



ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINE IN MALAYSIA



LAND-DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LD-P2M2)

BACKGROUND

- The topic on soil erosion and sedimentation prevention and control is **not a new subject in DOE**, with **guidelines issued** on the very subject:
 - *Guidelines for the Prevention and Control of Soil Erosion and Siltation 1996/2008.*

BACKGROUND

- DOE also kept up with the evolution of this subject, which culminated in the issue of :
- *Guidance Document For Addressing Soil Erosion And Sediment Control Aspects In The Environmental Impact Assessment (EIA) Report in 2010.*

BACKGROUND

- In the pursuit to further enhance the understanding and control of erosion and sedimentation issues in Malaysia, more recently, DOE introduced into the EIA process (EIA Guideline in Malaysia 2016), :
- *Guidance Document for the preparation of the Document On Land-disturbing Pollution Prevention And Mitigation Measures (Ld-p2m2).*

BACKGROUND

- The more comprehensive LD-P2M2 Guidance Document is expected to be issued by DOE during the 4th Quarter of 2017.

Source of Power to Control Erosion and Sedimentation in Malaysia

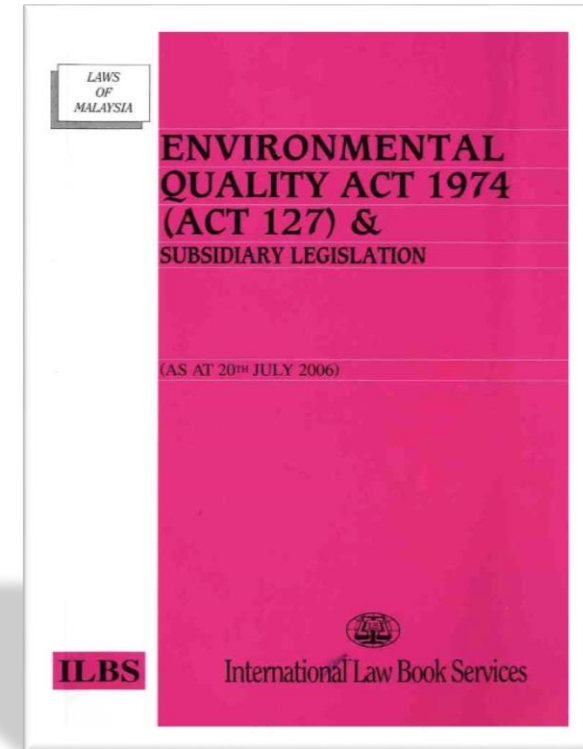
- **No regulation** yet to stipulate the standard discharge of parameter TSS in runoff
- **Resort to EIA** subjected activities (Section 34A & EIA Order 2015)
- Address through **EIA Guideline**
- **Legal-bind** the Guideline
- Condition of EIA approval (**COA**)

LEGAL REQUIREMENT

**ENVIRONMENTAL
QUALITY ACT (EQA)
1974 (AMENDMENT)
2012**

**Section 34A
Section 34AA
Section 33A**

**Environmental
Quality (Prescribed
Activities)
(Environmental
Impact Assessment)
Order 2015**



*Why do we need
 $\mathcal{LD}\text{-}\mathcal{P}_2\mathcal{M}_2$?*

Why LD-P2M2

An increase in events related to erosion and sedimentation arising from construction projects in recent times and through various inspections at project site development has shown that various factors and issues are perceived to be the driving forces for the need of LD-P2M2 for EIA projects...

**Scenarios At Our Agricultural
Activities (Highland) Area And
Construction Sites**

&

**Impacts associated with Erosion
and Sedimentation**

Issues

➤ *Earthwork Practices*

- *The absence of development phasing in which only a portion of the construction site is cleared and graded at any one time*
- *Unnecessary clearing of environmental sensitive areas, such as stream riparian buffers, steep slopes, wetlands and seeps*
- *Lacked of coordination among players. (C&C)*
- *Misunderstood ESC with SWM and Landscaping.*
- *Long time lags between soil disturbance and soil stabilization*
- *Installations not to the standards and specifications.*
- ***Perception that ESC is all about putting up sediment basin***
- *Poor field inspection practices or none.*
- *Maintenance, maintenance and maintenance.*
- *Etc, etc, etc. → attitude (trivial, ignorance), KPI*

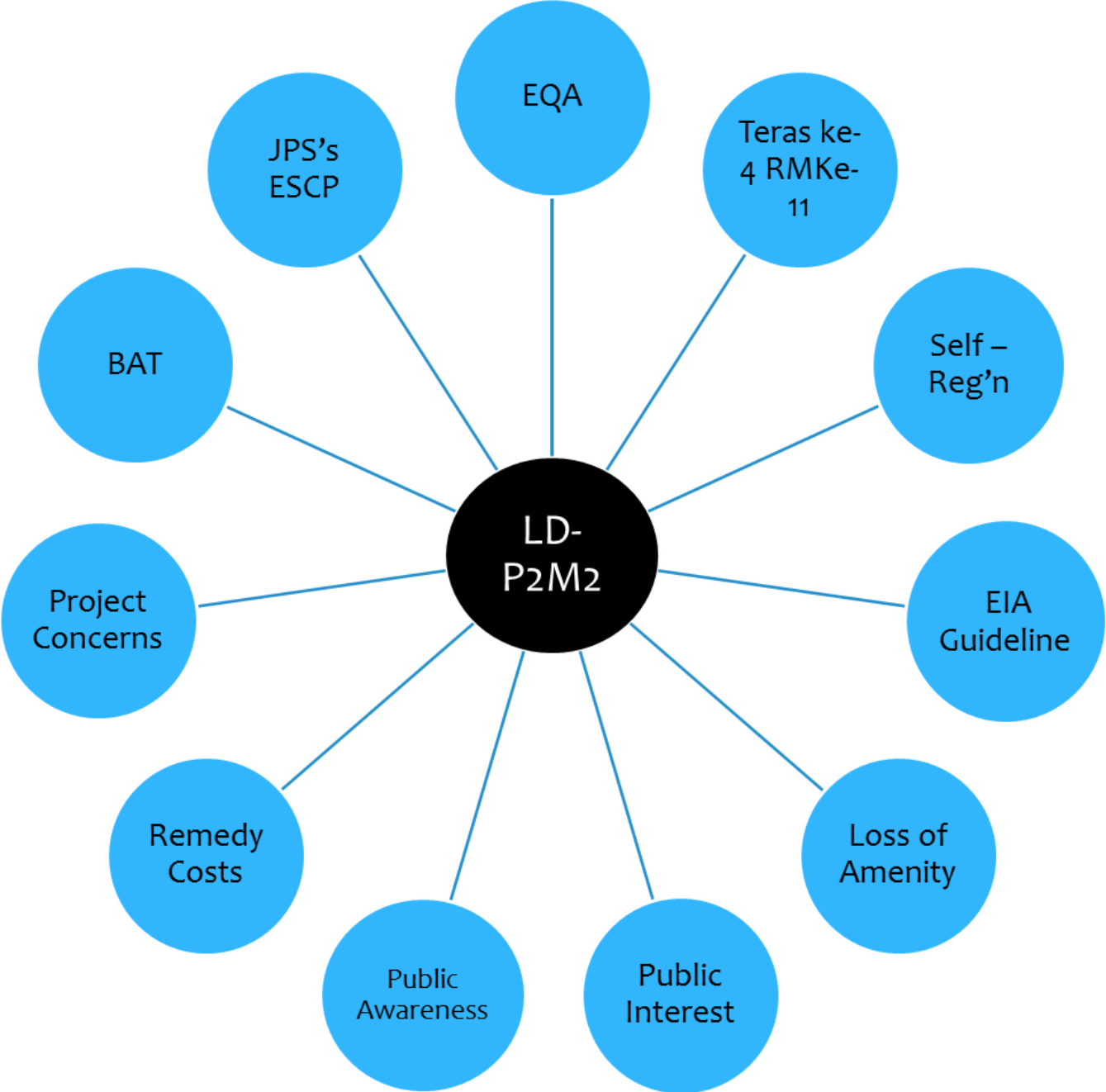
- Some sayings by some players:
- **It's normal to have little pollution during any land development**
- **We don't have the knowledge in handling ESC since we are not so called technical guys.**
- **It's costly and expensive to implement ESC.**

Overall Issues

- Issue of work program
- Construction activity
- Construction schedule
- Construction methodology (Method statement)
- Issue of [planning](#)
- Issue of work stages
- Issue of project phasing
- Issue of [work sequence](#)
- Issue of site possession
- Issue of river/stream diversion/crossing
- Issue of capacity building and logistic (physical/financial/fund)
- Issue of cost and benefit analyses (double handling and timeline)
- [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), [9](#)

- Issue of upholding Code of Practice in Earthwork
- Issue of construction (earthwork) team having common practice of Excavation (cut & fill) Team, Stabilization Team and Permanent Drainage Team while in short of Temporary Drainage Team.
- Issue of design change
- BMPs stocking
- Environment Officer level of authority
- Coordination & Communication
- Command & Control
- Subsequently end up →
- BMPs NOT FUNCTIONING OR NOT IN PLACE!**

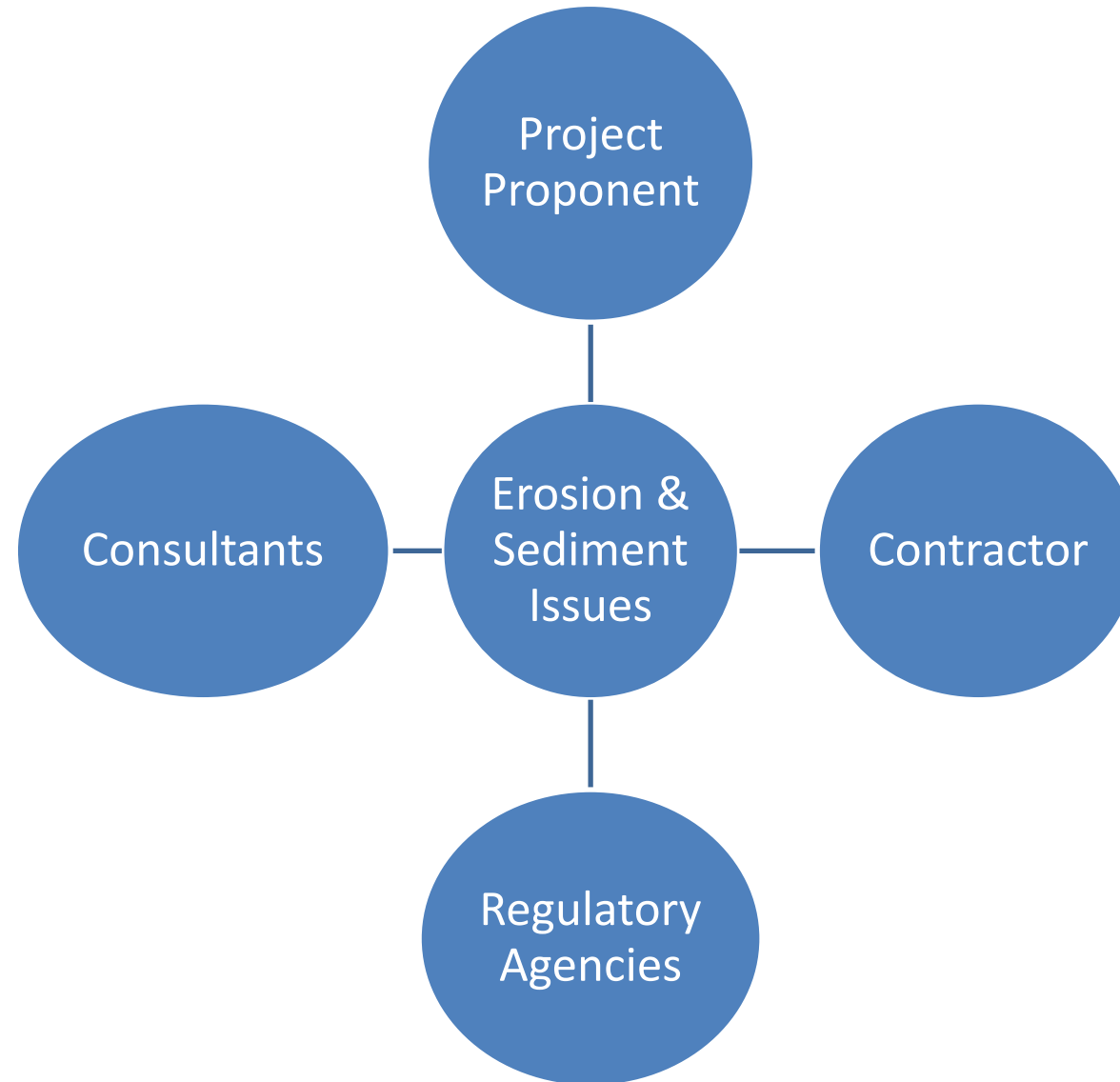
Driving forces for the need of LD-P2M2

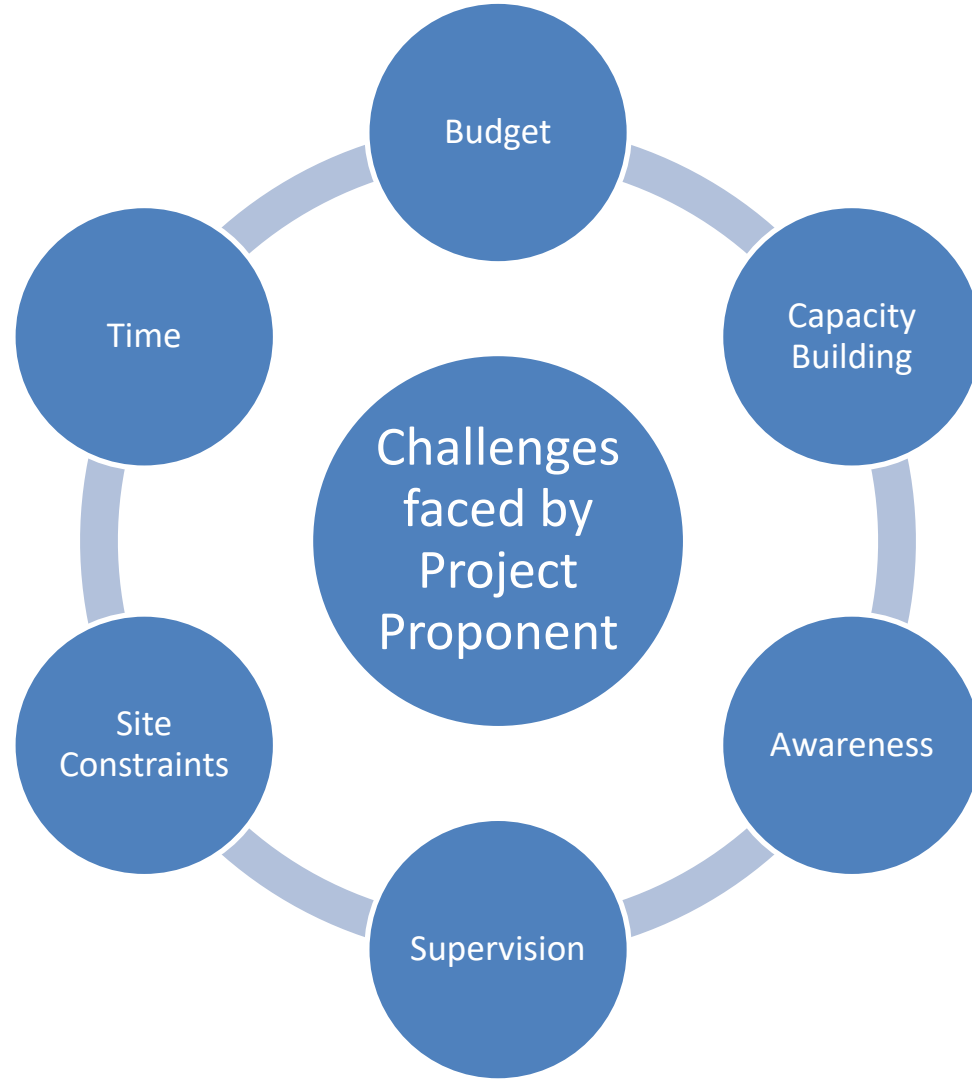


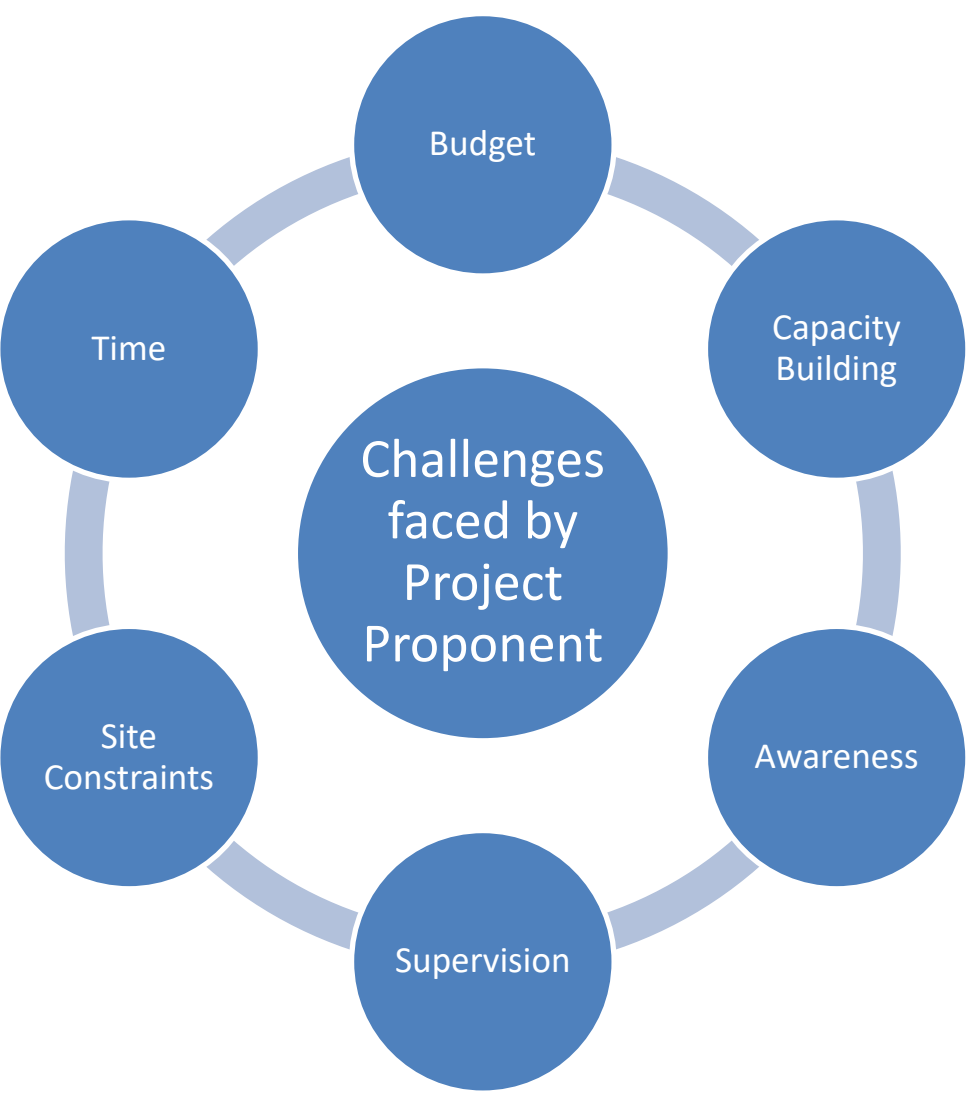
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GSR

THE PLAYERS









TRANSITION



ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINE IN MALAYSIA



LAND-DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LD-P2M2)

What is the LD-P2M2 document?

