MALAYSIAN STORMWATER ORGANIZATION

SWaM-2017

NATIONAL CONFERENCE ON STORMWATER MANAGEMENT and EROSION & SEDIMENT CONTROL

GOOD MORNING

"… some bmps …"

… some techniques on Sediment Containment Systems and PE-BMPs …

by: LEONG KWOK WING CHT-NATURAL SOLUTIONS SDN BHD
DR. JERALD FIFIELD HYDRODYNAMICS (USA)

“… some bmps …”

… some techniques on Sediment Containment Systems and PE-BMPs …..

….last defense….Sediment Containment Systems….

… terminal velocity of sediment in SCS..???

…effectiveness in Sediment Capture….

… SCS Physical-bmps & PE-BMPs

“… some bmps …”

… some techniques on Sediment Containment Systems and PE-BMPs …..

…improve SCS at construction site…less room & more effective…

…and Faster….

“… some bmps …”

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Relative Rate of Erosion caused by Man-Activities

	Soil Loss tons/ac-yr	Relative Forest
Forest	0.04	1 ***BASE-LINE***
Grassland	0.38	10
Abandoned mines	3.75	100
Cropland	7.50	200
Harvested Forest	18.75	500
Active Surface Mining	75.00	2000
Construction Sites	76.00	2000

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UNPROTECTED SOIL STOCKPILE CONTAMINATES ADJACENT PUBLIC PARK PONDS

SEDIMENT FLOW FROM UNPROTECTED SOIL SURFACE, KILLS POND AQUATIC LIFE

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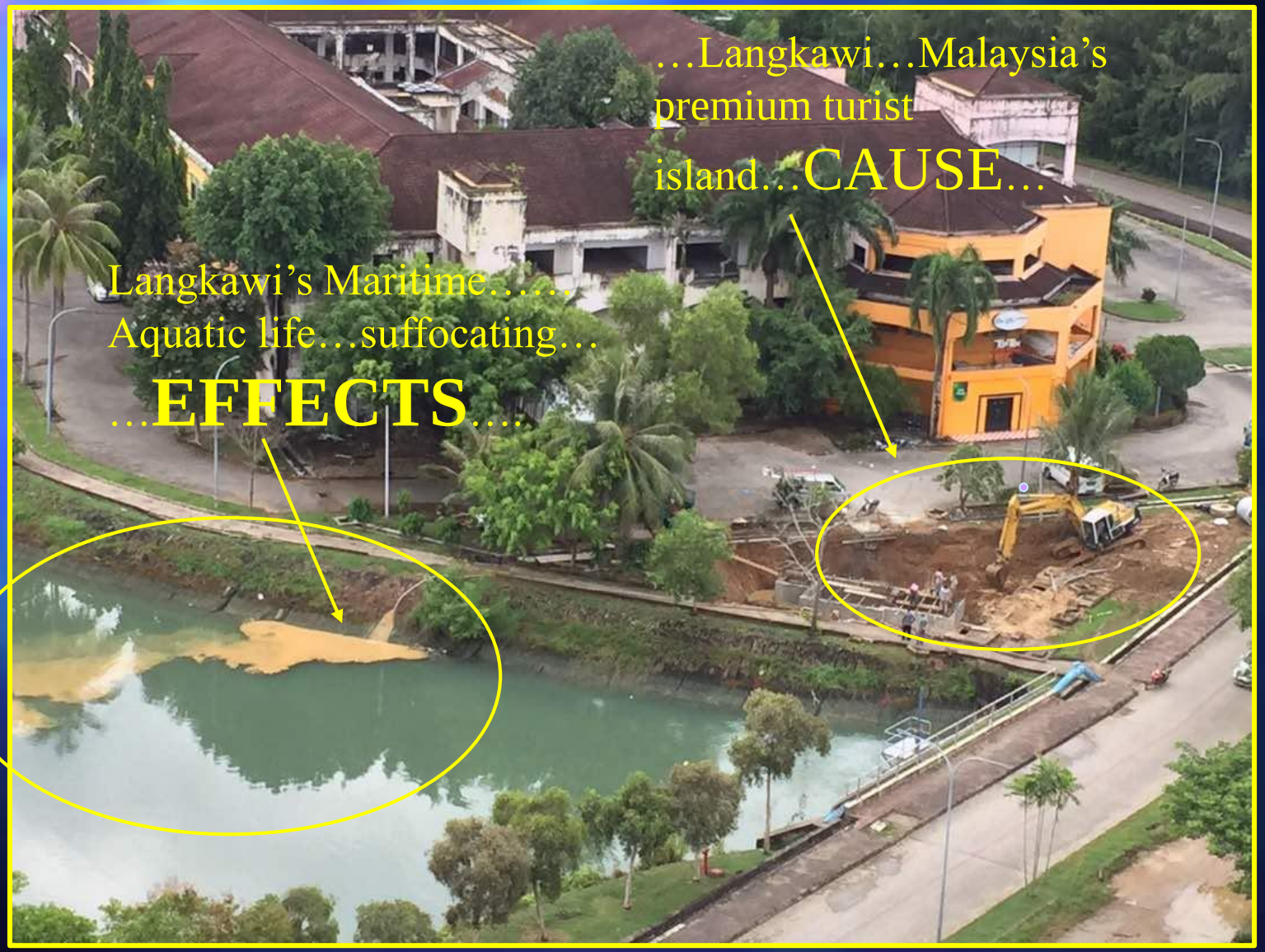

"… some bmps …"

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IS THIS EFFECTIVE SEDIMENT CONTROL…??

