP shall refer to the latest edition of PUB’s Code of Practice on Surface Water Drainage** (*posted at PUB website address <http://www.pub.gov.sg/downloads/pr6.aspx>*).

(B) GUIDELINES FOR ECM SUBMISSION

The information required pertaining to the ECM proposals can be categorized into five (5) major groups:

- (1) Contract Particulars
- (2) Detailed information for ECM Plan
- (3) Calculations
- (4) Method Statement on Erosion & Sediment Controls
- (5) Inspection, Maintenance, Monitoring & Review of ECM

(1) Contract Particulars

- (a) Owner / Developer - Name & Address, Contact Person
- (b) QP for Project - Name & Address of QP
- (c) Contractor - Name & Address, Contact Person
- (d) QECP - Name & Address of QECP
- (e) ECO – Name & Address of ECO

(f) Project Title

(g) Project Duration

(h) Programme of Work (Earthworks only)

(2) Detailed information for ECM Plan

The ECM plan should be an independent document, which concisely provides the erosion and sediment control measures to be used. It should provide a simple narrative and plan showing the following information:

(a) Key/location plan showing the proposed site in relation to main roads and including any special landmarks or features.

(b) Boundary line of proposed development.

(c) Proposed phasing of work.

(d) Proposed outlet discharge points to the existing roadside/outlet drains.

(e) Direction of storm runoff into the proposed internal temporary drains.

(f) Direction of flow for all existing and proposed drains.

(g) Ground levels and invert levels of proposed and existing drains.

(h) Location of silt fences, silt traps, sedimentation tanks, cut-off drains, turbidity curtains, treatment units. To submit the specifications/catalogues.

(i) Sampling points for Total Suspended Solids (TSS) etc.

(j) The area of bare earth surfaces, where the storm runoff is expected, shall be indicated in m² on the plan. Other areas where bare earth surfaces are treated with erosion control blankets (ECBs), concreted etc.

(k) The location and size/capacity of storage ponds/tanks for storm runoff.

(l) Professional Engineer's endorsement and original signature (printed signature is not acceptable) with the **QECP No.** written below the endorsement.

(3) Calculations to be submitted

(a) Calculation of soil loss / sediment yield.

(b) Hydraulic calculations for the proposed temporary drainage system, silt traps, sedimentation tanks and size/capacity of storage ponds/tanks.

(c) Calculations for the required and designed capacity of treatment units.

- (4) Method statement on Erosion & Sediment Controls
 - (a) Proposed Erosion Control Measures adopted throughout the entire phases/stages of the project.
 - (b) Proposed Sediment Control Measures adopted throughout the entire phases/stages of the project.
- (5) Inspection, Maintenance & Monitoring of ECM
 - (a) Inspection schedule and report forms & Maintenance schedule
 - (b) Plan for monitoring quality of discharge into public storm water drainage system
- (6) Review & Revision of ECM Plan
 - (a) Schedule for Review of ECM
 - (b) Review ECM in tandem with progress of works and revise ECM plan accordingly

Annex B

ECM Site Inspection Guide - Checklist

ECM SITE INSPECTION GUIDE – CHECKLIST

(A) INTRODUCTION

The inspection, operation and maintenance of the ECM implemented at construction are crucial to the success of any ECM plan. This inspection checklist assists to identify the various areas of the Best Management Practices (BMPs) that shall be inspected and maintained for BMPs to serve its intended function effectively.

The aim of this guidelines are to provide the Environmental Control Officers (ECOs), Clerk-of-Works (COWs), Site Supervisors and other site supervisory staff with general requirements to inspect on the Best Management Practices that have been implemented and maintained at a typical worksite.

This checklist is not exhaustive and serves as a guide only. Photographs shall supplement the inspection checklist. QECs shall develop their own ECM inspection checklist according to the need of their sites for their ECM plan and brief the site staff on the use of the checklist.

(B) ECM SITE INSPECTION GUIDE - CHECKLIST

The checklist pertaining to the inspection of the ECM implementation, operation and maintenance can be categorized as follows:

- Project Information

- Inspection of Erosion Control Measures

- Inspection of Sediment Control Measures

- Inspection of Temporary and Permanent Flow Control and Conveyance Measures

INSPECTION OF EARTH CONTROL MEASURES				
S/N	BMP	INSPECTION	COMPLIANCE	ACTIONS
1	Construction Sequence & Scheduling	Clearing of construction areas carried out in phases?	Yes / No / NA	
2	Embankment / Earth Slopes	Protected against erosion?	Yes / No / NA	
3	Stockpiles of Earth Materials	Stockpile location according to ECM plan?	Yes / No / NA	
4	Stablization through laying of milled waste, lean concrete, turfing ...etc	Location according to ECM schedule?	Yes / No / NA	
		Construction according to ECM details?	Yes / No / NA	
		Any signs of damage at lean concrete areas?	Yes / No / NA	
		Any signs of damage at milled waste areas?	Yes / No / NA	
5	Stockpiles of Earth Materials	Any signs of damage at turfed areas?	Yes / No / NA	
		Stockpile location according to ECM plan?	Yes / No / NA	
		Protected against erosion?	Yes / No / NA	
		Protected against sedimentation?	Yes / No / NA	
6	Silt Traps	Installation of silt traps including location according to ECM schedule?	Yes / No / NA	
		Installation of silt traps according to ECM plan including nos & size?	Yes / No / NA	
		Silt Traps damaged?	Yes / No / NA	
7	Sedimentation Basins	Installation of Sedimentation Basins including location according to ECM schedule?	Yes / No / NA	
		Installation of Sedimentation Basins according to ECM plan including no.s?	Yes / No / NA	
		Concentration of TSS in effluent (outlet of discharge) >50mg/l?	Yes / No / NA	
		Sediment filled to within 300mm of water discharge level of outflow structure?	Yes / No / NA	
		Sedimentation basins inlet / outlet choked?	Yes / No / NA	
		Protected against sedimentation?	Yes / No / NA	
8	Treatment Units / Polymer Blocks	Treatment unit(s) in operation?	Yes / No / NA	
		Polymer blocks used / edequate?	Yes / No / NA	
9	Perimeter cut-off drains	Installation of cut-off drains including location according to ECM schedule?	Yes / No / NA	
		Installation of cut-off drains according to ECM plan including lengths?	Yes / No / NA	
		Cuto-off drain lined?	Yes / No / NA	
		Any signs of inedequate capacity? (flooding)	Yes / No / NA	
		Any obstructions / sediment?	Yes / No / NA	
10	Wheeled wash areas, entry/exit points	Any signs of damage?	Yes / No / NA	
		Location according to ECM plan?	Yes / No / NA	
		Construction according to details?	Yes / No / NA	
		Run-off (from wheeled wash areas) and overflow / discharge channeled to suitable areas for proper treatment?	Yes / No / NA	
		Any signs of silty water from these areas into public drains (drains / roads / etc)?	Yes / No / NA	
		Any signs of damage?	Yes / No / NA	
11	Others	Any areas without/inedequate ECM?	Yes / No / NA	
		Public drains at discharge points silted?	Yes / No / NA	
		Public drains in vicinity of site silted / obstructed?	Yes / No / NA	
		Run-off from site not channeled through silt fences / cut-off drains / silt traps?	Yes / No / NA	
		Any discharge of water into public drains?	Yes / No / NA	
		Earth surfaces / slops adjacent to any drain not turfed, paved or covered?	Yes / No / NA	

PROJECT INFORMATION
Project Title:
Location of Site :
Project Duration:
Type of Present Construction Activity:
PUB Permit Number:
Earthworks Phases / % Completion:
Owner / Developer:
QP for Project:
QP /QECP for ECM:
Date of ECM Plan:
Last Date of ECM Plan Review:
ECO:
Date & Time of Site Visit:
Weather Conditions:
Name of Inspecting Officer
Appointment
Owner / Developer's Representative on-site:

ADDITIONAL INFORMATION:
Date & Time of Previous Site Visit:
Date of last Inspection Report:
Issued Identified in previous site visit:

This site inspection has been certified by:

QP / QECP:
Signature:
Date:

Contractor:
Signature:
Date:

Owner / Developer:
Signature:
Date:

Any other observations / comments:
(To be signed by QECP / ECO and Contractor)

Annex C

Clearance Certificate to Commence Works Requiring ECM

Annex C

DRAFT

Your Ref:

Our Ref: (Case ID: A)

Date:

Please quote the Case ID
in future correspondence /
telephone enquiry

MR
M/S

SINGAPORE

Dear Sir

**CLEARANCE CERTIFICATE TO COMMENCE WORKS REQUIRING EARTH CONTROL MEASURES (ECM)
PROPOSED _____**

Thank you for your Earth Control Measures (ECM) submission dated _____

2 We have in-principle no objection to the proposed ECM endorsed by your Qualified Erosion Control Professional (QECP) for the above proposal.

3 Notwithstanding our no-objection, you are reminded to:

- (a) monitor and maintain the ECM during construction to ensure its effectiveness;
- (b) request QECP to review the ECM in tandem with progress of works during construction and revise the it to take care of any site changes;
- (c) request QECP to set up a system to monitor the implementation of ECM on site, including submission of weekly reports;
- (d) make available to PUB Officers at all times of visits the endorsed ECM plan and records of inspections by QECP and ECO;
- (e) obtain QECP's approval before ECM is removed; and
- (f) install (as may be required) a continuous monitoring system for the monitoring of discharges from the construction / earthwork sites into stormwater drainage system to ensure that it does not contain Total Suspended Solids (TSS) in concentrations greater than the prescribed limits under Regulation 4(1) of the Sewerage and Drainage (Surface Water Drainage) Regulations.

Yours faithfully

Digital Signature

AUTHORISED OFFICER
CATCHMENT & WATERWAYS DEPARTMENT
PUB

CC Developer / Owner

QECP