- A project-specific document to be prepared by the EIA Consultant at the EIA/EMP stage, to address and detail out all the elements that are required for applying the concept of LD-P2M2 into the project development;
- **Guides** the Project Proponent's personnel, namely **Environmental Officer** in supervising the implementation of the LD-P2M2 that includes the installation, inspection and maintenance of the Best Management Practices, as well as in preparing the required documentation and reports.
- The **focus** of the LD-P2M2 is on the prevention, mitigation and control of the discharge from the development area containing the **major pollutant (suspended solids)** resulting from land disturbing activities.

LD-P2M2 Definition


“use of construction methods, processes, materials, and practices intended to prevent, reduce, or eliminate the generation of pollutants at the source during any land-disturbing activity, through the protection of natural resources by preservation and conservation, reduction of waste generation and releases or discharges of pollutants to land, air, and water, and incorporation of best management practices and techniques to attain compliance with the conditions stipulated in the EIA approval conditions”

what is Id-p2m2?

“a system for erosion and sediment control for EIA projects, by considering the **construction methods** (method statements), **processes** (sequence & phasing), **materials**, and **practices** during any land-disturbing activities through the protection of natural resources by incorporation of best management practices (BMPs) and/or pollution prevention mitigation measures to comply with the EIA’s approval conditions”

Definition

Pollution
Prevention and
Mitigation
Measures (P2M2)



- **Best Management Practices (BMPs)** that include:
 - activities, facilities, measures, planning or procedures used to minimize accelerated erosion and sedimentation as well as other pollutants resulting from land disturbing activities and to manage runoff water to protect and maintain the quality of soil or inland or Malaysian waters and the existing and designated uses of waters before, during, and after land disturbing activities.

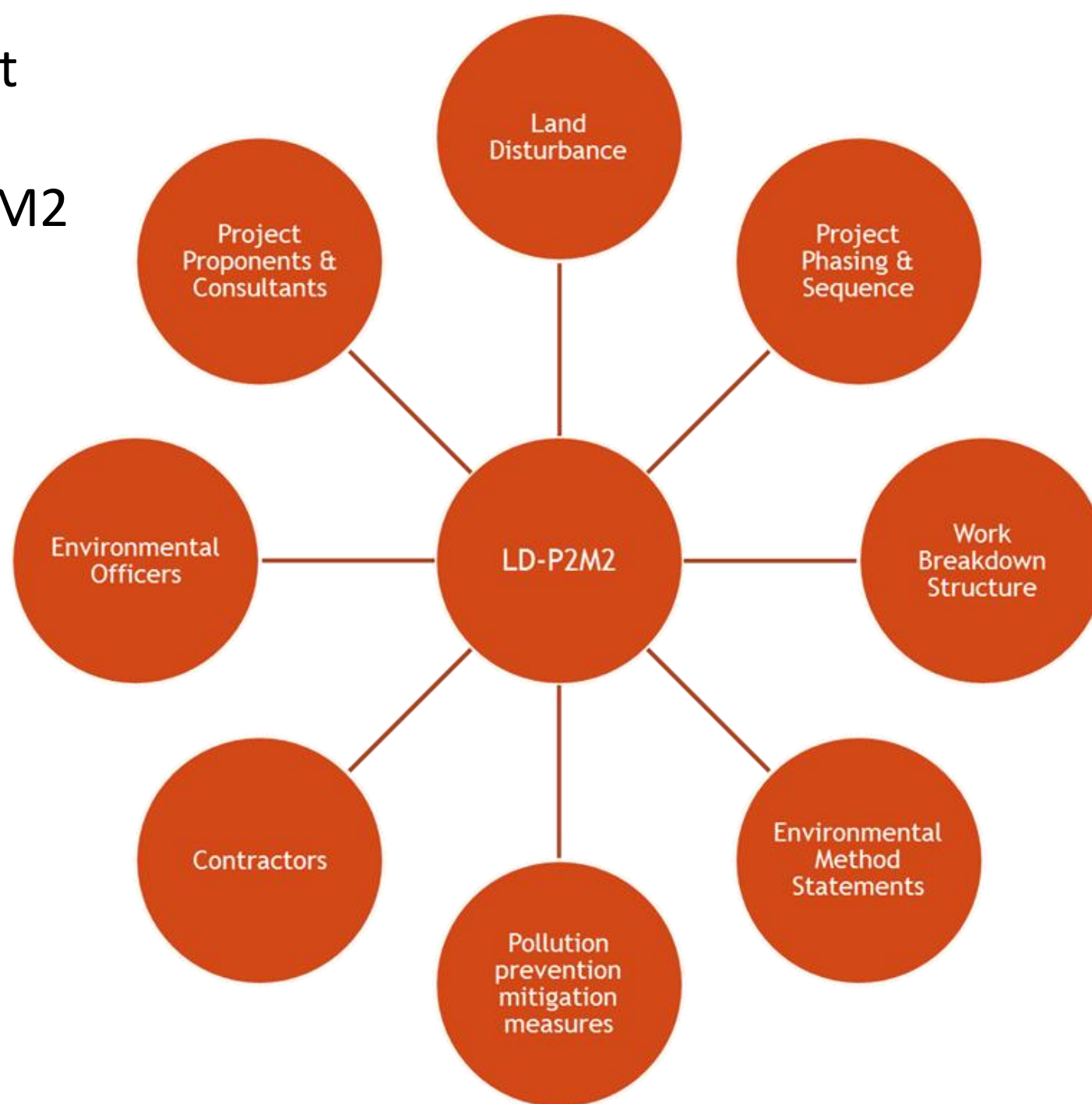
Definition

Land disturbing activity

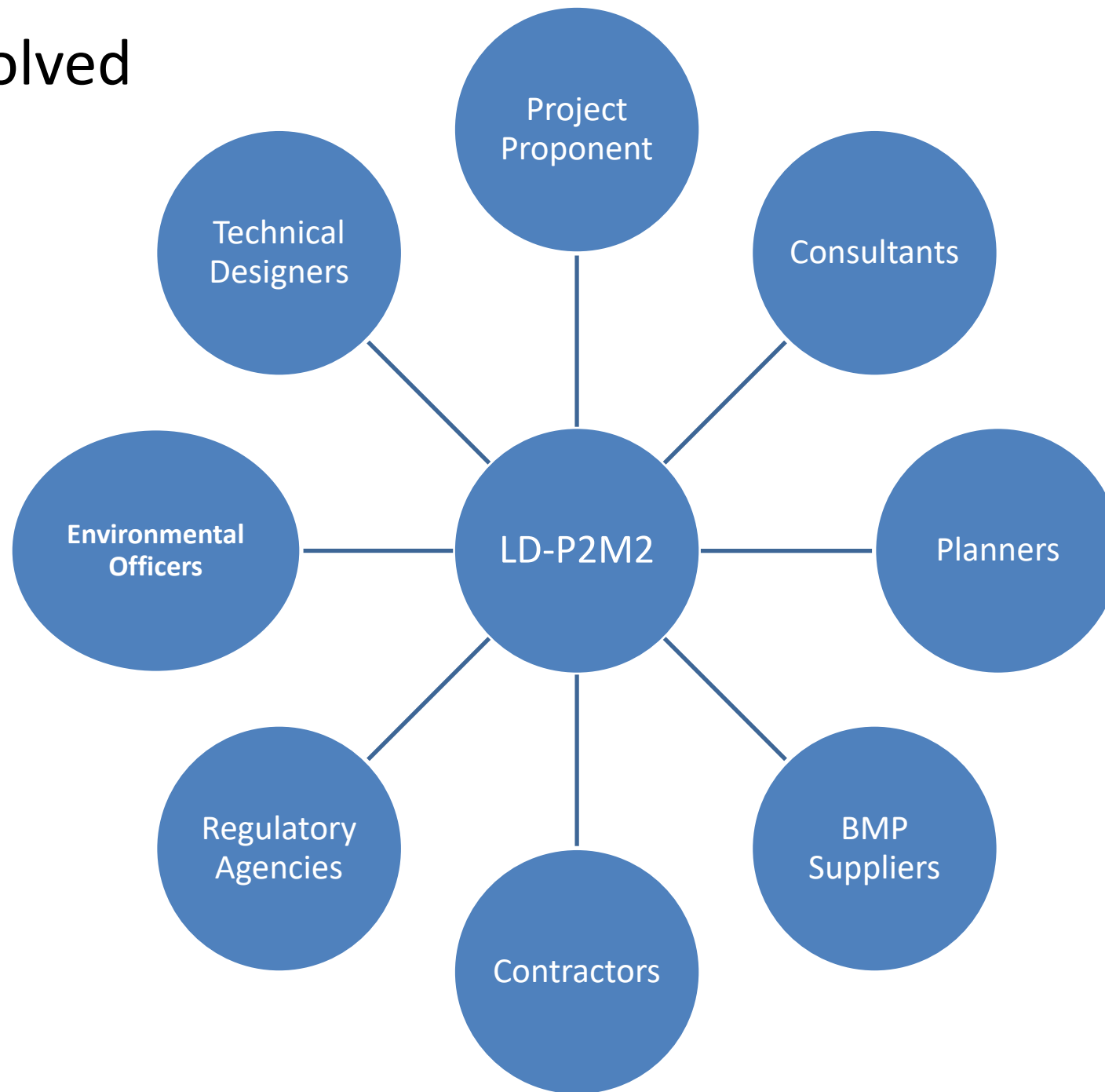


- Any project development that is subject to Section 34A EQA 1974 that involves activities such as:
 - clearing of trees or vegetation, excavation (e.g., site land clearing, drilling of the borehole, foundation pits), raising or sloping of ground, trenching (e.g., excavation of cuttings, forming of embankments and fills, excavation of, trenches and tunnels or viaduct, stream or river diversion / crossing, In-stream works, grading and blasting

The elements that encapsulate the concept of LD-P2M2 include....



Who are involved in ld-p2m2?



**What stage of submission
LD-P2M2 or When is Id-p2m2 required?**

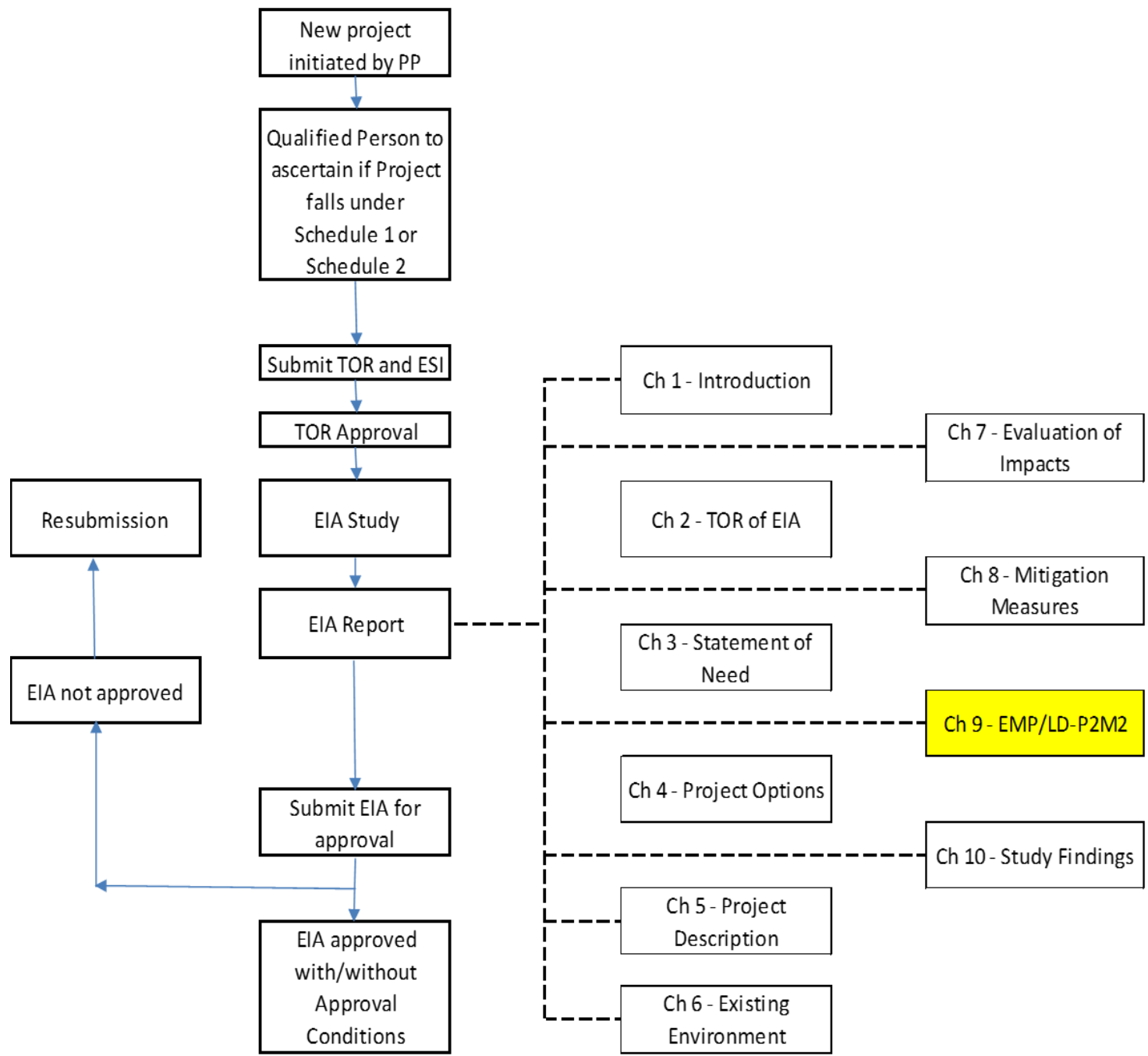
1. During submission of EIA Report

✓ **CHAPTER 9 OF EIA REPORT: EMP**

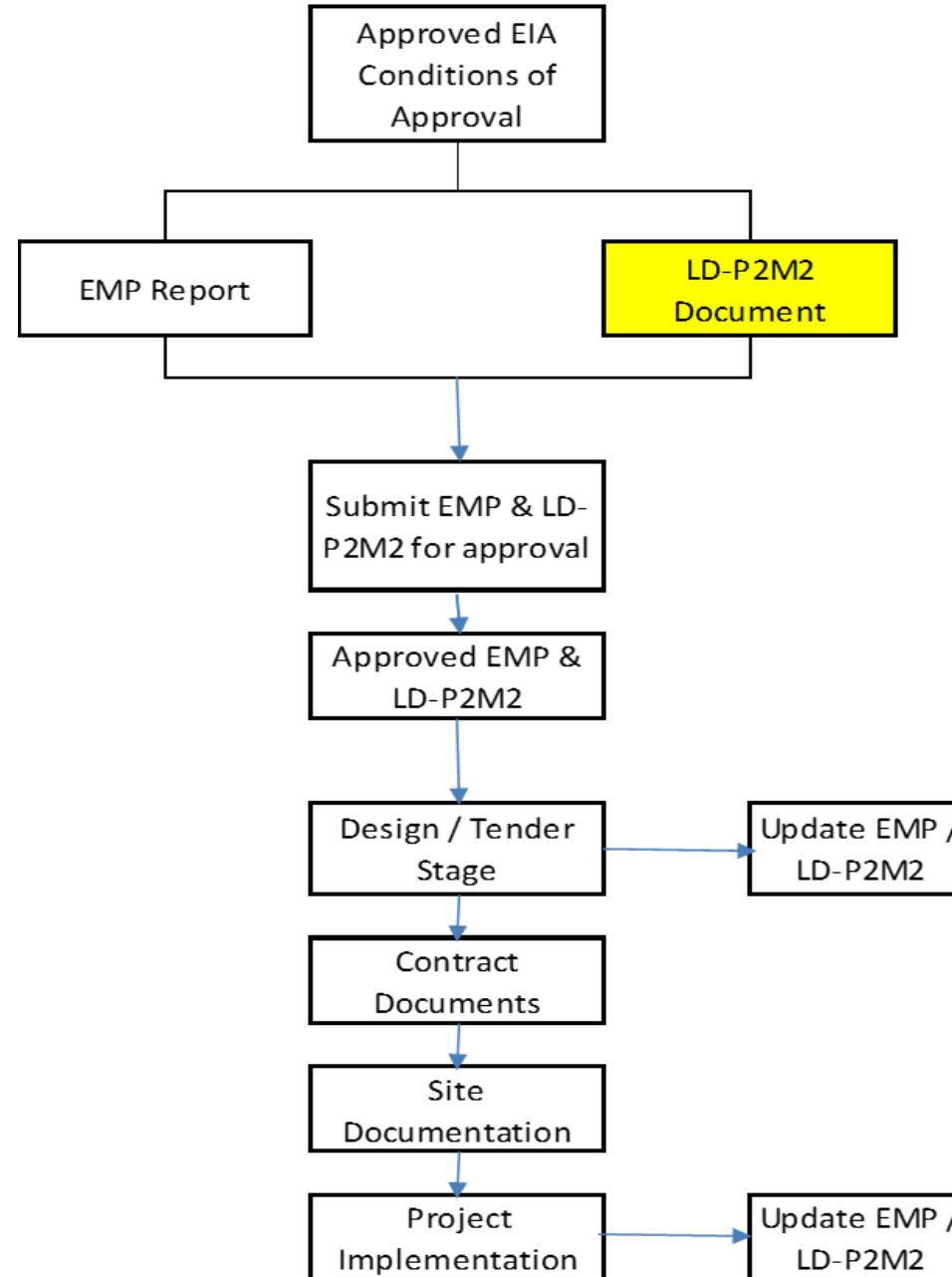
2. Post submission

✓ **EIA Approval Condition (COA)**

LIFE CYCLE OF LD-P2M2



LIFE CYCLE OF LD-P2M2



Land disturbing activity

Land development activities that promote
accelerated erosion

HOUSING DEVELOPMENT



HIGHLAND AGRICULTURAL PROJECT



LOWLAND AGRICULTURAL PROJECT



TIMBER LOGGING ACTIVITY



QUARRYING ACTIVITY



MINING ACTIVITY



MINING DUMP WASTE

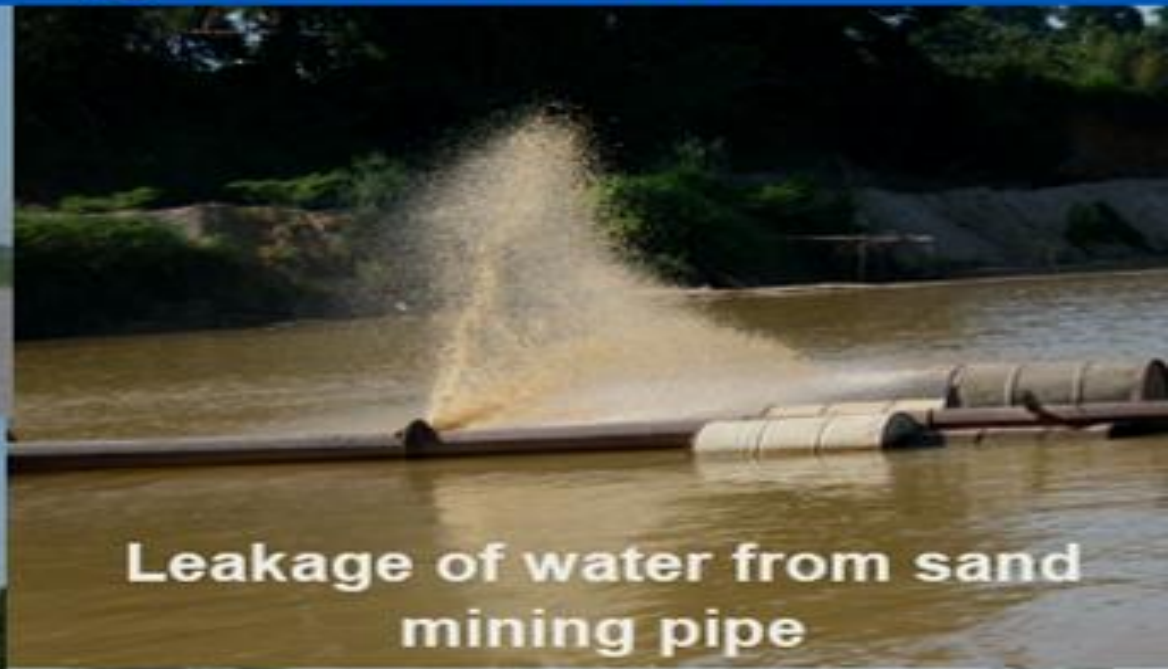


16.10.2015 10:45

Sand Mining



Pontoon and piping system



Leakage of water from sand mining pipe



Sand grading using Palong



Sand stock-piling yard close to river bank

**GENERAL COVERAGE OF LAND-DISTURBING POLLUTION PREVENTION AND
MITIGATION MEASURES (LDP2M2) DOCUMENT**

- (a) Narrative Description**
- (b) Schedule of construction (land disturbing) activities**
- (c) LD-P2M2 Plan and Construction Notes**
- (d) Method Statement**