“… some bmps …”

… some techniques on Sediment Containment Systems and PE-BMPs …

..talk about…
…unconventional pollutant extraction…

“… some bmps …”

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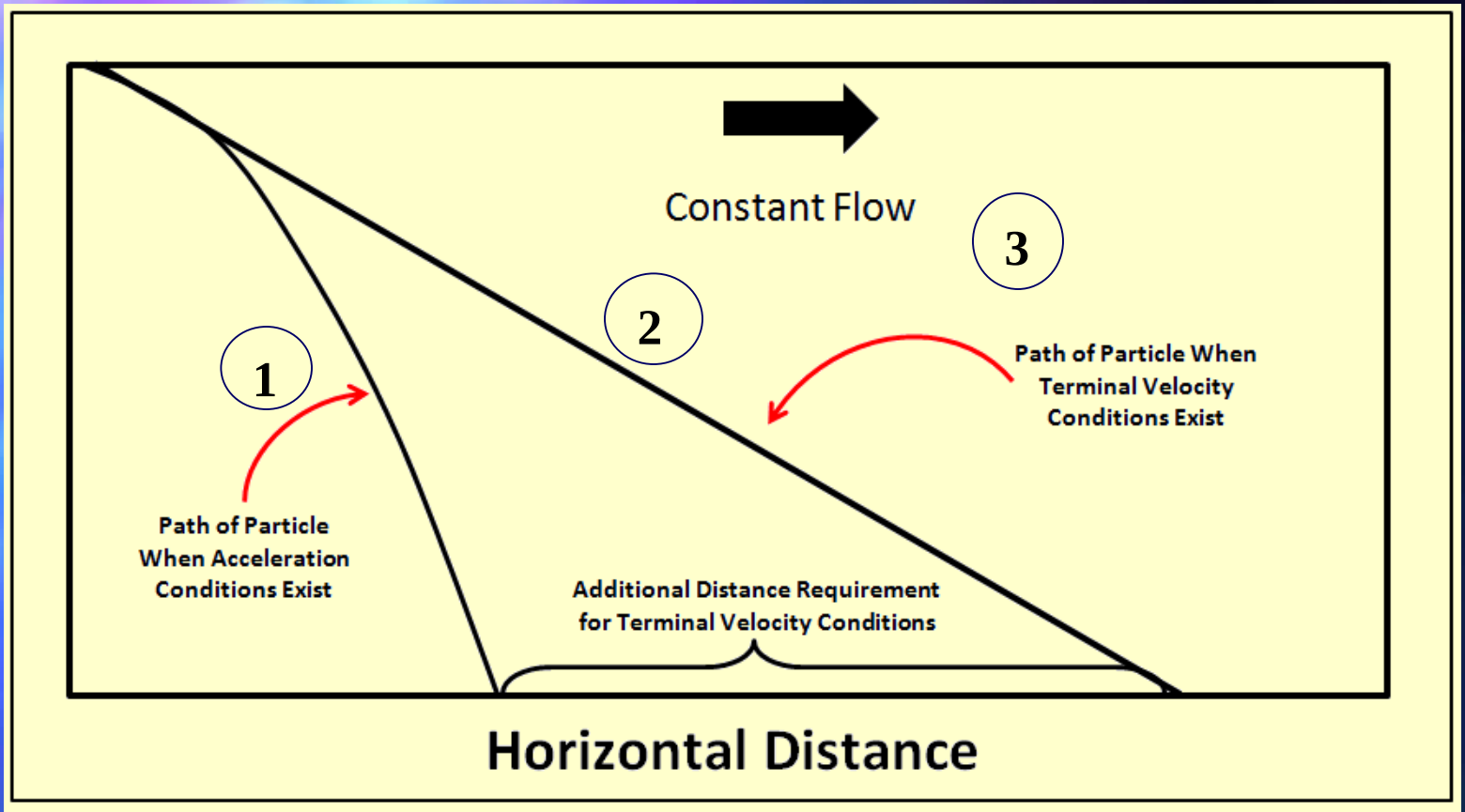
Where does all OUR Malaysian soil go to….

??

THE MALAYSIAN SOIL JOURNEY……..

SEDIMENT CONTAINMENT SYSTEMS SCS

- BEST BMP TO REMOVE SEDIMENT FROM RUNOFF IS A PROPERLY DESIGNED SEDIMENT BASIN
- SCS EFFECTIVENESS IN SEDIMENT CAPTURE DEPENDS ON DISCHARGE RATE FROM SCS
- MAX EFFECTIVENESS WHEN SEDIMENT BASIN (RETENTION POND) IS BIG ENOUGH TO CAPTURE ALL RUNOFF, BUT EXPENSIVE ON LAND
- DIFFICULTY ARISES WHEN SUSPENDED SOLIDS ARE < 0.02 MM, THE CLAY & SILT RANGE, RETENTION PONDS HAVE TO BE VERY LARGE



- **1) Newtonian Physics**: Larger particles (mass > 0.02mm) accelerates through column of water and falls to bottom of SCS.
- **2) Stokes' Law**: Smaller particles (mass < 0.02mm) encounter fluid resistance will not accelerate but fall through water column at terminal velocity.
- **3) Brownian Movement**: Very small particles, colloidal particles (mass < 0.01mm) fine clays –silts take extensive time to settle, days….

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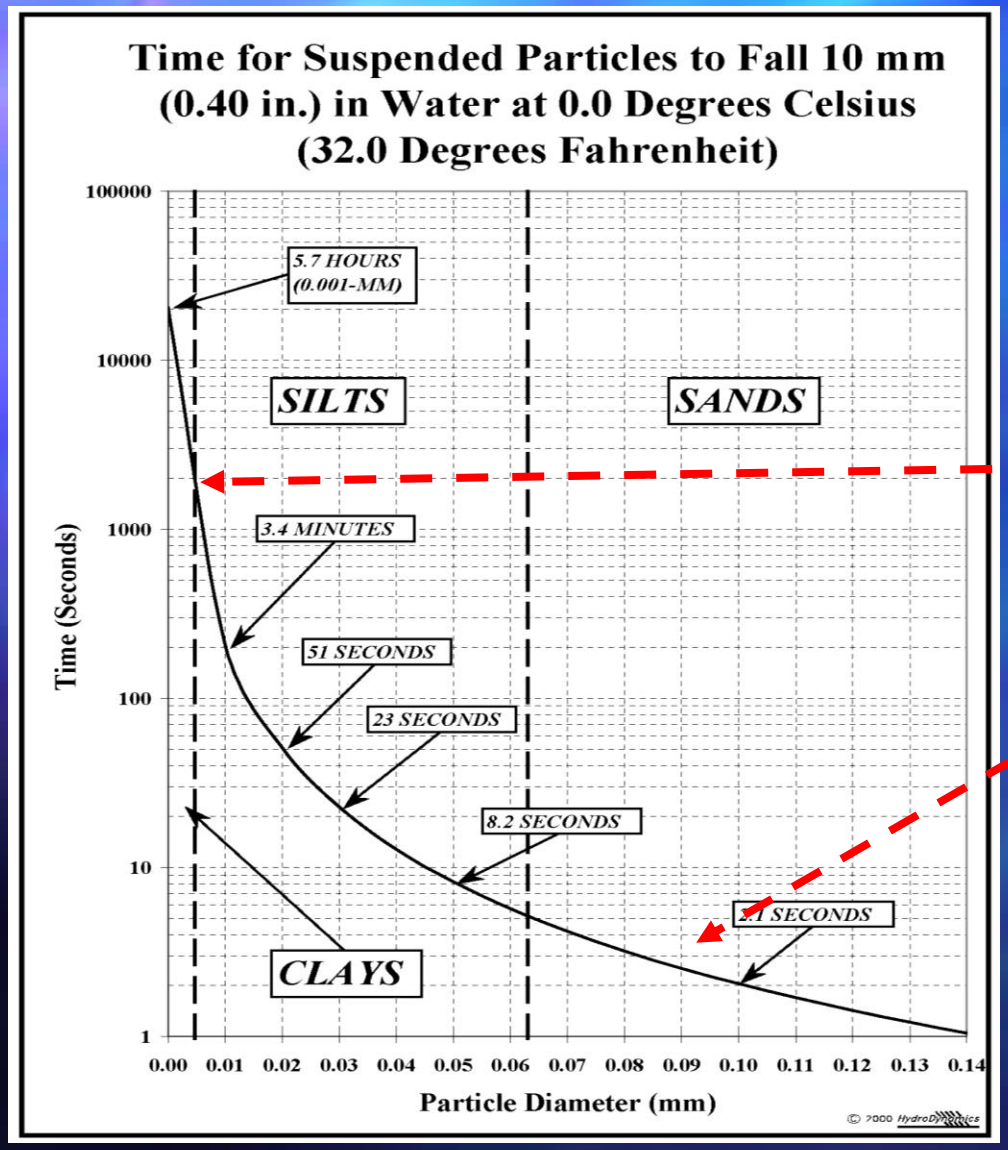