GENERAL COVERAGE OF LAND-DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LDP2M2) DOCUMENT (cont)

(a) Narrative Description

- Describing the project description, existing site conditions, conditions after development, major land disturbing activities, total site area, total disturbed area, soil types, design criteria for Pollution Prevention and Mitigation Measures (P2M2), expected rainfall, runoff velocities and peak flows, and illustration of **who, what, where, why, when** and **how** P2M2 is to be installed, inspected and maintained.

**GENERAL COVERAGE OF LAND-DISTURBING POLLUTION PREVENTION AND
MITIGATION MEASURES (LDP2M2) DOCUMENT(cont)**

(b) Schedule of construction (land disturbing) activities

- Schedule of construction activities **detailing the project phasing, construction stages and sequences that progress** with the implementation of each of the LD-P2M2s in a timely manner.

**GENERAL COVERAGE OF LAND DISTURBING POLLUTION PREVENTION AND
MITIGATION MEASURES (LDP2M2) DOCUMENT(cont)**

(b) Schedule of construction (land disturbing) activities

- Example:

Typical Programme Activities:

1. *Mobilization*
2. *Construction of bridge columns*
3. *Construction of bridge spans*
4. *Construction of bridge drainage*
5. *Installation of railings*
6. *Installation of signboards*
7. *Rehabilitation of disturbed site areas*
8. *Demobilization*

GENERAL COVERAGE OF LAND DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LDP2M2) (cont)

Suggested Programme Activities for LD-P2M2 document:

1. Mobilization
2. Survey and mark site boundaries and environmental buffer zones
3. Install silt fence and temporary drainage prior to access road construction
4. Land clearing/access road construction - where practical, limit to no more than 50m per section
5. Pave access road, or cover up road excavation with crusher run
6. Install silt fence, temporary drainage and sediment basin to cater for construction of office facilities, workshop, storage yard
7. Site clearing and site formation
8. Construction of office facilities, workshop, storage yard
9. Install silt fence, temporary drainage and sediment basin to cater for excavation of foundations
10. Excavation of foundations
11. Construction of bridge columns
12. Construction of bridge spans
13. Construction of bridge drainage
14. Installation of railings
15. Installation of signboards
16. Rehabilitation of disturbed site areas and removal of BMPs
17. Demobilization

GENERAL COVERAGE OF LAND DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LDP2M2) (cont)

(c) LD-P2M2 Plan and Construction Notes

- A plan consisting of maps and/or site plans showing the **existing** geomorphology and land use of the site, to be **overlaid** with **site development map** that depict the proposed land disturbing activities or earthworks, inclusive of proposed area alterations and the locations of all P2M2s facilities.
- Construction notes which refer to general instructions of P2M2s application, shall be included in the LD-P2M2 plan or may written on a separate sheet.

GENERAL COVERAGE OF LAND DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LDP2M2) (cont)

(d) Method Statement

- In this context, Method Statement refers to **Environmental Method Statement** that details **what, where, who, why, when and how** the elements of environmental protection, P2M2s will be integrated and implemented into each of the land disturbing activities.

GENERAL COVERAGE OF LAND DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LDP2M2) (cont)

(d) Method Statement (cont)

- The land disturbing activities which progress in stages and sequences include but are not limited to:
 - Site land clearing
 - Excavation of cuttings
 - Forming of embankments and fills
 - Excavation of foundation pits, trenches and tunnels or viaduct
 - Stream or river diversion
 - Stream or river crossing
 - In-stream works
 - Drilling of the borehole

GENERAL COVERAGE OF LAND DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LDP2M2) (cont)

(d) Method Statement – Example:

Work description of how the work will be undertaken:

Bridge Foundation:

*Using the **bored piling** method. In general bored piles offer the most economical foundation as they can be constructed in a wide choice of diameters, typically ranging from 300mm to 1800mm, and to depths of up to 70m.*

*Assuming a bored pile diameter of **1500mm** with a depth of **30m**, an estimated **53m³** ($V=\pi r^2 h$) of excavated soil will be displaced from the bored location. This translates to about **20** nos. of **10** tons lorries to be used for transporting out these materials. (A **pier** may consume the construction of **4** to **10** bored piles: **212 mt** with some moisture content).*

BRIDGE CROSSING



02/12/2015 18:29

BORED HOLE

Slurry sediment

02/12/2015 18:33



BORED HOLE

Slurry sediment

02/12/2015 18:28



BORED HOLE



Borehole protected

02/12/2015 18:34

Casing



27.04.2017

Concrete



27.04.2017



AM 11:33 27/APR/2017



AM11:32 27/APR/2017



AM 9:07 27/APR/2017



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Discharge

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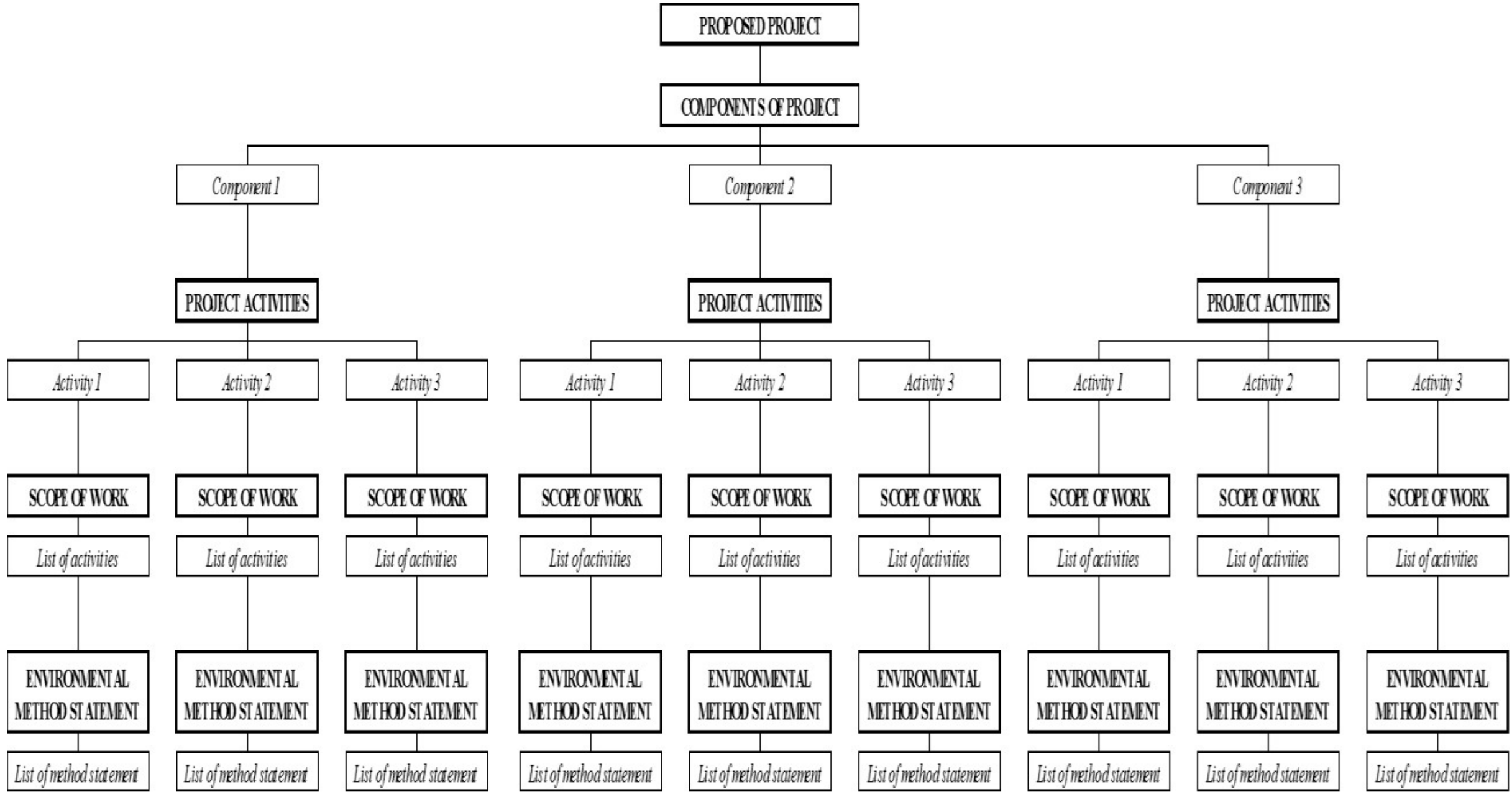




- For LD-P2M2 to become effective, it is imperative that the preparer or user of the LD-P2M2 Document has some basic knowledge in identifying the *WORK BREAKDOWN STRUCTURES* of some of the key project components.

Phases in a Project

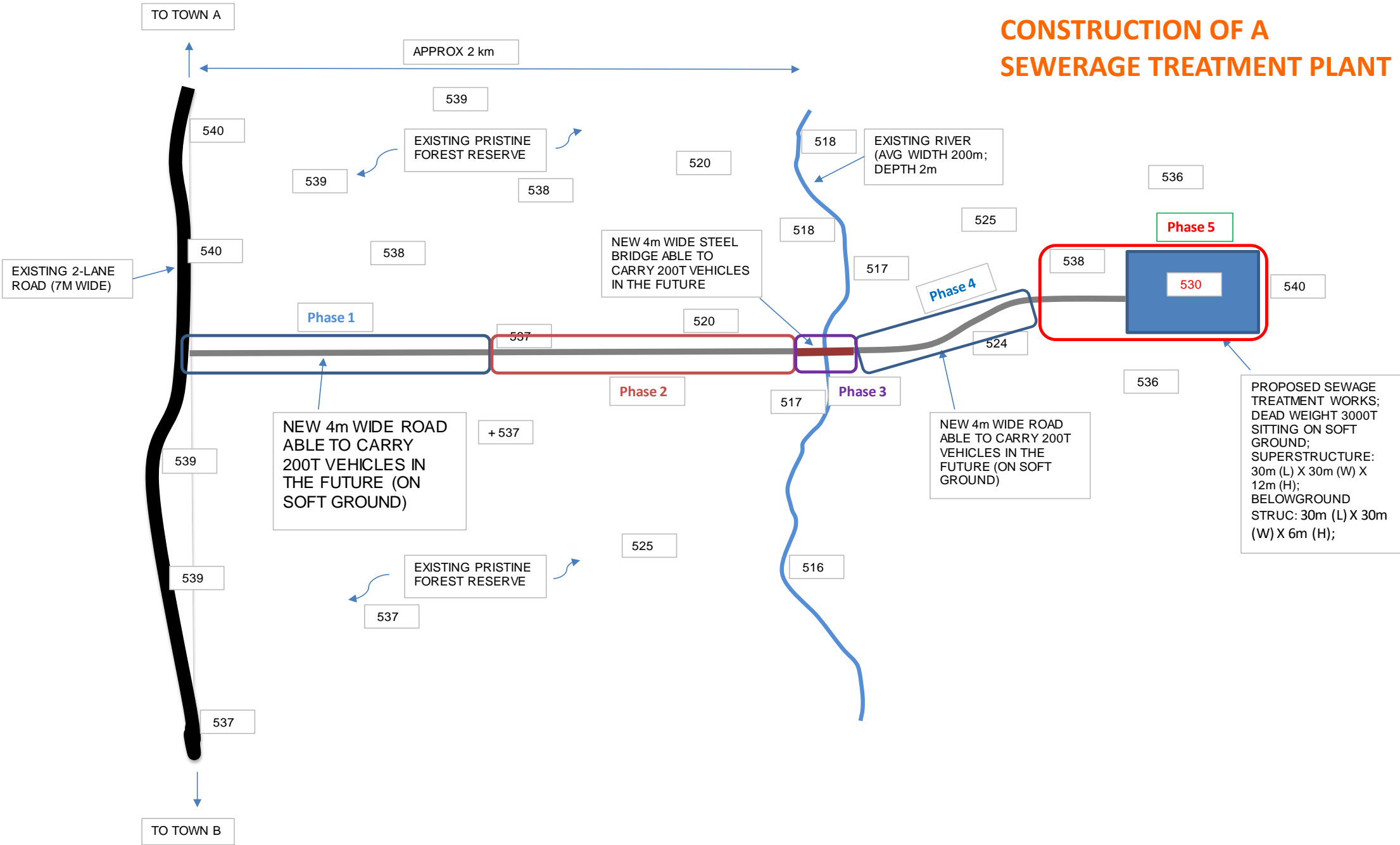
An illustration of a work breakdown structure pertaining to erosion and sediment control....



Phases in a Project

An example of looking at a work breakdown structure of a civil engineering project to address erosion and sediment control....

CONSTRUCTION OF A SEWERAGE TREATMENT PLANT



PROJECT TITLE: PROPOSED SEWAGE TREATMENT WORKS (STW) ADJACENT TO FOREST RESERVE

COMPONENTS OF PROJECT

ROAD

BRIDGE

BUILDING SITE

PROJECT ACTIVITIES

PROJECT ACTIVITIES

PROJECT ACTIVITIES

SITE CLEARANCE

SITE GRADING

DRAINAGE

SITE CLEARANCE

BOREHOLE DRILLING

ELEVATED STRUCTURES

SITE CLEARANCE

EXCAVATION

CONCRETING

Scope of work

Undertake survey
Mark site boundary
Identify interfaces
Identify clearance extent
Clearing works

Scope of work

Undertake survey
Mark surface elevation
Mark work/buffer zones
Grading works

Scope of work

Identify flowpath
Mark work/buffer zones
Mark storage zones
Excavate trench
Drainage works

Scope of work

Undertake survey
Mark site boundary
Identify interfaces
Identify clearance extent
Clearing works

Scope of work

Mark work zones
Mark storage zones
Drilling works
Export excavated soil

Scope of work

Formwork
Steelwork
Concrete pour
Remove formwork

Scope of work

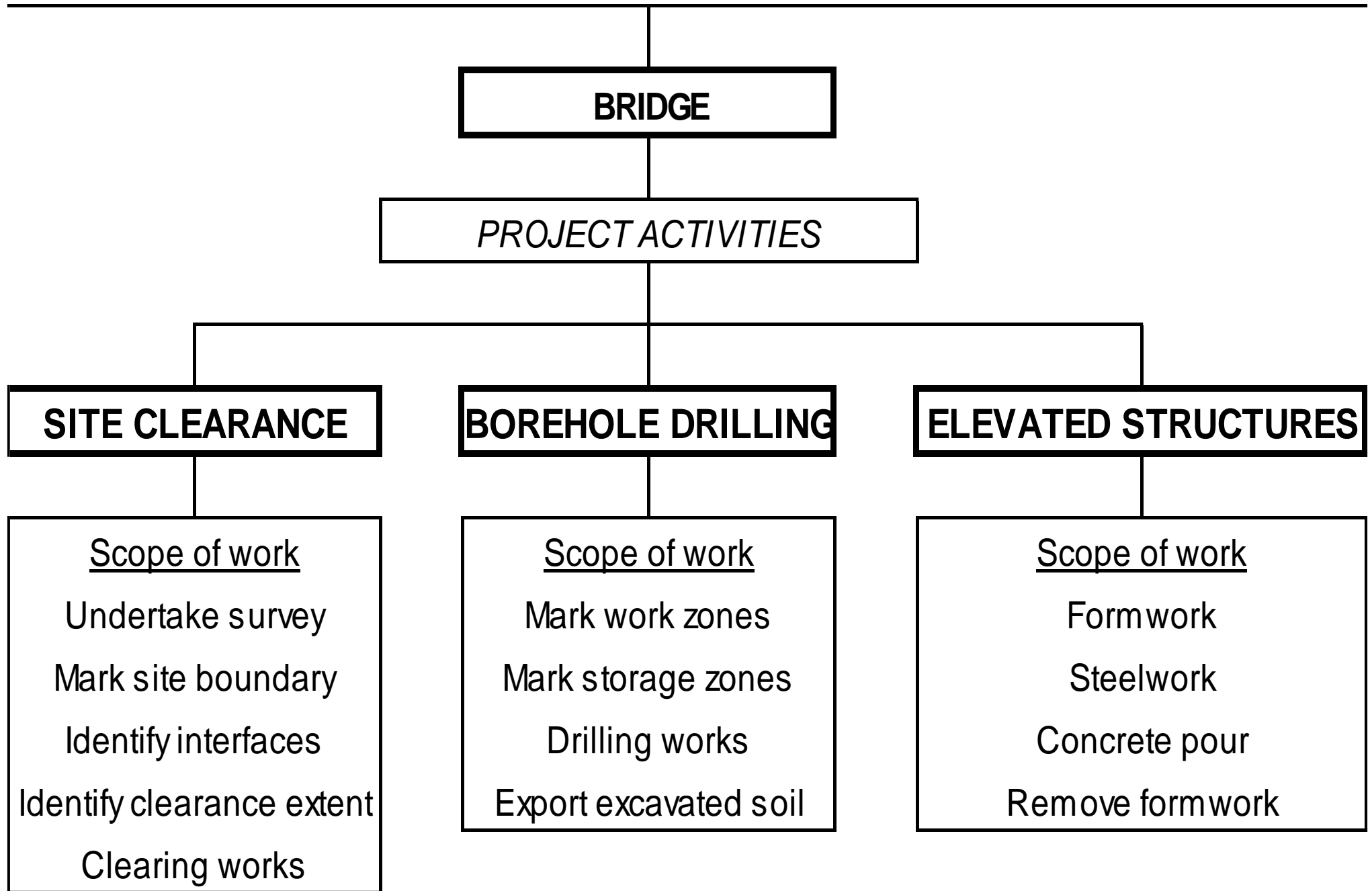
Undertake survey
Mark site boundary
Identify interfaces
Identify clearance extent
Clearing works