- **How Fast Sediment Settles in SCS is dependent on its Size & Mass**
- **Clays & Silts takes a much Longer time to Settle compared to Sand & Gravel….**

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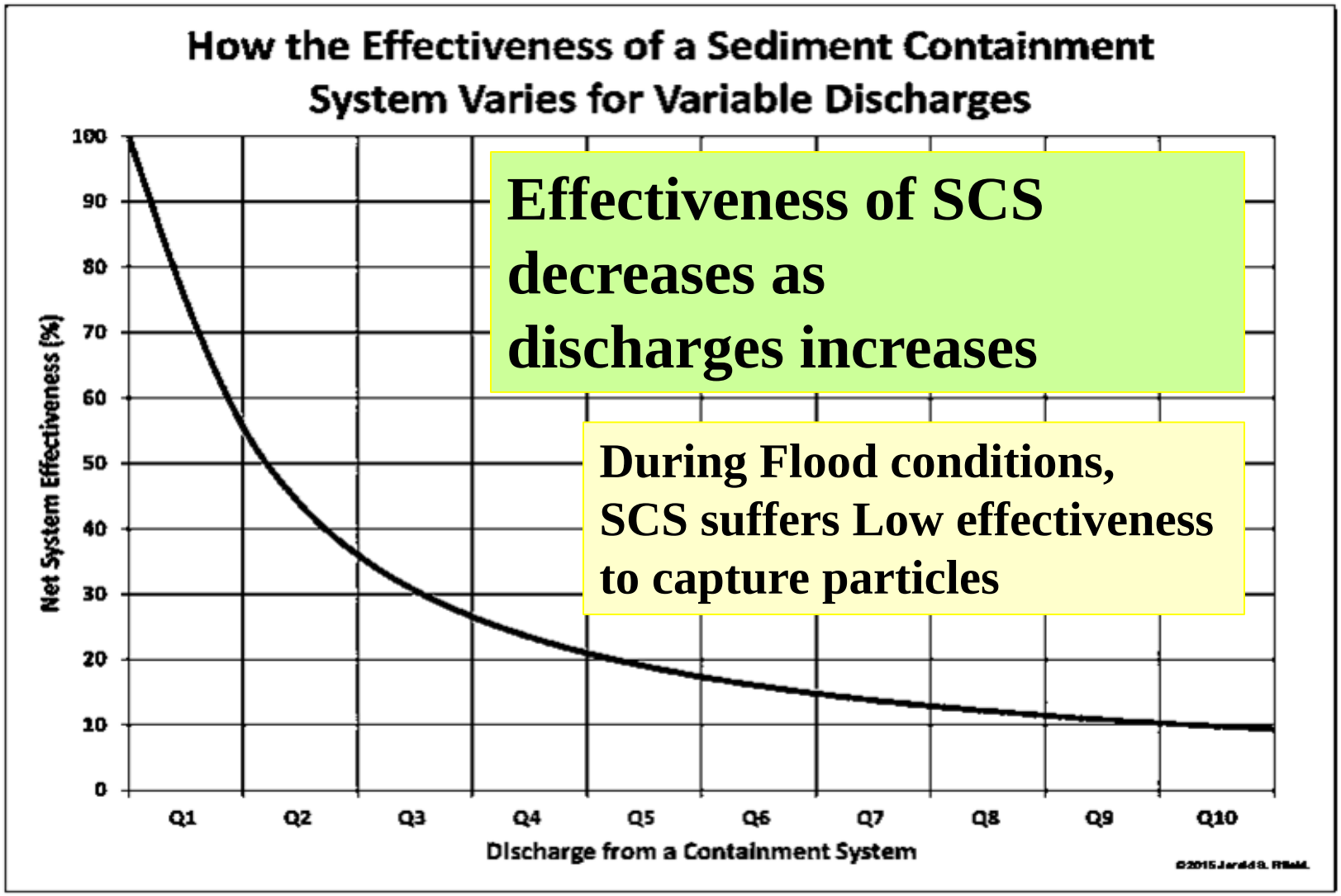

SCS Minimum Pond Surface Area

S $A_{min.}$ = Q outflow **÷ V** terminal velocity

SA min. = Minimum pond surface area (m2)

Q outflow = Discharge from SCS (litres/sec)

V terminal velocity = Terminal Velocity of Design Particle Size (m/sec)

Most efficient SCS is Rectangular shape with L ≥ 2W

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A) PHYSICAL CONSTRAINTS AT CONSTRUCTION SITE :

What happens when SCS:

- Space does **not allow** for the ideal Rectangular shape with $L \geq 2W$?
- Space available for SCS is **Square** ?
- Space available for SCS is just **too Small** ?

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1) SEDIMENT BASIN w/BAFFLES bmps

1i) PHYSICAL COSNSTRAINTS AT CONSTRUCTION SITE

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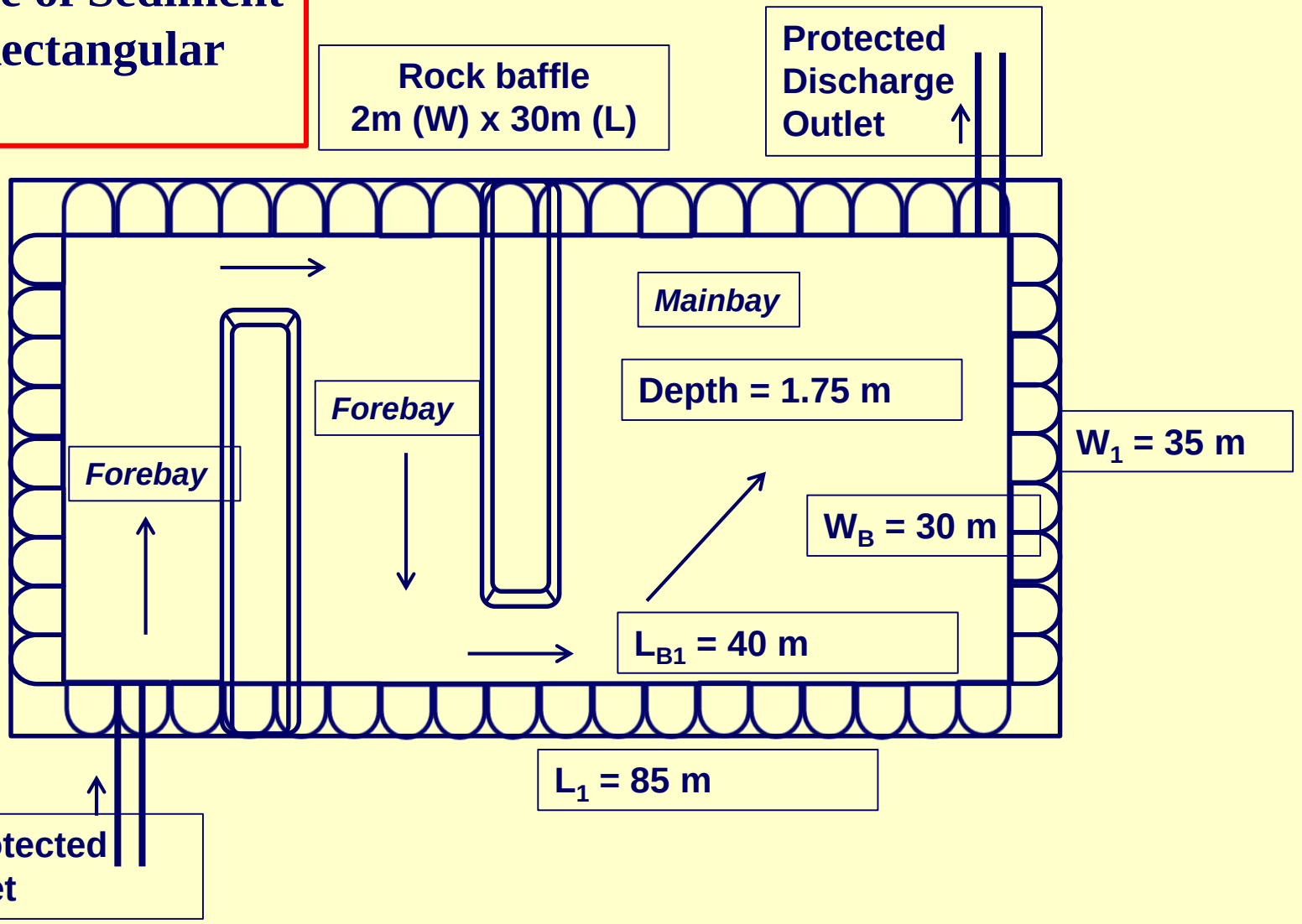
Example of Sediment Basin Rectangular
L > 2W



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- **Baffle Length Increases Flow Length New L_B = (35+5.5+35+5.5)+ 53 = 134m (134/85) =**
- **Flow length is 1.57 or 57% longer, for the same rectangular shape**
- **Flow length is increased by baffles without actual space increase**

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B) “SEDIMENT PARTICLE” CONSTRAINTS AT CONSTRUCTION SITE:

2) POLYMER ENHANCE bmps (PE-BMP)

2i) PAM BLOCK for CONSTRUCTION SITE SEDIMENT TREATMENT

2ii) ATS – MINI for RAPID & MOBILE SEDIMENT TREATMENT

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Reduce pond slurry overflow

Gravity flow over water treatment “floc logs”

Turbulent flow increases mixture agitation & reaction with pollutants

Suspended solids are flocculated & deposition w/clean water discharging

Before @ 800 NTU

After @ 2.1 NTU

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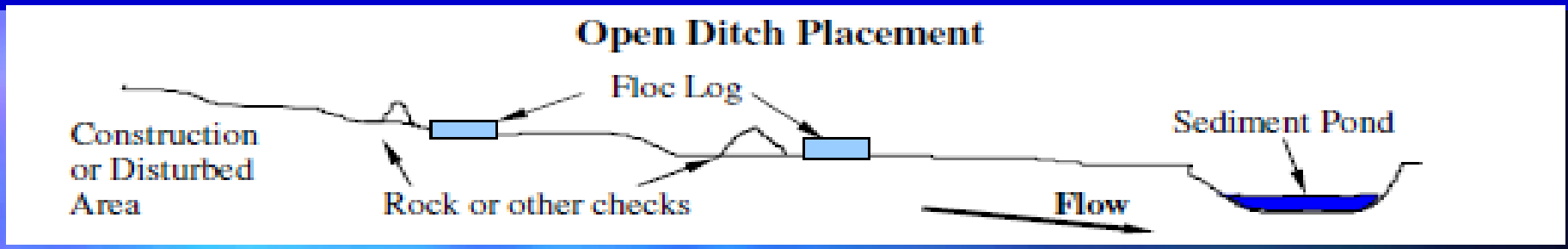
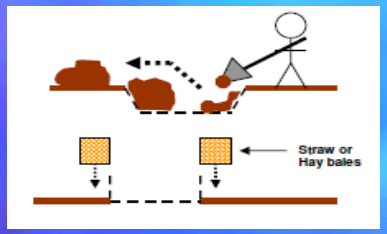
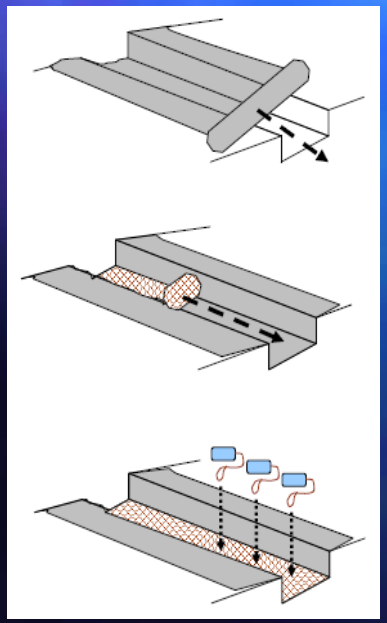