Scope of work

Mark work zones
Mark buffer zones
Mark storage zones
Excavate foundation
Export excavated soil

Scope of work

Formwork
Steelwork
Concrete pour
Remove formwork



BRIDGE

PROJECT ACTIVITIES

SITE CLEARANCE

Scope of work
Undertake survey
Mark site boundary
Identify interfaces
Identify clearance extent
Clearing works

ENVIRONMENTAL METHOD STATEMENTS

SITE CLEARANCE

- A. Identify sensitive receivers
- B. Identify/mark perimeter controls
- C. Identify/mark environmental buffer zones
- D. Identify limits of works, 100m clearance
- E. Identify stockpile locations
- F. Mark BMPs on drawings:
 - Perimeter drainage along site boundary
 - Boundary for environmental buffer zones
 - Location of silt fences
 - Indicate limits of works
 - Indicate type/extent of erosion controls
 - Mark temporary drainage
 - Indicate silt traps location
- G. Add Construction Notes

BOREHOLE DRILLING

Scope of work
Mark work zones
Mark storage zones
Drilling works
Export excavated soil

ENVIRONMENTAL METHOD STATEMENTS

BOREHOLE DRILLING

- A. Identify dewatering discharge location
- B. Identify/mark perimeter controls
- C. Identify/mark environmental buffer zones
- D. Identify limits of works, 100m clearance
- E. Identify stockpile locations
- F. Mark BMPs on drawings:
 - Boundary for environmental buffer zones
 - Location of silt fences
 - Location of sediment pond location
 - Indicate limits of works
 - Indicate type/extent of erosion controls
- G. Add Construction Notes

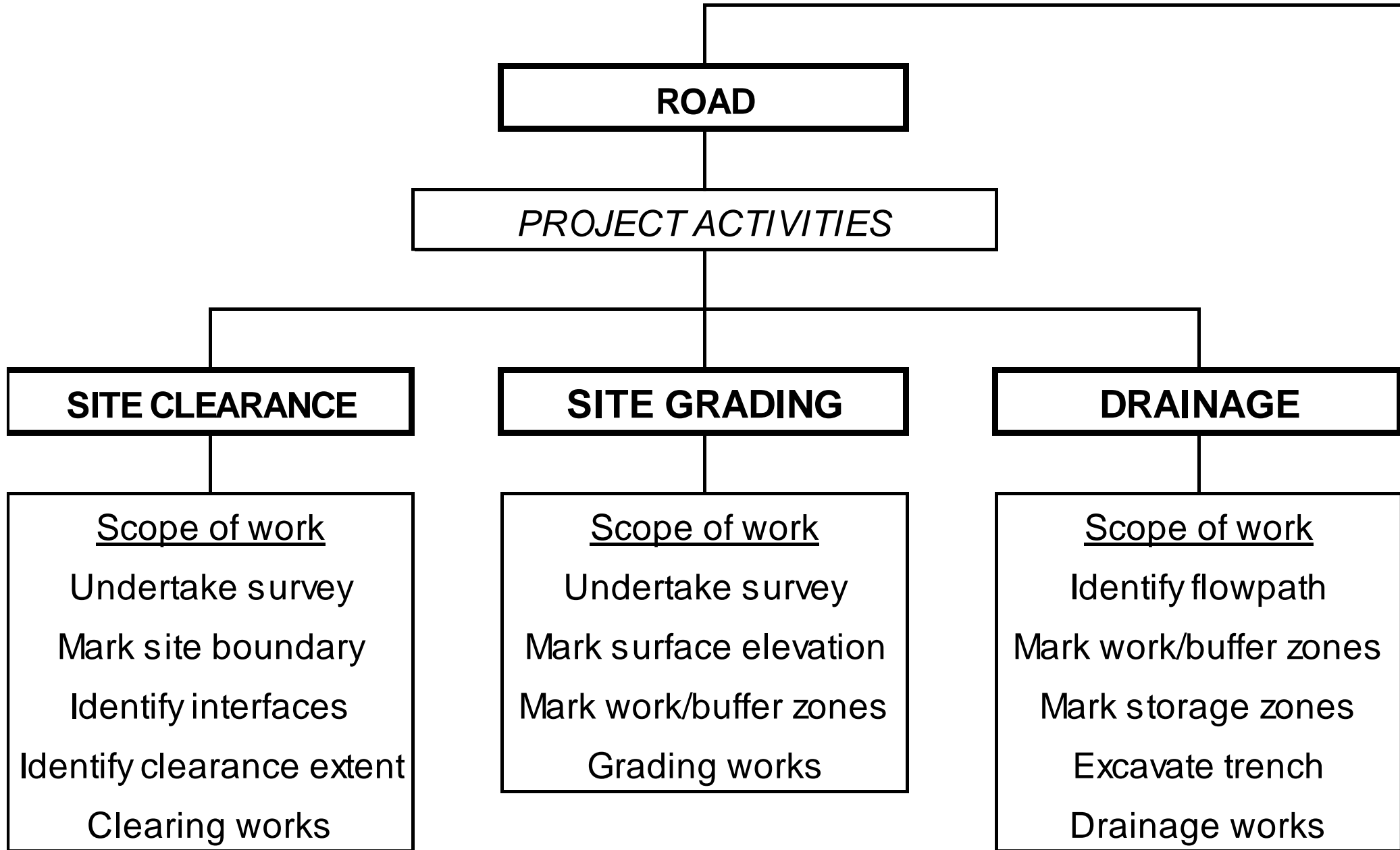
ELEVATED STRUCTURES

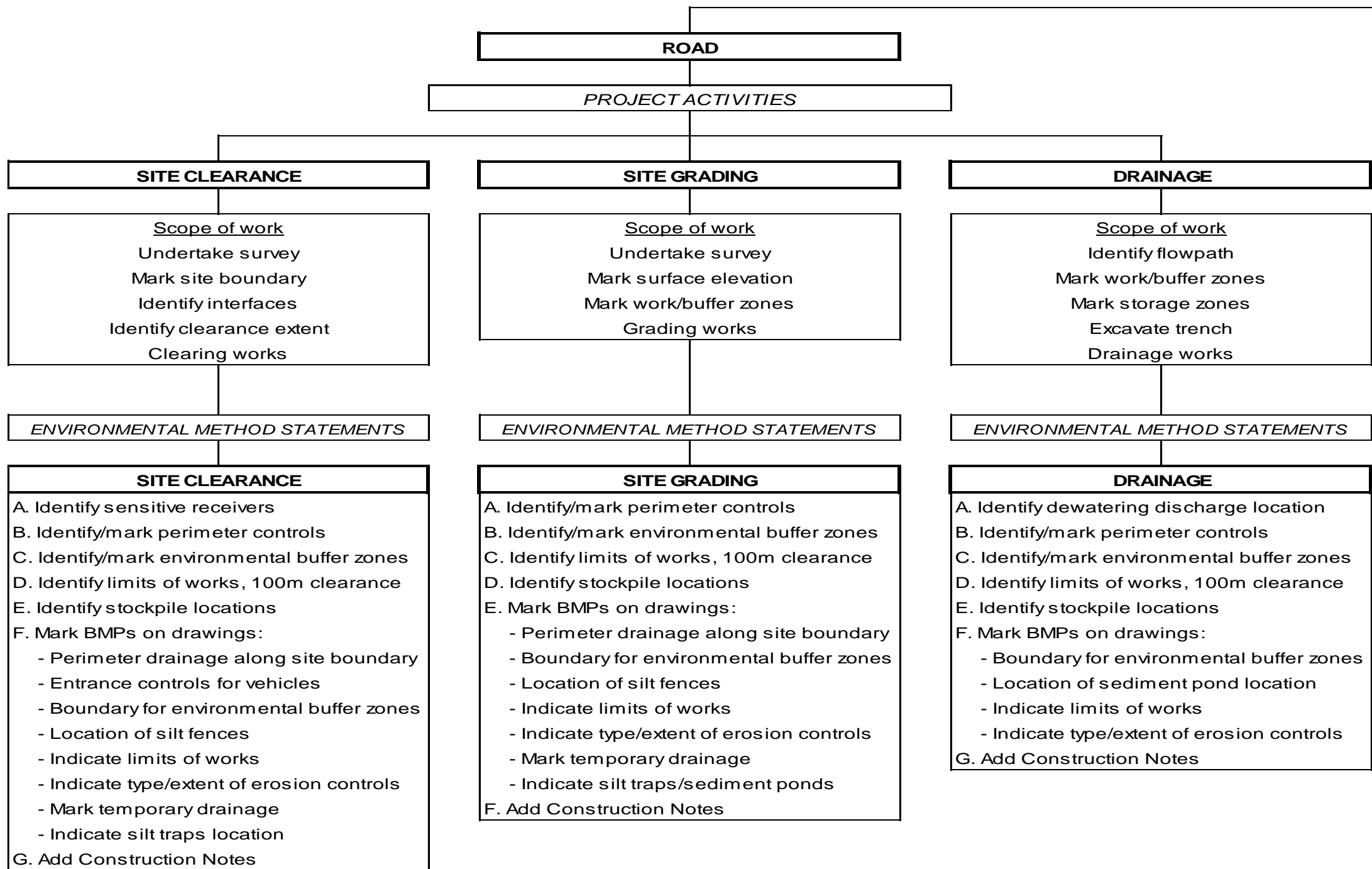
Scope of work
Formwork
Steelwork
Concrete pour
Remove formwork

ENVIRONMENTAL METHOD STATEMENTS

ELEVATED STRUCTURES

- A. Identify limits of works, 100m clearance
- B. Identify stockpile locations
- C. Mark BMPs on drawings:
 - Perimeter drainage along site boundary
 - Location of silt fences
 - Indicate limits of works
 - Indicate stockpile location
 - Mark temporary drainage
 - Indicate silt traps location
- D. Add Construction Notes





ROAD

PROJECT ACTIVITIES

SITE CLEARANCE

Scope of work
 Undertake survey
 Mark site boundary
 Identify interfaces
 Identify clearance extent
 Clearing works

ENVIRONMENTAL METHOD STATEMENTS

SITE CLEARANCE

- A. Identify sensitive receivers
- B. Identify/mark perimeter controls
- C. Identify/mark environmental buffer zones
- D. Identify limits of works, 100m clearance
- E. Identify stockpile locations
- F. Mark BMPs on drawings:
 - Perimeter drainage along site boundary
 - Entrance controls for vehicles
 - Boundary for environmental buffer zones
 - Location of silt fences
 - Indicate limits of works
 - Indicate type/extent of erosion controls
 - Mark temporary drainage
 - Indicate silt traps location
- G. Add Construction Notes

SITE GRADING

Scope of work
 Undertake survey
 Mark surface elevation
 Mark work/buffer zones
 Grading works

ENVIRONMENTAL METHOD STATEMENTS

SITE GRADING

- A. Identify/mark perimeter controls
- B. Identify/mark environmental buffer zones
- C. Identify limits of works, 100m clearance
- D. Identify stockpile locations
- E. Mark BMPs on drawings:
 - Perimeter drainage along site boundary
 - Boundary for environmental buffer zones
 - Location of silt fences
 - Indicate limits of works
 - Indicate type/extent of erosion controls
 - Mark temporary drainage
 - Indicate silt traps/sediment ponds
- F. Add Construction Notes

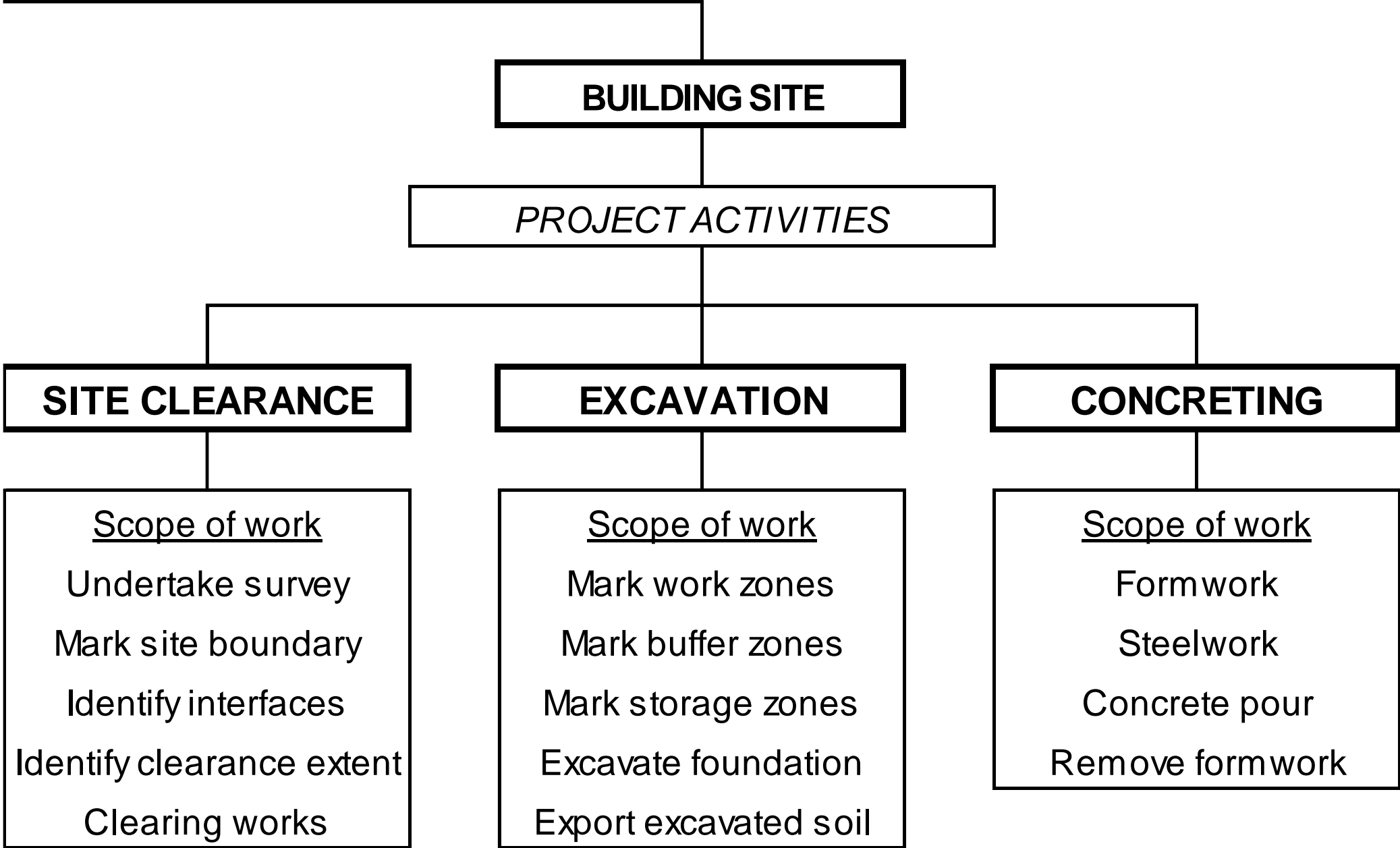
DRAINAGE

Scope of work
 Identify flowpath
 Mark work/buffer zones
 Mark storage zones
 Excavate trench
 Drainage works

ENVIRONMENTAL METHOD STATEMENTS

DRAINAGE

- A. Identify dewatering discharge location
- B. Identify/mark perimeter controls
- C. Identify/mark environmental buffer zones
- D. Identify limits of works, 100m clearance
- E. Identify stockpile locations
- F. Mark BMPs on drawings:
 - Boundary for environmental buffer zones
 - Location of sediment pond location
 - Indicate limits of works
 - Indicate type/extent of erosion controls
- G. Add Construction Notes



BUILDING SITE

PROJECT ACTIVITIES

SITE CLEARANCE

Scope of work
Undertake survey
Mark site boundary
Identify interfaces
Identify clearance extent
Clearing works

ENVIRONMENTAL METHOD STATEMENTS

SITE CLEARANCE

- A. Identify sensitive receivers
- B. Identify/mark perimeter controls
- C. Identify/mark environmental buffer zones
- D. Identify limits of works, 100m clearance
- E. Identify stockpile locations
- F. Mark BMPs on drawings:
 - Perimeter drainage along site boundary
 - Boundary for environmental buffer zones
 - Location of silt fences
 - Indicate limits of works
 - Indicate type/extent of erosion controls
 - Mark temporary drainage
 - Indicate silt traps location
- G. Add Construction Notes

EXCAVATION

Scope of work
Mark work zones
Mark buffer zones
Mark storage zones
Excavate foundation
Export excavated soil

ENVIRONMENTAL METHOD STATEMENTS

EXCAVATION

- A. Identify dewatering discharge location
- B. Identify/mark perimeter controls
- C. Identify/mark environmental buffer zones
- D. Identify limits of works, 100m clearance
- E. Identify stockpile locations
- F. Mark BMPs on drawings:
 - Boundary for environmental buffer zones
 - Location of silt fences
 - Location of sediment pond location
 - Indicate limits of works
 - Indicate type/extent of erosion controls
- G. Add Construction Notes

CONCRETING

Scope of work
Formwork
Steelwork
Concrete pour
Remove formwork

ENVIRONMENTAL METHOD STATEMENTS

CONCRETING

- A. Identify/mark perimeter controls
- B. Identify limits of works, 100m clearance
- C. Identify stockpile locations
- D. Mark BMPs on drawings:
 - Perimeter drainage along site boundary
 - Indicate sediment pond location
 - Indicate limits of works
 - Mark temporary drainage
 - Indicate type/extent of erosion controls
- E. Add Construction Notes

Project Sequence for Phase 1

Activities	Sequence of Work
<p><i>Activity 1: Site Clearance</i></p>	<ul style="list-style-type: none"> A. Establish entrance to site; construction access; construction routes, areas designated for equipment parking, and entrance controls for vehicles B. Undertake site survey to identify: <ul style="list-style-type: none"> ➤ Interfaces with existing facilities ➤ Environmental sensitive receivers ➤ Limits of works and site boundary C. Mark site boundary D. Install perimeter controls such as drainage E. Mark environmental buffer zones F. Mark clearance extent & limits of works G. Install silt fences H. Install silt traps / sediment basin I. Identify and allocate stockpile & disposal areas for biomass J. Commence site clearing works K. Inspection & maintenance of silt fences / silt traps / sediment basin