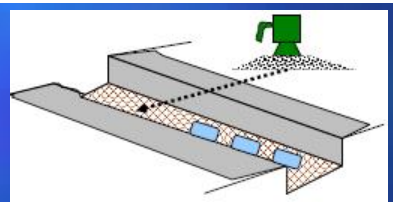
Create ditch/earth drain



Line w/Plastic sheet.
Prevent treated water from soil contamination

Lay coir mattress
Provide surface for pollutant to attach

Place Floc Logs
Flog Logs position in-line to allow polluted water to flow over & around them



Apply Silt Stop powder
Sprinkle over mattress will improve final water clarification

Polluted water flow into Temporary Treatment Ditch

Clarified water leaving site can be discharged into riparian waters

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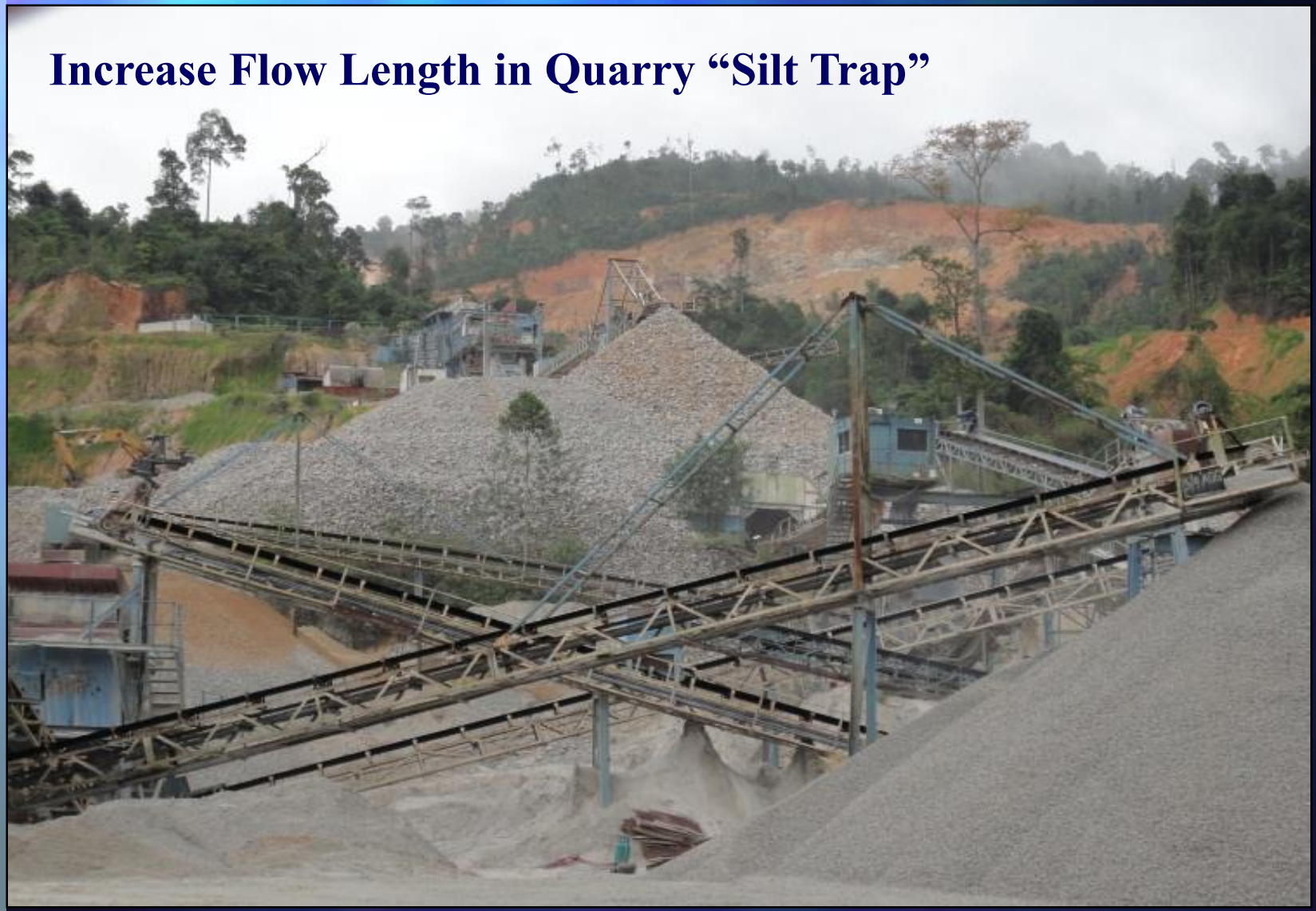
Increase Flow Length in Quarry “Silt Trap”



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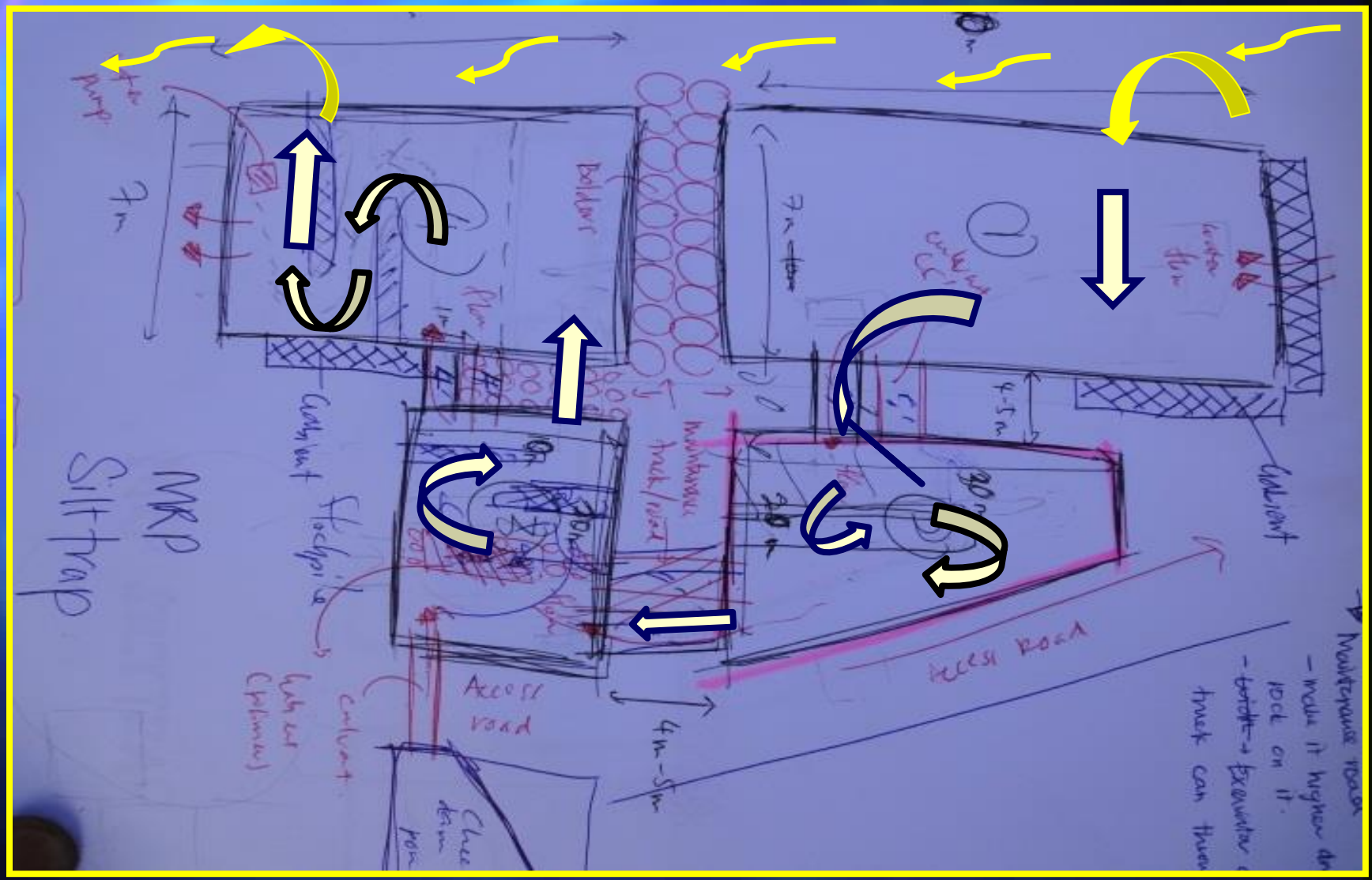

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CHT – Natural Solutions

Vigormat : Natural Slope Erosion Control Mattress
Vigorlok : Natural River- Shoreline Protection Logs
VigorJet : Water Quality Solar Aeration
ATS : Water Quality Fast Dewater Sludge

RUN-OFF SEDIMENT TREATMENT

PE-BMP: IN-STREAM CLARIFICATION

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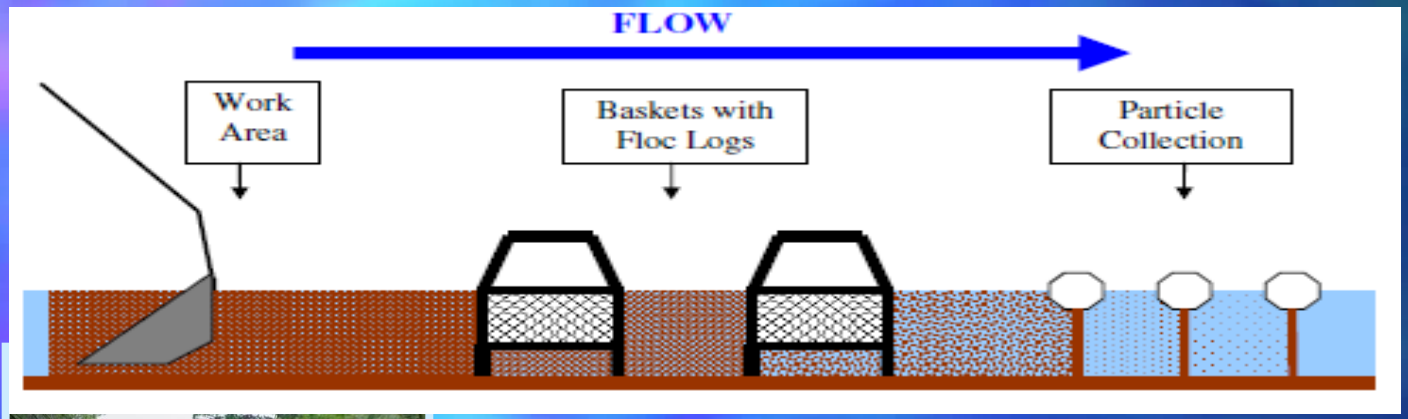

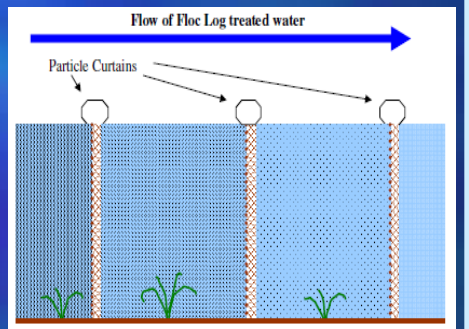

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B) SEDIMENT CONSTRAINTS AT CONSTRUCTION SITE:

2) POLYMER ENHANCE bmps (PE-BMP)

2ii) ATS – MINI for RAPID & MOBILE SEDIMENT TREATMENT

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TYPICAL LINEAR CONSTRUCTION SITE