***Activity 2: Site
Grading***

- A. Retake site survey to identify
 - Environmental buffer zones
 - Limits of works
 - Marking of surface elevations
- Mark/remark site boundary
- Install new or upgrade perimeter controls including drainage
- Mark environmental buffer zones
- Install silt fences
- Install silt traps / sediment basin
- Identify and allocate stockpile & disposal areas for biomass
- Commence site grading works
- Inspection & maintenance of silt fences / silt traps / sediment basin

***Activity 3: Road &
Drainage works***

- A. Mark work limits and buffer zones
- B. Survey and mark flow paths
- C. Identify and mark perimeter controls
- D. Mark environmental buffer zones
- E. Allocate stockpile locations
- F. Identify dewatering discharge location and treatment facilities
- G. Install new or upgrade sediment pond
- H. Excavate trench for permanent drainage
- I. Laying or permanent drainage works and roadworks

TRANSITION

8.0: LD-P2M2 SUBMISSION CHECKLIST

INSTRUCTIONS

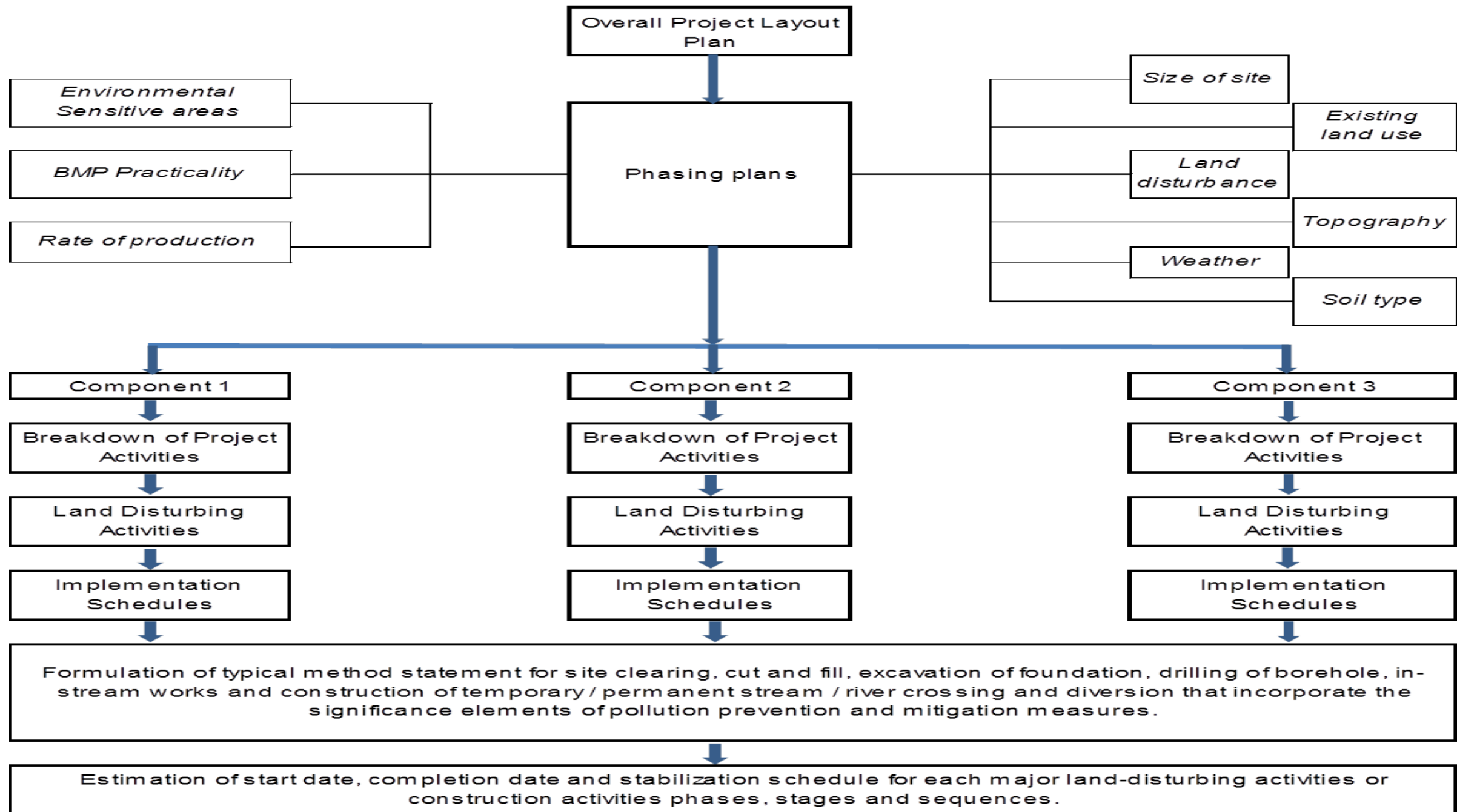
- All relevant items cited in Section 8.1, 8.2, 8.3 and 8.4 checklist are required to be identified, addressed, discussed, assessed, evaluated and presented in the LD-P2M2 document according to appropriate chapters.
- All relevant items cited in Section 8.3 and 8.4 checklist are required to be illustrated or depicted in a minimum of three (3) sheets of plan or map or drawing to be referred to as LD-P2M2 Plan which contains the following:
 - Map of site plan with the existing site conditions (pre-development),
 - Map of site development plan (during development) and
 - Overlaid map of (a) and (b).
- Maps shall be clear and legible where they may be provided with more than one sheet to commensurate with the size and complexity of the drainage areas as well as the terrain of the project site.
- The LD-P2M2 document shall include a legal pledge by the Project Proponent (PP) to comply with the Minimum Standards requirement of P2M2s as outlined in Section 7 of this Guidance Document (PP).

8.0: LD-P2M2 SUBMISSION CHECKLIST

8.1. Project Activity and Implementation:

- ❖ Phasing plan if relevant
- ❖ Project implementation schedule
- ❖ Description of the construction activity
- ❖ Construction schedule for each major land disturbance complete with timeline or chart for the installations of P2M2s
- ❖ Typical method statement for site clearing, cut and fill, excavation of foundation, drilling of borehole, and construction of temporary / permanent stream / river crossing and diversion that incorporate the significance elements of pollution prevention and mitigation measures.
- ❖ Estimated start date, completion date and stabilization schedule for each major land-disturbing activities or construction activities phases, stages and sequences.

PROJECT ACTIVITY AND IMPLEMENTATION



8.0: LD-P2M2 SUBMISSION CHECKLIST

8.2. Information and Analysis on Project Development

These information and analysis shall contain the following:

- a. Weather and rainfall data
- b. Site runoff velocity and flow rate, both pre and during development
- c. Description of site soil characteristics
 - i. Soil types
 - ii. Soil test erodibility
 - iii. Soil hydrologic group
 - iv. **Dispersible fine clay: Percentage of dispersible material**
 - v. **Anticipated excavation depth** for the proposed land disturbing activity
- d. Description of adjacent areas, such as streams, lakes, residential areas, and roads that might be affected by the land disturbance.

Chapter 12 MSMA: 12.4.4 Sediment Control BMPs

12.4.4.3 Sediment Traps

(a) Description

A **sediment trap** is a small temporary ponding area, usually with a gravel outlet, formed by excavation and construction of an earthen embankment (Figure 12.14). The purpose of the trap is to detain runoff from disturbed areas for a long enough period of time to allow majority of the coarser suspended soil particles in the runoff to settle out. It is intended for use on small catchments (2 ha) areas with no complex drainage features, where construction will be completed in a reasonably short period of time.

This practice is one of the most efficient and cost effective methods of sediment control. When possible, sediment traps should be constructed as a first step in any land-disturbing activity. Sediment trap should never be location on-stream. In areas near to public, safety fence should be provided.

It should be noted that since sediment traps are only effective in trapping coarse sediment, **a chemical binder or coagulant may be required for fine particle trapping**. The sediment trap requires monitoring during each storm event. It **should drain within 36 hours after a storm event**, failing which, **mechanical dewatering is required**. Regular maintenance should include sediment removal (after sediment is 300 mm thick), as well as structural and outlet protection inspection.

Chapter 12 MSMA: 12.4.4 Sediment Control BMPs

12.4.4.4 Sediment Basins

(a) Description

A **sediment basin** (Figure 12.15) typically consists of an impoundment, a dam, a riser pipe outlet, and an emergency spillway. It functions in the same way as a sediment trap but caters to a larger catchment. The basin is a temporary measure (with a design life of 12 to 18 months) and is to be maintained until the site area is permanently protected against erosion or a permanent detention basin or water quality control structure is constructed.

Sediment basins are suitable for nearly all types of construction projects. Wherever possible, they should be constructed before land clearing and grading work begins. **The type of basin is to be determined using Table 12.16 below.** The basin must not be located in a stream or natural waterway but should be located to trap sediment-laden runoff before it enters any stream. It is a common and encouraged practice to locate this structure at the location where permanent stormwater BMPs (mostly ponds) will be located. Like a sediment trap, sediment basin may pose a safety hazard and should be properly fenced if required by the local regulatory authority. Large sediment basins (dams higher than 3 m) shall be subject to Federal and/or State dam safety criteria.

Maintenance of sediment basins is similar to sediment trap maintenance. Removal of accumulated sediment should be carried out once the sediment storage zone is full. **The basin must be able to drain in 36 hours of a rain event, failing which, mechanical dewatering is required.**

Regular inspections are to be carried out to ensure structural stability and functionality of the inlet, outlet and outlet protection works. If the basin is located at the final discharge point from site, periodic water quality samples shall be collected and tested for total suspended solids (TSS) and turbidity to comply with DOE water quality regulations.

Chapter 12 MSMA: 12.4.4 Sediment Control BMPs

12.4.4.4 Sediment Basins

Table 12.16: Sediment Basin Types and Design Considerations

Category	Soil Description	Hydrological Soil Group	Basin Type	Design Considerations
I	Coarse-grained sand, sandy loam: less than 33% <0.02 mm	A	Dry	Settling velocity, sediment storage
II	Fine-grained loam, clay: more than 33% < 0.02 mm	B	Wet	Storm impoundment, sediment storage
III	Dispersible fine-grained clays: more than 10% of dispersible material	C, D	Wet	Storm impoundment, sediment storage, assisted flocculation

OTHER ASSESSMENT FACTORS OR CRITERIA MAY BE USED TO JUSTIFY THE APPLICATION OF FLOCCULANTS :

1) LIMITED SPACE CHALLENGES:

- Sediment ponds has limited capacity
- Treatment facilities lack space, emergency discharge

2) POLLUTANT CHALLENGES:

- Suspended Organic solids
- Suspended solids that stays colloidal for long time
fine clays, silts, bentonites w/high ionic charge

3) VOLUME CHALLENGES w/LIMITED TIME

High flow volume w/insufficient settling time

Bil.	Texture Layer	Soil Layer Depth (m)
1.	a (Surface soil)	0.00 – 0.50
2.	b (Subsoil)	0.51 – 1.00
3.	c (Substratum)	1.01 – 1.50

Bil.	Series	Layers	K Factor	Texture	HSG
1	Akob	A	0.053	clay	D
		B	0.050	clay	D
		C	0.050	clay	D
2	Apek	A	0.045	clay loam	C
		B	0.055	clay loam	C
		C	0.062	clay	D
3	Batu Anam	A	0.056	clay	D
		B	0.057	clay	D
		C	0.051	clay	D
4	Batu Hitam	A	0.060	clay	D
		B	0.063	clay	D
		C	0.063	clay	D
5	Batu Iapan	A	0.045	clay loam	C
		B	0.049	clay loam	C
		C	0.060	clay	D
6	Bukit Temiang	A	0.029	sandy clay loam	C
		B	0.038	sandy clay	C-D
		C	0.035	sandy clay loam	C
7	Beriah	A	0.053	clay	D
		B	0.057	clay	D
		C	0.057	clay	D
8	Bungor	A	0.036	sandy clay loam	C
		B	0.053	clay	D
		C	0.054	clay	D

Bil.	Series	Layers	K Factor	Texture	HSG
9	Clay Over Organic	A	0.048	clay	D
		B	0.048	clay	D
		C	0.048	clay	D
10	Chat	A	0.048	clay	D
		B	0.048	clay	D
		C	0.048	clay	D
11	Chempaka	A	0.049	clay loam	C
		B	0.049	clay loam	C
		C	0.045	clay loam	C
12	Chengai	A	0.049	clay	D
		B	0.050	clay	D
		C	0.050	clay	D
13	Chenian	A	0.056	clay	D
		B	0.058	clay	D
		C	0.060	clay	D
14	Durian	A	0.053	clay	D
		B	0.051	clay	D
		C	0.051	clay	D
15	Guar	A	0.052	clay	D
		B	0.052	clay	D
		C	0.053	clay	D
16	Halu	A	0.051	sandy clay loam	C
		B	0.058	sandy clay loam	C
		C	0.051	sandy clay loam	C

8.0: LD-P2M2 SUBMISSION CHECKLIST

8.2. Information and Analysis on Project Development (cont)

These information and analysis shall contain the following:

- e. List of streams and rivers identified on-site. (Use coding for unnamed streams and rivers)
- f. List of receiving streams and rivers. (Use coding for unnamed streams and rivers)
- g. List of existing drainage identified on-site
- h. List of P2M2s proposed. Please also make reference to P2M2s Description in [Appendix III](#).
- i. Identify access roads and other outsourced components (such as mobile batching or premix plant) that are located outside the proximity of the project boundary.
- j. Earthworks cut and fill volume
- k. Availability of rocks material
- l. Biomass management
- m. Solid (construction waste) and domestic waste management

8.0: LD-P2M2 SUBMISSION CHECKLIST

8.2. Information and Analysis on Project Development (cont)

These information and analysis shall contain the following:

- n. Spill Prevention and Control from fuel and chemical use or storage
- o. Hazardous Waste Management
- p. **Soil loss** prediction using the Universal Soil Loss Equation (USLE), **sediment yield** calculation using Modified Universal Soil Loss Equation (MUSLE) and **runoff** estimation for pre, during and post development accounted for both with and without the implementation of LD-P2M2. All of the data and parameters used in the calculations shall be measured or rationally determined, and identified. If secondary sources are used, they shall be clearly identified.
- q. Calculation of proposed sediment trap/basin based on drainage area disturbed and projected runoff flow direction from each disturbed land segment that will drain into the proposed sediment trap/basin.

8.0: LDP2M2 SUBMISSION CHECKLIST

8.3. Map of site plan with the existing site conditions (pre-development)

(I) Site map which refers to:

- a) Topography survey map showing:
 - i. Contours
 - ii. Elevation
 - iii. Slopes
- b) Geological Terrain Mapping (if relevant)
- c) Erosion risk map
- d) Drainage pattern showing:
 - i. Delineation of watercourses
 - ii. Delineation of natural drainage depression
 - iii. Flow path and direction for the different drainage areas
 - iv. Marks and labels of drainage area(s) or drainage divides

8.0: LDP2M2 SUBMISSION CHECKLIST

8.3. Map of site plan with the existing site conditions (pre-development)

(II) Land use showing:

- i. Trees
- ii. Vegetation area
- iii. Roads and infra-structures (inclusive of drainage system)
- iv. Buildings
- v. Utilities

8.0: LD-P2M2 SUBMISSION CHECKLIST

8.3. Map of site plan with the existing site conditions (pre-development)

(III) Adjacent within 150 metres from project site:

- i. Watercourses (Flowing into or from site)
 - ii. Roads and infra-structures (inclusive of drainage system)
 - iii. Buildings and utilities
 - iv. Vegetation area
- The map shall be prepared with the scale of 1:500 for areas of less than 20 hectares or 1: 1000 for areas of more than 20 hectares. All plans shall be in A3 or A1 size.

8.0: LDP2M2 SUBMISSION CHECKLIST

8.4. Map of site development plan

- This map shall illustrate the earthwork activities to be conducted according to project components and scope of works that shall be overlaid with the site plan above mentioned. Map shall be clear and legible where it may be provided with more than one sheets to commensurate with the size and complexity of the drainage areas as well as the terrain of the project site.
- The map shall include the following:

8.0: LDP2M2 SUBMISSION CHECKLIST

8.4. Map of site development plan (cont)

- a. Depict the existing contour and proposed level
- b. Indicate the total site area
- c. Indicate the total disturbance area with line showing the area to be disturbed
- d. Show the cut and fill area
- e. Show the direction of the proposed earthwork movement
- f. Mark the limit of disturbance of each of the phase construction
- g. Identify and mark the temporary or permanent stream or river crossing
- h. Identify and mark the temporary or permanent stream or river diversion
- i. Identify and mark on-site temporary access or construction or haul road
- j. Identify and mark site office area
- k. Identify and mark stockpile areas
- l. Identify and mark temporary preservation of existing vegetation
- m. Identify and mark permanent preservation of existing vegetation
- n. Identify and mark material staging area or equipment storage area
- o. Identify and mark workshop/maintenance or engineering work area
- p. Identify and mark generators set and/or motorized equipment area

8.0: LDP2M2 SUBMISSION CHECKLIST

8.4. Map of site development plan (cont)

- q. Identify and mark Vehicle and Equipment Washing Facility
- r. Identify and mark petroleum-based material/refueling, chemicals and skid tank area
- s. Identify and mark schedule waste storage area
- t. Identify and mark workers camp location
- u. Identify and mark sanitary facilities location
- v. Identify and mark batching plant location
- w. Identify and mark concrete wash P2M2 location
- x. Identify and mark spoil (unsuitable material) area or disposal area
- y. Identify and mark borrow area
- z. Identify and mark the location(s) of all proposed P2M2s application
- aa. Identify and mark all of the designated point(s) of water discharge and also any other potential point(s) of water discharge to off-site drainage ways.
- bb. Provide the GPS location (WGS 84) of the construction ingress/egress and all designated point(s) of water discharge for the site.
- cc. Use map scale and size of:
 - 1:500 for area less than 20 hectares;
 - 1: 1000 for area more than 20 hectares
 - Size: A3 or A1

8.0: LDP2M2 SUBMISSION CHECKLIST

8.5. Minimum Standards of Pollution Prevention and Mitigation Measures (P2M2s)

- Project Proponent (PP) shall **attach or insert** the Minimum Standards of P2M2s outlined in Section 7 of this Guidance Document to the LD-P2M2 Document.

TRANSITION

MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

PP shall **comply the minimum standards requirements** outlined in the section 7.0 of this guidance document.

PP shall **attach or insert** these minimum standards requirements in the LD-P2M2 document.

PP shall adopt, apply and implement as the minimum P2M2s wherever necessary throughout the process of carrying out land disturbing activities at the development site.

- The term “**standard requirements**” here refer to the physical or non-physical measures to be taken to prevent, reduce and control the discharge of suspended solids and other pollutants from the development site. The standard requirements are meant to achieve a certain quality or attainment.