SEDIMENT PUMPED FROM PILE-FOOTING INTO SILT TRAP AFTER STORM EVENT

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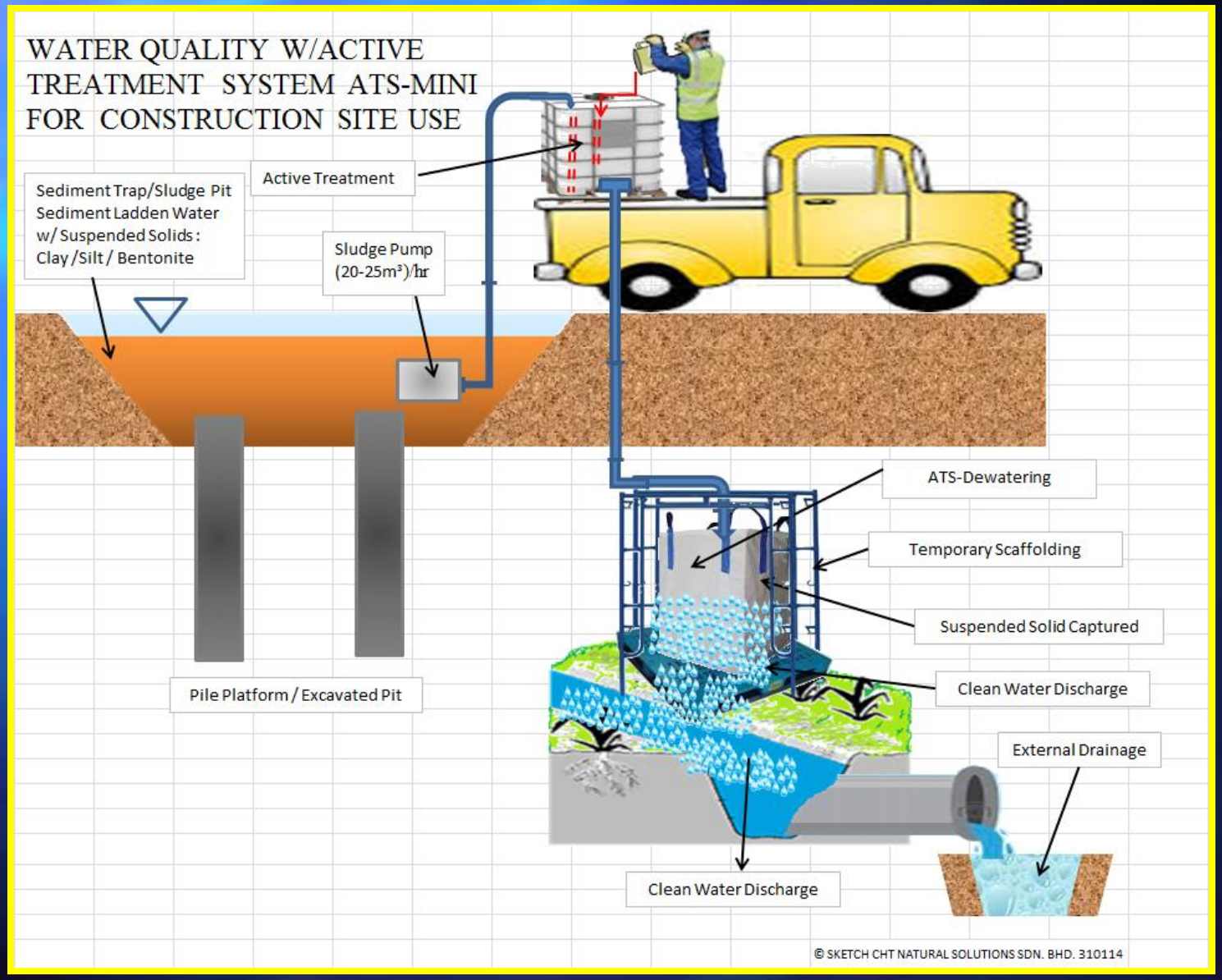
ACTIVE TREATMENT SYSTEM: ATS – MINI SITE MOBILE SEDIMENT TREATMENT



ACTIVE TREATMENT SYSTEM: ATS – MINI SITE MOBILE SEDIMENT TREATMENT

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ACTIVE TREATMENT SYSTEM: ATS – MINI RAPID & MOBILE SEDIMENT TREATMENT

MVI_2342.MOV

EiMAS-CPESC Jan2011 Class Demo ATS

DE-SILTING LAKE

EiMAS-CPESC Jan2011 Class Demo ATS

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…most “polluted waters - sediment flow” contains (5-15)% Solid Matter

…the Balance (85-95)% is Water…

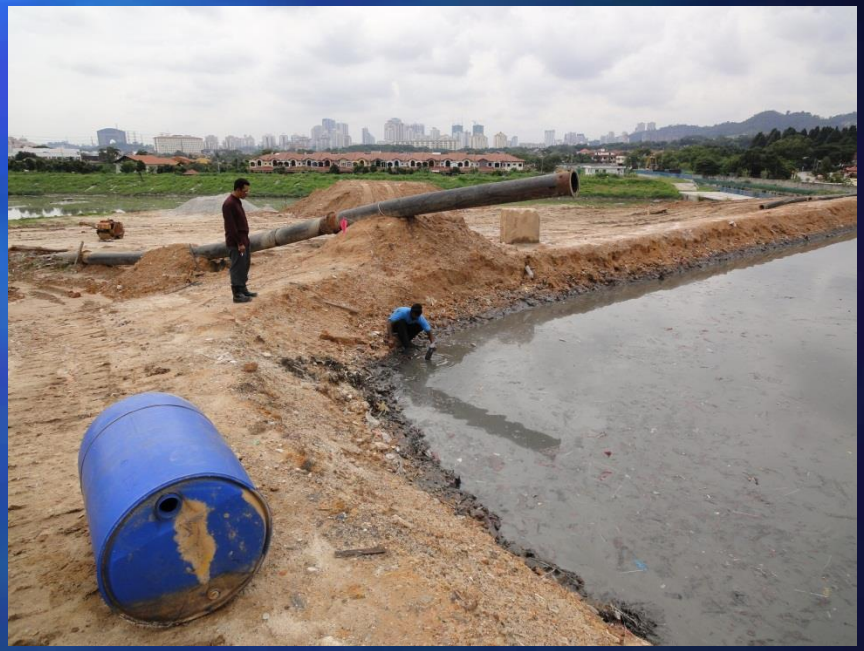
..the bmp is to :

Separate Suspended Solid Particles & discharge Water back to Environment….

FACTS : OUR BODY IS MADE UP OF 70% WATER

WOULD U PREFER WATER FROM THIS ?