7.0 MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

7.1 Pollution Prevention and Mitigation Measures (P2M2s)

- a. Schedule of Phasing, Staging and Sequencing**
- b. Scheduled Site Meeting**
- c. Construction Markers**
- d. Stabilized Construction Entrance**
- e. Stream/drainage way/waterway/watercourse buffers**
- f. Perimeter Control**
- g. Sediment Basin/Trap**
- h. Runoff Management**
- i. Temporary or permanent watercourse diversion**
- j. Temporary or permanent watercourse crossing**
- k. Temporary or permanent roadways**
- l. Temporary Stabilization**
- m. Stockpile Soil Management**
- n. Spoil Management Area (Disposal Area)**
- o. Dewatering practices**
- p. Active Treatment System (ATS)**
- q. Discharge**
- r. Corrective Actions**
- s. Site Inspections**
- t. Maintenance**
- u. Standards and Specifications for P2M2s**

7.2 Self-Regulation

- a. Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation**

**MINIMUM STANDARDS
REQUIREMENTS OF
POLLUTION
PREVENTION AND
MITIGATION MEASURES**

**7.1: Pollution
Prevention and
Mitigation Measures
(P2M2s)**

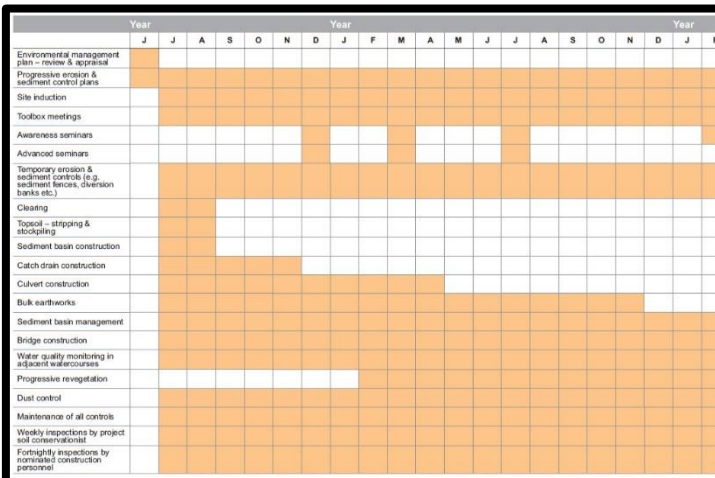
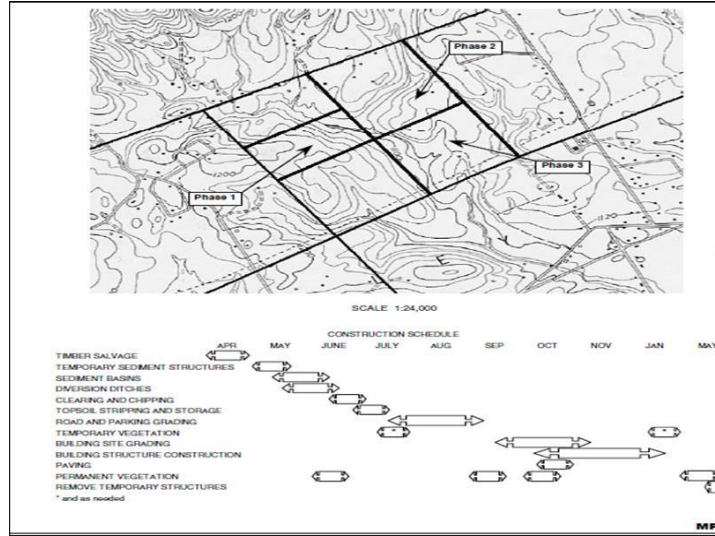
- The Project Proponent shall ensure that:
- All relevant parties including project consultant, contractors, and Environmental Officer (EO) understand LD-P2M2 in order to facilitate compliance with the minimum standards requirements.
- All relevant pollution prevention and mitigation measures (P2M2s) especially temporary BMPs at the constructional phase are installed and maintained to mitigate the potential pollution due to land disturbing activities.

MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(a) Schedule of Phasing, Staging and Sequencing

A project schedule shall be prepared in advance to ensure the jobs involved in project implementation are properly scheduled in order to effectively address and manage the environmental pollution. The schedule shall include the following:

- i. **Project construction scheduling** for all major land-disturbing activities which include work zone(s), phasing of construction within the work zone(s), staging and sequencing within the phases of construction that coincides with the installation of P2M2s.
- ii. **Critical Path Method (CPM)** may be adopted in establishing work program that shall fit in the elements of pollution prevention and mitigation measures for each phase, stage and sequence of project development.

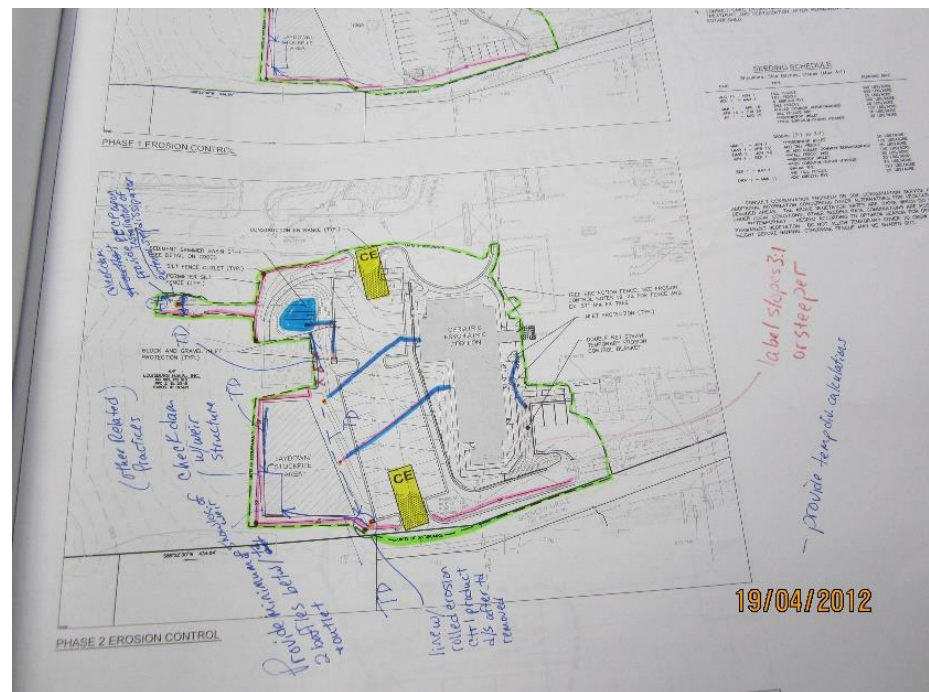


Task Name	Baseline Start	Baseline Finish	Baseline Duration
TMS Report 5	30 May '16	06 Jun '16	6 d
TMS Report 6	30 Aug '16	06 Sep '16	6 d
TMS Report 7	30 Nov '16	06 Dec '16	6 d
TMS Report 8	28 Feb '17	06 Mar '17	6 d
TMS Report 9	30 May '17	06 Jun '17	6 d
TMS Report 10	30 Aug '17	07 Sep '17	6 d
TMS Report 11	30 Nov '17	07 Dec '17	6 d
TMS Report 12	28 Feb '18	06 Mar '18	6 d
10.0 ENVIRONMENTAL PROTECTION WORKS	01 Apr '15	03 Mar '18	865 d
10.2 EMP	01 Apr '15	28 Feb '18	862 d
Prepare, submit & Approval of EMP	22 May '15	26 Jun '15	30 d
Env Officer (E.O)	01 Apr '15	28 Feb '18	862 d
10.3 AIR QUALITY CONTROL	01 Apr '15	28 Feb '18	862 d
Water Browser - 2 nos	01 Apr '15	28 Feb '18	862 d
Tyre Washing Facilities - 2 nos	01 Apr '15	28 Feb '18	862 d
10.4 WATER QUALITY CONTROL	16 Jul '15	18 Sep '17	643 d
Maintenance of Silt Fence	16 Jul '15	18 Sep '17	643 d
maintenance of Silt Trap	17 Aug '15	18 Sep '17	618 d
10.5 EROSION CONTROL	30 Mar '16	12 Jan '17	231 d
10.5.1 Gabion Protection	30 Mar '16	26 May '16	48 d
10.5.2 Drain Check Dam - Sand bag & Rock check Dam	30 Mar '16	26 May '16	48 d
10 kg Sand bag with Geotextile filter	30 Mar '16	26 May '16	48 d
Rock check Dam	30 Mar '16	26 May '16	48 d
10.5.3 Temporary Slope Drain	16 May '16	12 Jan '17	192 d
Temporary Slope Drain	16 May '16	18 Jul '16	48 d
Rip Rap Stone outlet & Remover	19 Jul '16	14 Sep '16	48 d
Tapered Inlet	15 Sep '16	14 Nov '16	48 d
Plastic Mat or Blanket	15 Nov '16	12 Jan '17	48 d
10.6 CONTROL OF FUEL	11 Aug '15	22 Aug '15	10 d
10.6.1 Skid Tank - Concrete base	11 Aug '15	22 Aug '15	10 d
10.6.1 Waste storage shed	11 Aug '15	19 Aug '15	7 d
10.7 ENVIRONMENTAL MONITORING	01 Apr '15	28 Feb '18	862 d
Air Quality Monitoring	01 Apr '15	28 Feb '18	862 d
Noise Quality Monitoring	01 Apr '15	28 Feb '18	862 d
Water Quality Monitoring	01 Apr '15	28 Feb '18	862 d
10.8 ENVIRONMENTAL REPORT	01 Apr '15	28 Feb '18	862 d
Env Report	01 Apr '15	28 Feb '18	862 d
10.9 ENVIRONMENTAL AUDIT	14 May '15	03 Mar '18	830 d

MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(b) Scheduled Site Meeting

- i. Conduct site meeting prior to start of any construction activity or land-disturbing activity to be attended by PP, project EO, project contractors and/or sub-contractors to discuss in detail all of the relevant scopes of work that have relevance to pollution prevention and mitigation measures.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(c) Construction Markers

- i. Physically mark on site to show the limit of the following:-
 - Land disturbing from any drainage way or waterway or watercourse within project site;
 - Areas not to be worked or disturbed, and
 - Buffer area or/and existing vegetation meant for temporary or permanent preservation and for protection.
- ii. The construction markers are fences, signs, tapes, flags or other similar marking device.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(d) Stabilized Construction Entrance

- i. All entrance/exit roads to the site shall be stabilized and paved for a suitable distance from where these access roads join the existing paved roads or public road where **Stabilized Construction Entrance P2M2** and/or **Tires Washing Facility** shall be constructed from this point inward to the subjected construction site.
- ii. Any swept soil or sediment accumulated on pavement or other impervious surfaces from within Stabilized Construction Entrance P2M2 and sediment-laden washed water from Tires Washing Facility are not allowed to be **hosed down** and **discharged** respectively into any off-site drainage way, storm drain inlet or watercourse unless connected to a **sediment basin or sediment trap**.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(e) Stream/drainage way/waterway/watercourse buffers

- i. Retain a 20 metres natural buffer between on-site land disturbance and any watercourse (intermittent or permanent) unless otherwise specified by the relevant authority; or
- ii. Provide vegetated buffer that is less than 20 metres between on-site land disturbance and any watercourse (intermittent or permanent) in combination with additional erosion and sediment controls;
- iii. If not feasible to provide natural or vegetated buffer of any size between on-site land disturbance and any watercourse (intermittent or permanent), install suitable erosion and sediment controls in combination with all possible perimeter controls.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(f) Perimeter Control

- i. Before land-disturbing activities are executed, perimeter control shall be first constructed and made operational. The perimeter control shall include but is not limited to filter or perimeter berms, silt fences, sediment traps, sediment basins, construction entrance, temporary diversion dikes or earth bunds and diversion drains that control discharges from the site.

(Notes: A certain amount of initial land disturbance may be required to provide access for equipment to install the perimeter controls, but site clearing and grading should be kept to a minimum until the perimeter controls are in place).



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(g) Sediment Basin/Trap

- i. Before land-disturbing activities are executed, principal sediment basin/trap shall be first constructed and made operational. Any constructed sediment basin/trap shall install vertical **silt marker** for the purpose of measuring the depth of accumulated sediment to facilitate maintenance program.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(h) Runoff Management

- i. Before land-disturbing activities are executed, key runoff control measures shall be first constructed and made operational. The runoff control measures shall include but is not limited to temporary earth drain, diversion channel and conveyance system that control flows and discharges from and within the site and to be combined with installation of interval check dams along the channel to reduce the runoff velocity.
- ii. Slope drains, flexible pipe slope drains or downpipe, rock lined drainage chutes or flume, cascade drain shall be applied to convey upslope runoff down slope without affecting the slope surface.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(h) Runoff Management

- i. Before land-disturbing activities are executed, key runoff control measures shall be first constructed and made operational. The **runoff control measures** shall include but is not limited to **temporary earth drain, diversion channel and conveyance system** that control flows and discharges from and within the site and to be combined with installation of **interval check dams** along the channel to reduce the runoff velocity.
- ii. **Slope drains, flexible pipe slope drains or downpipe, rock lined drainage chutes or flume, cascade drain** shall be applied to convey upslope runoff down slope without affecting the slope surface.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(h) Runoff Management...cont;

- iii. In-slope or out-slope diversion runoff control P2M2s shall be applied in combination with **water bars** to divert runoff towards stabilized area or sediment treatment P2M2 prior to discharge.

- iv. Any incomplete permanent drainage lines constructed along sloping area, shall not be left unattended without first applying **rocks dissipater** at the end points or at the toe end of the incomplete adjoining conveyance structure. The anticipated runoff discharge from this point should be diverted using **temporary earth drain** combined with **check dam** towards **stabilized area** or into **sediment treatment P2M2s**. It is highly recommended that **pipe slope drains** are used to convey runoff directly into sediment containment system.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(i) Temporary or permanent watercourse diversion

- i. Temporary or permanent diversion channel of any watercourse or off-site run-on water shall be protected either by using rock lined channel bed with protected side slope using Turf Reinforcement Mat (TRM) or plastic sheeting or by installing plastic sheeting canvas along the channel with extend across the side slope in combination with constructed check dams or sump slot checks. This has to be done to minimize erosive forces flow velocity along the channel bed and channel side slope surface to prevent it from eroding.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(j) Temporary or permanent watercourse crossing

- i. Construction of culvert or bridge for any watercourse crossing, the surface of the filling material (if earth is used) on the inlet and outlet end of the culvert or abutment of the both sides of the bridge shall be covered with appropriate materials such as rocks, Rolled Erosion Control Products (RECPs) and plastic sheeting or turf.
- ii. The approach distance of 10 metres or any suitable distance from both sides of the watercourse crossing shall be installed with sediment fence or equivalent along the sides, together with gravels or stone pad and water bar to prevent sediment traction onto the crossing that may potentially enter the stream.



**MINIMUM STANDARDS REQUIREMENTS
OF POLLUTION
PREVENTION AND MITIGATION
MEASURES**

**(k) Temporary or permanent
roadways**

- i. Runoff conveyance system such as road ditch, temporary earth drain, catch drains, berm drains, toe drains, slope drains and in-slope or out-slope diversion shall be constructed and conveyed runoff to stabilized area or into sediment treatment P2M2s prior to discharge.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(I) Temporary Stabilization

- i. Temporary soil stabilization shall be applied to exposed areas within **fourteen (14) days after final formation** level is reached on any portion of the site.
- ii. Temporary soil stabilization shall be applied within **seven (7) days** to exposed areas that **may not be at final grade but will remain unattended for longer than fourteen (14) days**.
- iii. Temporary stabilization means a condition where exposed soils or disturbed areas are provided a temporary vegetative and/or non-vegetative protective cover to prevent erosion and sediment loss. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until further construction activities take place to re-disturb this area.



Slope Formation:
13.4.2009



Slope Formation:
14.4.2009



Slope Formation Hydroseeding:
15.4.2009



Slope Formation Stabilization Mat:
16.4.2009

MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(m) Stockpile Soil Management

- i. Location of the stockpiles area shall be away at a minimum distance of 20 metres from any watercourse.
- ii. The stockpiled soil shall be protected from contact with runoff water (including run-on) using a **temporary perimeter control** such as berms, dikes, fiber rolls, silt fences, sandbag and gravel bags.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(n) Spoil Management Area (Disposal Area)

- i. Location of any disposal area shall be away at a minimum distance of 20 metres from any watercourse
- ii. All disposal area shall be protected from contact with runoff water (including run-on) using a **temporary perimeter sediment barrier** such as berms, dikes, fiber rolls, silt fences, sandbags and gravel bags.
- iii. All anticipated runoff flowing from any disposal area shall be drained into a **sediment trap/basin** prior to discharge.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(o) Dewatering practices

- i. Accumulated runoff water from excavations, trenches, foundations, vaults, or other similar points of accumulation shall be **treated effectively** using appropriate controls such as but are not limited to **sediment basins / traps, dewatering tank treatment system, active treatment system, bag or sand filters** prior to discharge.



**MINIMUM STANDARDS REQUIREMENTS OF
POLLUTION
PREVENTION AND MITIGATION MEASURES**

(p) Active Treatment System (ATS)

- i. Whenever **recommended** by the consultant, Active Treatment System (ATS) shall be implemented. The installation and operation of the ATS shall be in accordance with good engineering practices, and with design and specifications recommended by the provider of the treatment system.

(Note: Active Treatment System (ATS) refers to the treatment of runoffs using a mechanical system with the application of coagulants and flocculants to promote the settling of suspended solids out of the aqueous phase. Only coagulants and flocculants which have been approved for use by environmental agencies such as USEPA or similar authorities are allowed to be used.)



**MINIMUM STANDARDS REQUIREMENTS OF
POLLUTION
PREVENTION AND MITIGATION MEASURES**

**(p) Active Treatment System
(ATS)...cont;**

- ii. The Director General of DOE reserves the right to instruct any PP to install ATS system whenever:-
 - a) The project site has been found to have violated the total suspended solids discharge standard stipulated in the EIA approval conditions (COAs); or
 - b) Analyses of soil investigation in the project site shows that the dispersible fine-grained clays contain more than 10% of dispersible material.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(p) Active Treatment System (ATS)...cont;

For Additional Information Purpose Only:

ACTIVE TREATMENT SYSTEM is a water quality improvement system that combines latest chemical treatment and mechanical dewatering technology to effectively remove fine sediment, organics and metal contaminants in sludge masses.

Typically, anionic PAM flocculants are applied in pre-test dilutions to flocculate suspended solids whilst the filtration media traps the flocs allowing clean water to discharge. The process is accelerated with pumping and on-line dosing to reduce reaction time for flocculation and dewatering. Addition of coagulants and cationic conditioners are required when treating organic animal wastes and very fine bentonite sludges. A qualified technician with appropriate training is required to be present during the operation.

Pollutant Source : sediment pond



Active Treatment Containers/
Filtration System



Flocculant Dosing & Dewatering/
Filtration Process



Flocs trapped within containers.
Clean water discharged



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(p) Active Treatment System (ATS) ...cont;

For Additional Information Purpose Only:

- i. ATS-mini is a Polymer Enhanced BMP.
- ii. When construction areas are “tight” and space allocation for temporary sediment containment is very limited eg. as in linear construction light rail and existing highway widening projects, application of ATS-mini with “polymer flocculation – gravity filtration system” system may be appropriate and allowed under the recommendations of the environment consultant and meet the of Department of Environment approval.
- iii. Contaminated sludge from sediment pond/trap is pumped via “sand pump” to temporary mixing container situated on higher platform where correct PAM is added and stirred. Mixture flows by gravity to filtration bags. Flocs are trapped within the recyclable engineered bags whilst clean water is discharged.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

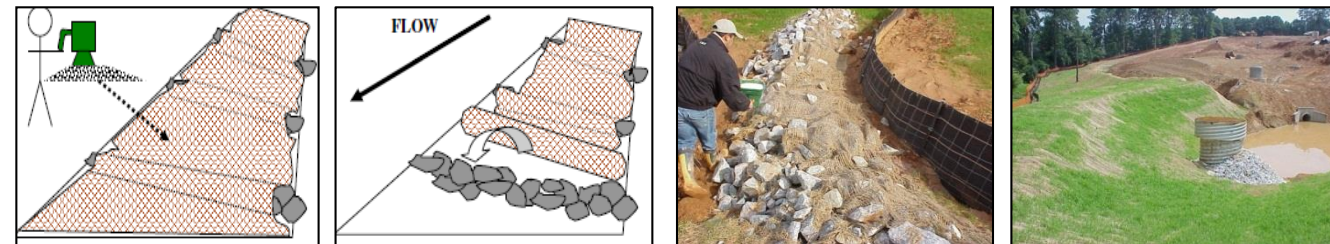
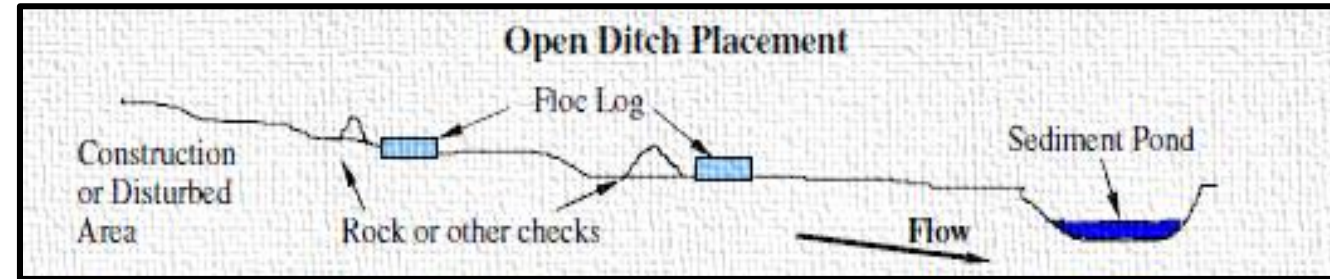
(p) Active Treatment System (ATS)...cont;

For Additional Information Purpose Only:

Polymer Enhanced BMP (PEBMP)

- i. (PAM) used for erosion and sediment control is a water soluble anionic polyacrylamide approved to enhance water quality discharges at construction sites by binding fine clay particles and reducing turbidity (NTU). PAM comes in powder, "slow release" polymer blocks and concentrate liquid for easy storage and applications. Some of the applications include powder additives to reinforce hydromulching & seeding process, PAM Blocks installed in drainage ditches as pre-treatment to flocculate and "settle-out" suspended solids in sediment traps/basins, application as emulsion-liquid medium in mechanical applications in ATS and ATS-mini to flocculate and "filter-out" suspended solids.

POLYMER ENHANCED BMP (LDPPMM - BMP)



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(q) Discharge

- i. All discharge runoff water from any land-disturbing activities shall be made through a sediment control P2M2 such as sediment basin or trap or any other erosion and sediment controls which is regarded as the designated final discharge(s).
- ii. All disturbed areas shall drain to sediment control measures at all times during land-disturbing activities and during site development until stabilized, after which, the sediment controls shall be removed. Any trapped sediment and the disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
- iii. The discharge point of the treated runoff shall be released by using a dissipater or other means of outlet protection.
- iv. All discharge run off water to offsite area shall only be allowed through a sediment basin or trap or other specified control measures.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(r) Corrective Actions

- i. In a case where a required P2M2 was **installed incorrectly**, or are **not effective** enough to produce a discharge that complies with the discharge standards, the PP shall install a new or modified control or additional control and make it **operational by no later than 7 calendar days** from the time of discovery.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(r) Corrective Actions;...cont;

- ii. The PP shall within 7 calendar days of discovering the occurrence of one of the triggering conditions above complete a report as described in the Performance Monitoring Document (PMD) and which shall be reported in the Performance Monitoring Report (PMR). The report details which shall also be recorded in the logbook include the following:
 - a) Any follow-up actions taken to review the design, installation, and maintenance of P2M2s , including the dates such actions occurred; and
 - b) A summary of P2M2 modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed; and
 - c) The PP shall send a report with photographic evidence as soon as practicable whenever corrective actions or measures have been taken or scheduled to be taken, using an online communication medium to the DOE.



**MINIMUM STANDARDS REQUIREMENTS OF
POLLUTION
PREVENTION AND MITIGATION MEASURES**

(r) Corrective Actions;...cont;

- iii. In all circumstances, the PP shall immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is taken and an appropriate P2M2 is installed or applied and made operational, including cleaning up any contaminated surfaces so that the material will not be discharged in subsequent storm events.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(s) Site Inspections

- i. Site inspections shall be conducted to check and to ascertain that all P2M2s specified in the EIA Report and this document have been properly installed and maintained as well as to determine whether any controls that are clearly not operating as intended or any P2M2s requires replacement, or additional P2M2s are required. The site inspections shall also assess if pollution is effectively being controlled and off-site discharge is being prevented in compliance with the EIA conditions of approval (COAs).
- ii. All inspection activities shall be recorded in the PM logbook.
- iii. At a minimum, inspections shall be conducted at the site prior to commencement of land clearing activities and after every storm event during construction and as specified in the established inspection schedule.



**MINIMUM STANDARDS REQUIREMENTS OF
POLLUTION
PREVENTION AND MITIGATION MEASURES**

(s) Site Inspections

- i. Site inspections shall be conducted to check and to ascertain that all P2M2s specified in the EIA Report and this document have been properly installed and maintained as well as to determine whether any controls that are clearly not operating as intended or any P2M2s requires replacement, or additional P2M2s are required. The site inspections shall also assess if pollution is effectively being controlled and off-site discharge is being prevented in compliance with the EIA conditions of approval (COAs).
- ii. All inspection activities shall be recorded in the PM logbook.
- iii. At a minimum, inspections shall be conducted at the site prior to commencement of land clearing activities and after every storm event during construction and as specified in the established inspection schedule.

Claim to be “CLOSE TURFING”



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(s) Site Inspections;...cont;

- iv. At a minimum, the following areas shall be inspected:
- a) All areas that have been cleared, graded, or excavated and that have not yet completed stabilization;
 - b) Construction entrances/exits ;
 - c) Roadways;
 - d) All P2M2s installed or applied at the site;
 - e) Material storage areas, spoil area, borrow area, or equipment storage and maintenance areas;
 - f) All areas where runoff water typically flows within the site, including drainage ways designed to divert, convey, and/or treat runoff water;
 - g) All points of discharge from the site;
 - h) All locations where stabilization measures have been implemented at least once every seven (7) days and within 24 hours after the end of a storm event of 12.5 mm or greater.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(s) Site Inspections;...cont;

- v. Rain gauge shall be properly maintained at the site so as to determine if a storm event of 12.5 mm or greater has occurred on the site. In a circumstance that a rain gauge is faulty, the storm event information shall be obtained from a weather station that is representative of the project site.
- vi. Major observations and incidents of non-compliance should be recorded in the inspection report, as well as corrective actions and maintenance and shall be recorded in the PM log book.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(t) Maintenance

The PP shall maintain the P2M2s in accordance with the following requirements:

- i. Maintenance shall begin as soon as the first P2M2 is installed or applied and shall continue through all the succeeding activities until the permanent erosion control measures are established and functioning. Maintenance method shall be in accordance to design specification.
- ii. Unless advised otherwise, maintenance shall occur within seven (7) calendar days of the inspection noted/reported. All maintenance activities shall be recorded in the PM logbook.
- iii. Sediment Basin/Trap shall be kept in effective operating condition and remove accumulated sediment to maintain at least $\frac{1}{2}$ of the design capacity of the sediment basin/trap at all times.



MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

(t) Maintenance;...cont;

- iv. Sediment shall be removed before it accumulates to one-half of the above-ground height of any perimeter control such as by cleaning out the silt fences when they are 1/2 full of sediment and/or by replacing them when they are torn or lifted, to retain their functionality.
- v. Stabilized Construction Entrance or wash trough or Tires Washing Facility shall be maintained so as not to track-out sediment or mud onto any adjacent public roads. In any occasion where sediment has been tracked-out from the project site onto the off-site streets, the deposited sediment shall be removed the end of the same work day by sweeping, shoveling, or vacuuming the surfaces, or by using other similarly effective means of sediment removal. Hosing or sweeping tracked-out sediments into any drainage is prohibited unless it is connected to a sediment basin, sediment trap, or similarly effective control.



**MINIMUM STANDARDS REQUIREMENTS OF
POLLUTION
PREVENTION AND MITIGATION MEASURES**

(u) Standards and Specifications for P2M2s

- i. All P2M2s shall be designed, constructed, installed, and maintained in accordance with good engineering practices and applicable design specifications.
- ii. Application of all P2M2s onsite shall be in accordance with standards and specifications indicated, specified, stated, depicted and set forth in:
 - a) Department of Irrigation and Drainage – DID. 2010. Guideline for Erosion and Sediment Control in Malaysia
 - b) Department of Irrigation and Drainage – DID. 2000. Urban Storm Water Management Manual for Malaysia

- c) Erosion and Sediment Control Planning and Design Manual issued by North Carolina Department of Environment and Natural Resources*
Note: This manual can be accessed at <https://enviro.doe.gov.my/>
- d) Best Management Practices for Construction and Maintenance Activities issued by North Carolina Department of Transportation**
Note: This manual can be accessed at <https://enviro.doe.gov.my/>
- [Note: For the use of the manuals mentioned in (c) and (d), credit is hereby given to the Sedimentation Control Commission for granting permission for its use in Malaysia- See the acknowledgement page of this Guidance Document]

**MINIMUM STANDARDS REQUIREMENTS OF
POLLUTION
PREVENTION AND MITIGATION MEASURES**

7.2: Self-Regulation

- The Project Proponent shall ensure that:
- All relevant parties including project consultant, contractors, and Environmental Officer (EO) understand LD-P2M2 in order to facilitate compliance with the minimum standards requirements.
- All relevant pollution prevention and mitigation measures (P2M2s) especially temporary BMPs at the constructional phase are installed and maintained to mitigate the potential pollution due to land disturbing activities.

MINIMUM STANDARDS REQUIREMENTS OF POLLUTION
PREVENTION AND MITIGATION MEASURES

(v) Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation

- i. The PP shall establish a project Environmental Performance Monitoring Committee (EPMC) to monitor the environmental performance and effectiveness of P2M2s, and status of regulatory compliance of the project.
- ii. The EPMC shall be represented by all relevant parties involved in project implementation and chaired by a senior member representing the PP. The chairman shall be responsible for ensuring the decisions of the meeting are responsibly executed. The EPMC shall meet at a minimum, once in a quarter and the minutes of the meeting be maintained.

**MINIMUM STANDARDS REQUIREMENTS OF POLLUTION
PREVENTION AND MITIGATION MEASURES**

(v) Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation

- iii. The PP through the Environment Officer (EO) shall prepare a Performance Monitoring Document (PMD) that describes in detail how EIA approval conditions (COAs) are going to be complied and how performance monitoring of the P2M2s will be conducted to ensure the optimal functionality of the P2M2s is maintained. The details in the PMD shall include, among others: performance monitoring equipment/instruments, sampling protocols and analysis, monitoring parameters, sampling frequency, preventive and corrective maintenance procedure for the P2M2s, discharge compliance, record keeping, etc.
- iv. The PP through the EO shall establish and execute an environmental performance monitoring (PM) program to monitor and evaluate the effectiveness of the P2M2s, inspect, maintain, take corrective actions on the P2M2s to ensure their functionality and effectiveness throughout the entire process of the land disturbing activities.

**MINIMUM STANDARDS REQUIREMENTS OF POLLUTION
PREVENTION AND MITIGATION MEASURES**

(v) Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation

- v. The PP shall set up a “[mini laboratory](#)” to facilitate the implementation of environmental performance monitoring program. This mini laboratory shall be adequately equipped with relevant resources including portable analytical testing equipment such as in-situ total suspended solids meter, turbidity meter, etc.

- vi. The PP through the [EO](#) shall [establish and maintain proper records](#) using a [log book \(called the Performance Monitoring logbook\)](#) that contains among others, Checklist of P2M2s List Sheet, Installation Sheet, Maintenance Sheet, Site and P2M2 Inspection Sheet, Photograph Folder Sheet, Corrective Action Sheet, Performance Monitoring Sheet, etc. The PMD and PMR shall be maintained for five years upon completion of project development. For a reference, [see Appendix I and Appendix II](#) for the samples of the PMD conducted at two different development project sites.

**MINIMUM STANDARDS REQUIREMENTS OF POLLUTION
PREVENTION AND MITIGATION MEASURES**

(v) Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation

- vii. The PP is required to keep a current copy of the **PMD and PM log book** at the site or at an easily accessible location, so that it can be made available at the time of an onsite inspection or upon request by the Department of Environment inspector. This log book shall be maintained or updated by weekly/event-based inspections.
- viii. The PP through the **EO** shall prepare a **Performance Monitoring Report (PMR)** that discusses the results of the performance monitoring conducted as described in the PMD. Wherever relevant, PMR shall include data interpretation and assessment of the effectiveness of the P2M2s by making comparison of the performance monitoring parameters with their recommended ranges (or standards). Statistical techniques and graphical presentation of the performance monitoring parameters shall be used wherever appropriate. PMR shall also make some definitive conclusions on the overall performance of the P2M2s and suggest improvement measures to be taken if necessary. PMR shall be submitted to the EPMC as established by the PP for the EIA project.

**MINIMUM STANDARDS REQUIREMENTS OF POLLUTION
PREVENTION AND MITIGATION MEASURES: Briefly - Functions of EPMC**

PMD

1. Detail of how EIA approval conditions (COAs) are going to be complied
2. Detail of how performance monitoring of the P2M2s will be conducted

PM

1. Logbook

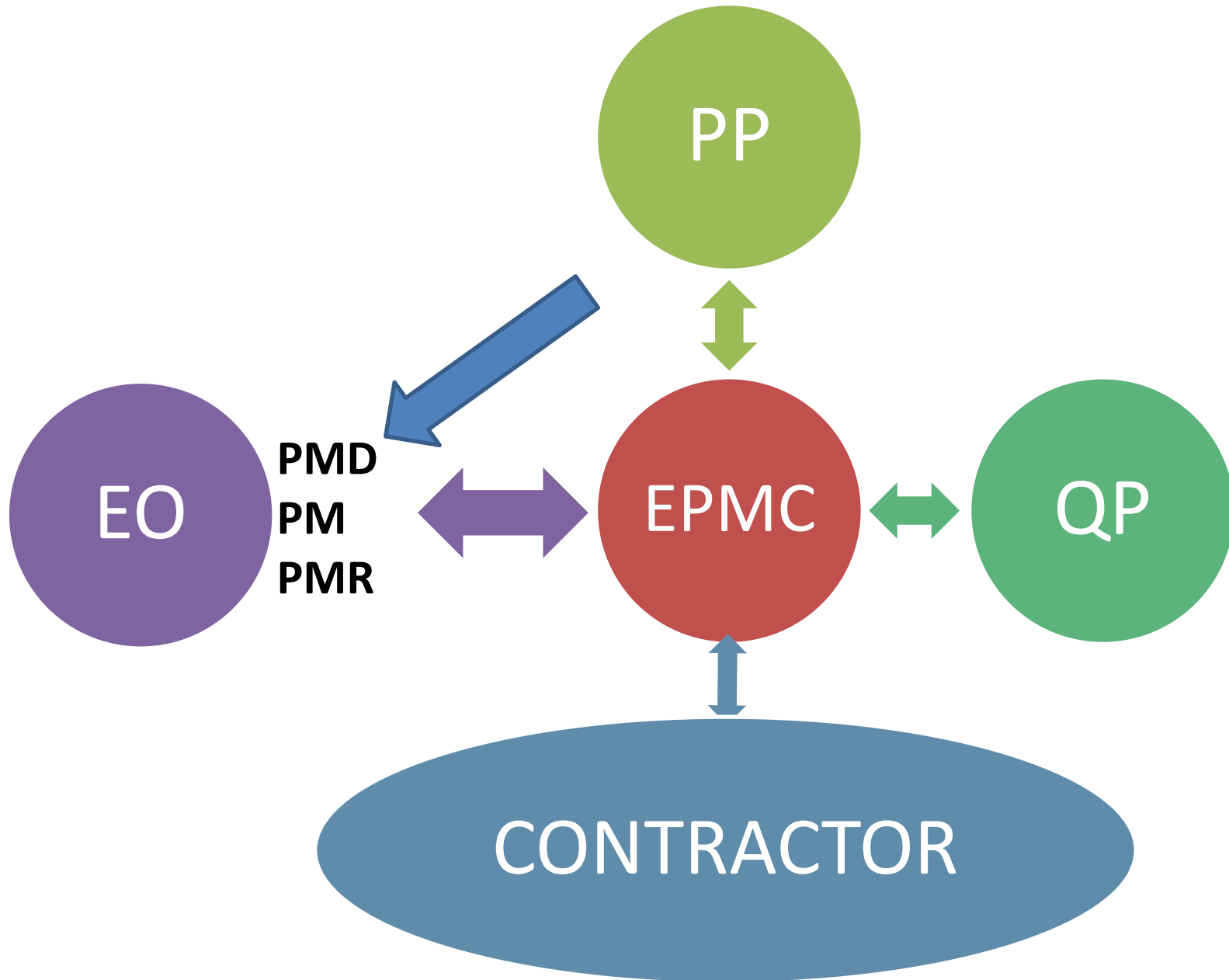
- Checklist of P2M2s List Sheet, Installation Sheet,
- Maintenance Sheet,
- Site and P2M2 Inspection Sheet,
- Photograph Folder Sheet, Corrective Action Sheet, Performance Monitoring Sheet, etc.