OR THIS ?



FACTS: OUR BODY IS MADE UP OF 70% WATER

OR THIS ?


OR THIS
Thank
You
MALAYSIAN
STORMWATER
ORGANIZATION

Quotes….

It has been said that:

A NATION THAT DESTROYS ITS SOIL, DESTROYS ITSELF….

F.D. ROOSEVELT

"Soil is more valuable than oil—and just as nonrenewable"

Tsampa Soup with Garden Veggies, 1 star: "The Nepalis don't load up their tsampa with salt."

"The thing we're gonna run out of first is water," he says. "And the second one is topsoil." He cites John Jeavons, co-founder of Ecology Action, who warns we have maybe 30 more years of topsoil. "Let's say you just don't believe it. Double it to 60. It's still a scary fact."

Quotes….

It is so critical that we do not splurge our valuable assets

(soil, water, nutrients from erosion process)

and convert it to downstream public misery.

Next CISEC CLASS 23-26 OCT 2017

CISEC Training Modules

&

Certification Examination

October 23 - 26, 2017
Sunway Putra Hotel
100 JALAN PUTRA, KUALA LUMPUR

MSO & DOE approved

- (36) DOE CPD units
- (13) BEM CPD units (to be confirmed)
- Inspector certification course w/rules& regulations of Malaysia
- 3 1/2 days ESC training &exam
- Only RM3200(incl GST) per pax
- Don't delay, for reservation call:
  (last day for registration Sept 15,2017)

Non - Government registrants
CHT-NATURAL SOLUTIONS SDN BHD
Tel : (603) 7847 4480 Fax : (603) 7847 4821
E-Mail :chtvigormat16@gmail.com

Government registrants
PINNACLE URBAN ENGINEERING
(MOF Sub-head No 221110 –KhidmatLatihan, Tenaga Pengajar Dan Moderator/ Negotiator)
Tel : (603) 60343262

Organiserreserves the right to reschedule and/or cancel this program

About CISEC Inc.

Its a non-profit 501(c)6 organization which administers an international certification program that recognizes the abilities, skills, experience, and knowledge of inspectors who demonstrate their proficiency in observing, inspecting, and reporting on the implementation of Storm Water Pollution Prevention Plans (SWPPPs)& EMP.

The CISEC Programs

CISEC provides two comprehensive sediment and erosion and stormwater pollution control inspector programs; i) the CISEC & ii) the CISEC-IT.

i) CISEC Registrant*Program

Individuals withtwo or more years of construction site inspection experience can apply for the CISEC Registrant Examination and upon passing be certified CISEC Registrant.

ii) CISEC-IT Registrant* Program

Individuals that do not qualify for the CISEC Registrant program can apply for an "In-Training" (CISEC-IT) examination and upon passing shall be designated CISEC-IT.

By passing the examination CISEC Registrant:

- Demonstrates comprehensive knowledge in the principles and practices of controlling sediment, erosion, and storm water pollutants.
- Demonstrates the skills to observe onsite and offsite conditions that impact storm water discharges from active construction sites.
- Demonstratesinspection expertise on BMPs to determine if the mitigation measures will minimize the discharge of pollutants from active construction sites.
- Demonstrates the ability to communicate and report on their inspection of construction sites as to whether compliance situations exist.

* A Registrant is a person who has passed the certified examination.

Training Modules

Day 1 8:00am –1:00pm (5hrs)

Module 1: Rules&Regulations Information

- JPS - MSMA StormwaterManagement Submission Checklist
- Malaysian Rules & Regulations
  including but not limited to: Environment Quality Act 1974- EIA Sect 34A, Federal Land Conservation Act 1960, Water Act 1920, Local Government Act 1976, Town and Country Planning Act 1976, Street, Drainage and Building Act Sect 70A, B,C & 71, Uniform Building By-Laws Sect 83, Fisheries Act 1985 Sect 38(1)(k)…
- Evaluating Construction Permit Processes &Inspector Requirements
- *Understanding EMP and the S&EC Drawings*

Next CISEC CLASS 23-26 OCT 2017

Day 1 2:00pm – 6:00pm (4hrs)

Module 2:Inspector Background Material Covered

- Definitions
  - Erosion
  - Sediment
  - Sedimentation
- Polymers and Sedimentation
- A Primer on Hydrology
  - Topographic maps
  - Hydrographs and sedigraphs
- Critical Inspector Requirements
  - EMPs and BMPs
  - Communication
  - Recognizinglimitations
- CISEC Code of Ethics

Module 3:Best Management Practices

- Understanding the Phases of Construction
- Inspecting
  - Barriers
  - Check structures
  - Drains and InletsSediment Containment Systems
  - Polymers
  - Wind/Dust control methods
  - Erosion control practices
  - Hazardous waste material sites
- Writing and Assessing Inspection Reports

Day 2 8:00am–1:00pm (5hrs)

Module 4:Conducting Inspections

- Inspection Requirements
  - Role of Designers, Inspectors, and Contractors
- Inspector Responsibilities During Construction Activities
  - Inspection Reports
  - Reporting on BMP Maintenance
  - Documentation and Communication
  - Working with Contractors and Clients
- Inspecting a Construction Site
  - During construction, Before grading
  - During construction, After grading

Day 2 2:00pm– 6:00pm (4hrs)

Module 5:General Exam Review

Malaysian Rules & Regulations for Inspectors as they apply to EMPs and S&EC plans

- Knowledge about BMPs and Pollutants
- BMP inspection requirements, assessing construction sites for compliance
- Identifying non-compliance conditions
- Writing Inspection Reports

Day 38:00am – 1:00pm (5hrs)

Module 6: Field-Trip Project Site

- Class is divided into teams 5- 6 each w/divided roles & responsibilities, must have safety gear
- Visit to construction site eg. LRT, Residential /Commercial Development EIA or without
- Teams shall identify & report BMPs installed correctly or otherwise; w/ 5W+1H questions

Day 3 2:00pm – 6:00pm (4hrs)

Module 7: Teams Critique Site Findings, Develop Reports & Present in Class

- Teams work separately to develop site sedimentation & erosion management report
- Teams presentation to the class

Day 49:00am – 12:30pm (3.5hrs)

Module 8 :CERTIFICATION EXAMINATION INSPECTORON SEDIMENT&EROSION CONTROL (CISEC)

CISEC REGISTRANT EXAM: 3.5 hour

CISEC-IT REGISTRANT EXAM:1.0 hour