2. Environmental performance monitoring (PM) program

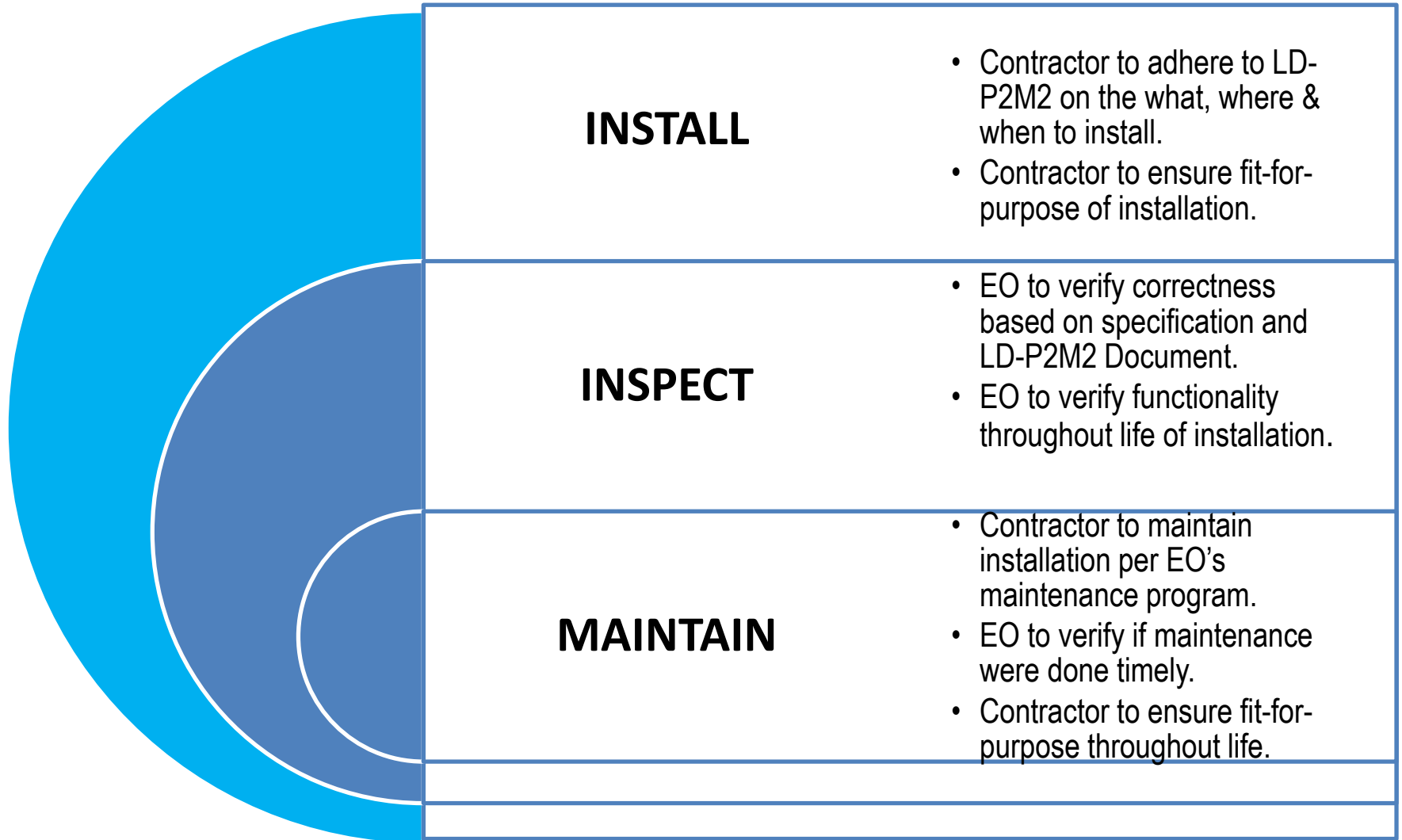
Establish and execute to monitor and evaluate the effectiveness of the P2M2s, inspect, maintain, take corrective actions on the P2M2s

PMR

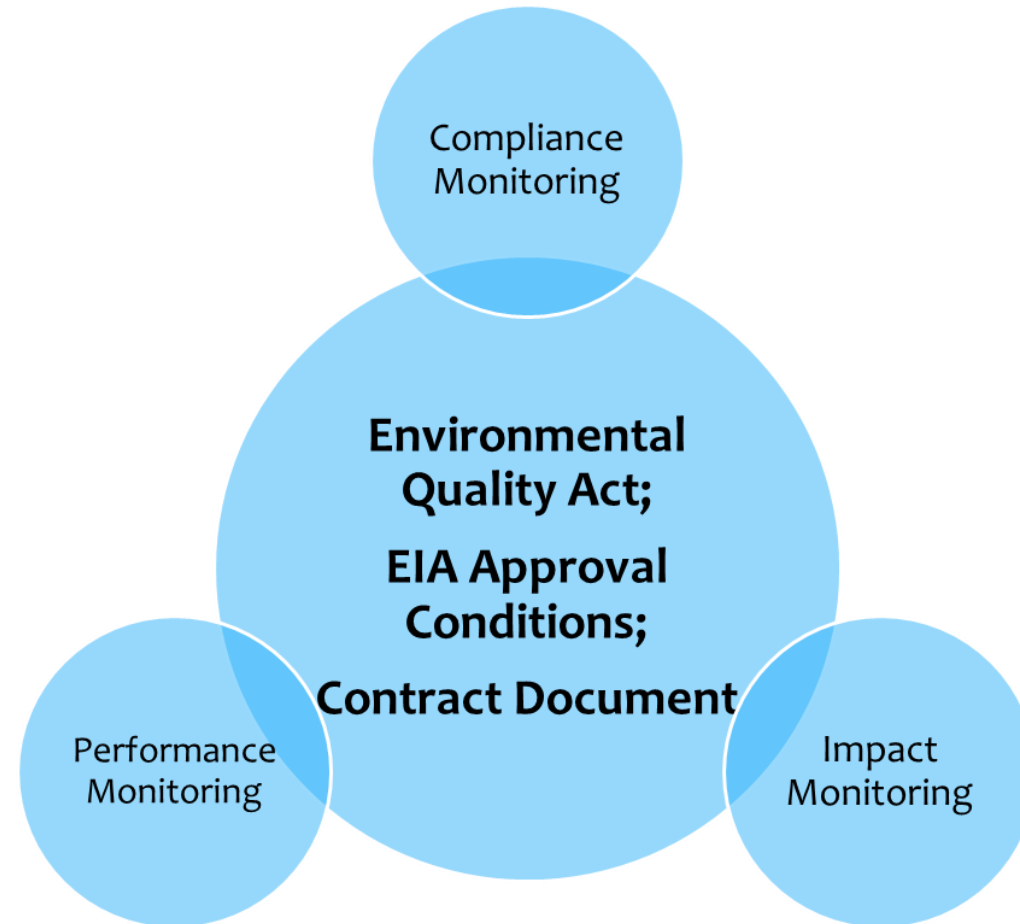
1. Discusses the results of the performance monitoring
2. Data interpretation and assessment of the effectiveness of the P2M2s.
3. Statistical techniques and graphical presentation of the performance monitoring parameters.
4. Definitive conclusions on the overall performance of the P2M2s and suggest improvement measures to be taken if necessary.
5. PMR shall be submitted to the EPMC as established by the PP.



ROLES OF FOUR PARTIES RELATIONSHIP IN EPMC



Types of Monitoring





BMPs Inspection Form

To be made
referenced during
project site
inspection by DOE
Inspectors.

SAMPLE BMP INSPECTION FORM

Bil	Inspection Element	Component	Common Potential Non-Compliances	√	X	Remarks
1.	Site Ingress / Egress	<ul style="list-style-type: none"> Wheel wash facility Plan (wash trough) Wheel washing facility (Water jet) Rubble grate / mild steel grating Crusher run (coarse aggregate) <p>Note: Installation of one or more of the above BMPs is acceptable.</p>	<ul style="list-style-type: none"> Wheel wash facility (wash trough) not installed. No sediment pond. Wheel wash facility (wash trough) installed on the wrong side of egress. Installed but not in use. Facility not maintained (no desilting). No sediment pond. Facility not maintained (no desilting) Materials used not meeting the ESCP specifications. No ingress/egress stabilization resulting in sediment being discharged outside of site ROW (right of way) 			

BMPs Inspection
Form

To be made
referenced during
project site
inspection by DOE
Inspectors.

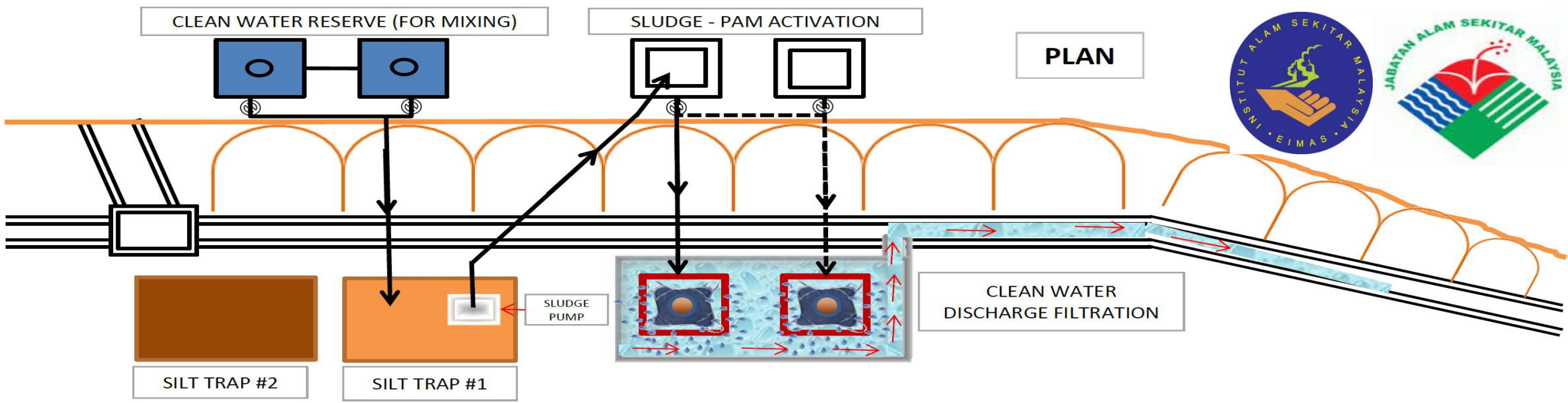
BMPs Inspection Form 1-2

TRANSITION



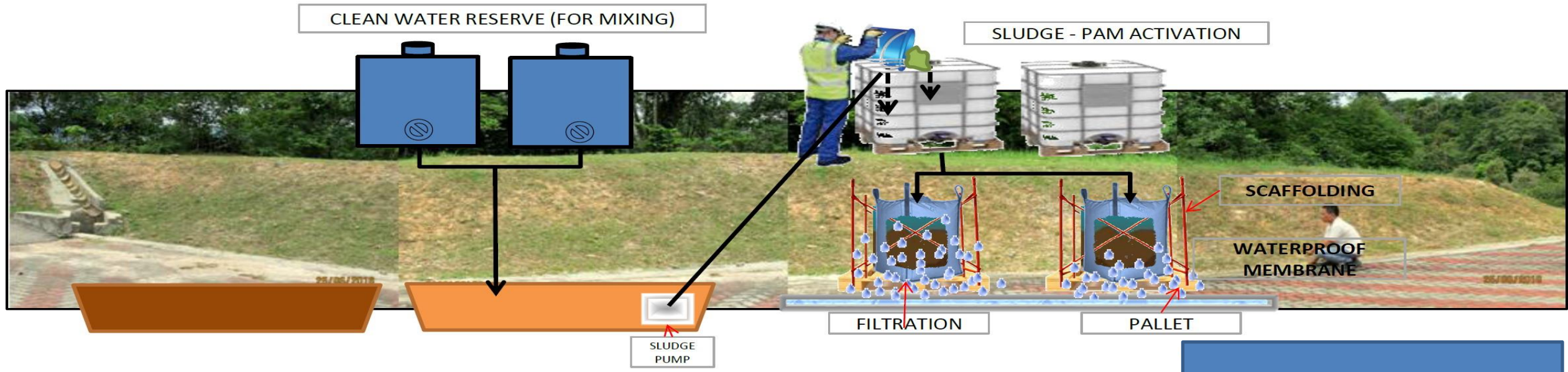
EiMAS BMPs Development and Demonstration &

New DOE's Direction to prescribe some proven
"Effective and Practical" BMPs at Construction Site



ATS MINI - DEMONSTRATION AT EIMAS

ELEVATION



CLEAN WATER RESERVE (FOR MIXING)

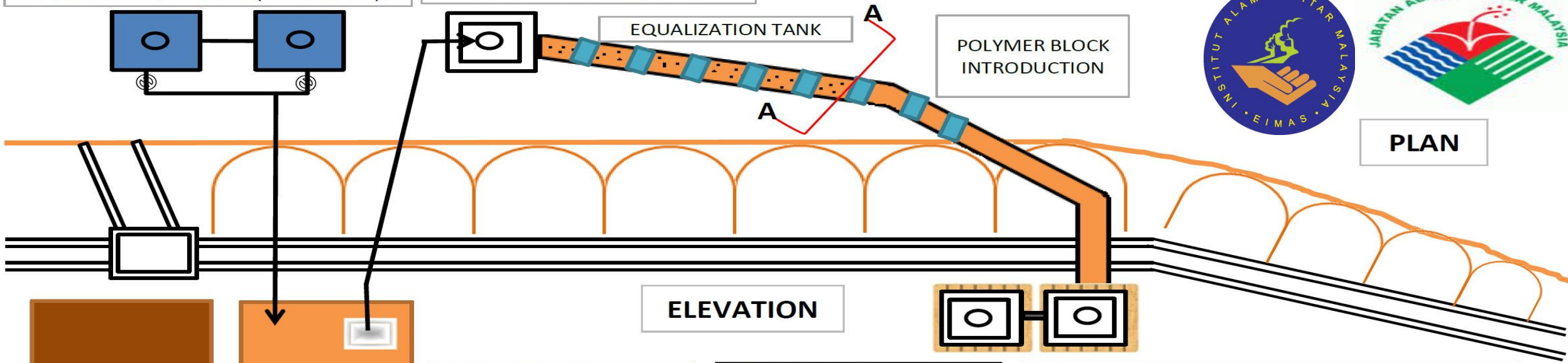
SLUDGE - PAM ACTIVATION

EQUALIZATION TANK

POLYMER BLOCK INTRODUCTION

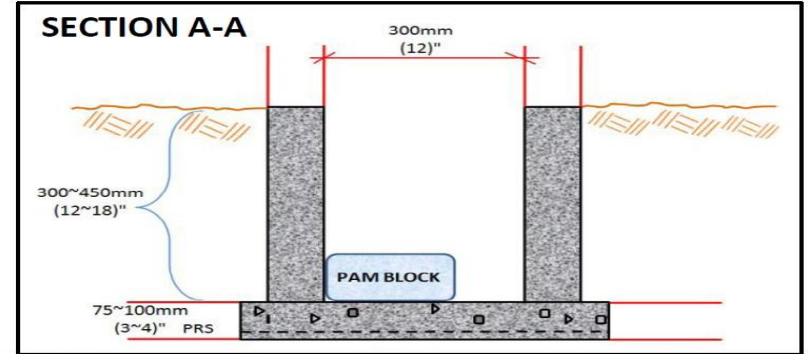


PLAN



ELEVATION

EiMAS - DEMO POLYMER BLOCK APPLICATION



MAIN BAY CLEAN - OUT BAY

"...LIKE MINI SEDIMENT POND"



EiMAS bmp DEMONSTRATION ATS-MINI for CONSTRUCTION SITE SEDIMENT TREATMENT

28-12-16: Presentation on Best Available Technology BMP Demonstration at EiMAS Training Institute.

Presentation principles of anionic flocculation and filtration, settling, filtration and clear water separation



Bauxite tailing made into sludge @ 100,000ppm, pumped to mixing tank, conditioners added and stirred.



Flocculation, mixture flow by gravity to filtration, clear water discharge, flocs trapped in recyclable bag.



EiMAS bmp DEMONSTRATION

EROSION CONTROL bmps at CONSTRUCTION SLOPE

28-12-16: Presentation on Best Available Technology BMP Demonstration at EiMAS Training Institute.



Clear, grub and trim exist. slope surface. Install anchor trench and secure RECP on slope with wood stakes



Seed, fertilize slope and wet down. Replenish surface by re-seeding when seeds are “feasted-by-birds”.





EiMAS bmp DEMONSTRATION PAM BLOCK for CONSTRUCTION SITE SEDIMENT TREATMENT



28-12-16: Presentation on Best Available Technology BMP Demonstration at EiMAS Training Institute.



Sediment mixture from construction site, pumped to equalization tank and discharged by gravity.

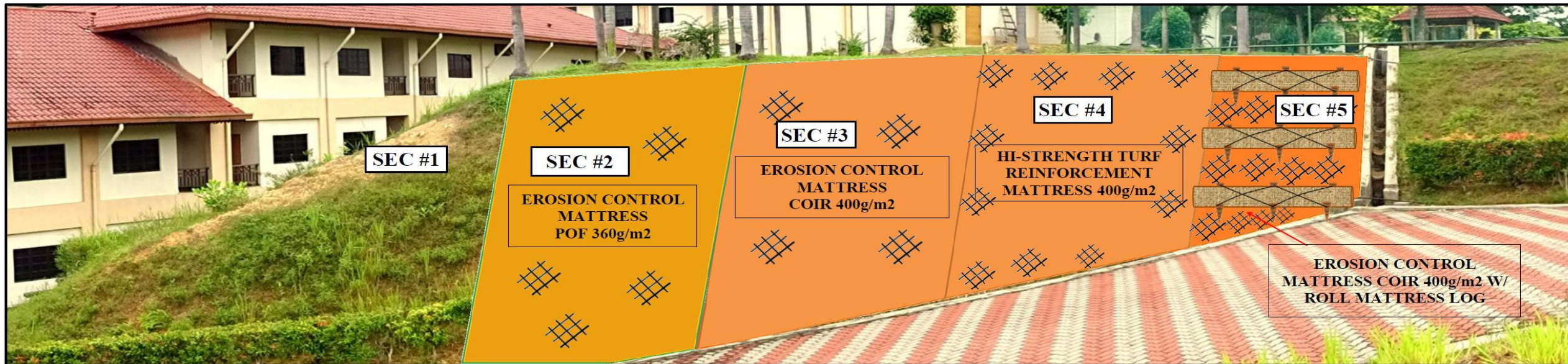


Sediment sludge flows over PAM BLOCK in drainage channel, contact-flocculation-deposit at sediment tank.





EiMAS - DEMO INSTALLATION OF SLOPE EROSION CONTROL & RE-VEGETATION BMPs



**For the time being, this erosion
control BMPs NOT ALLOWED HERE**



TRANSITION

LD-P2M2? ESCP?

- LD-P2M2 ↔ ESCP

Q&A

Appendix 3 is required to address esc at the stage of EIA. While the chapter EMP is part of the EIAR format. Element of LDP2M2 is part of the EMP. Study of potential esc is an essential part in the EIA that will ultimately address and resolve the factors of erosion and sedimentation issues.

LDP2M2 document is to be stipulated in the EIA COA of which replacing the previous ESCP but LDP2M2 is not replacing the functional aspects of ESCP while a matter a fact its complement ESCP.

LDP2M2 substances are all based on the ESC established in the Guidelines of Erosion and Sediment Control published by JPS, as such the fundamental, principle and standard and specification of BMPs component shall be made referenced. So, LDP2M2 is developed or prepared as of ESC cited in the said guidelines.

The gathered technical information earlier during the EIA study and report will definitely useful for designing the ESCP.

DOE is authorized to process and assess the adequacy of the ESC using the LD-P2M2.

DOE is authorized to process and assess the amendment or revised LD-P2M2.

LD-P2M2 carries the minimum standard requirement notwithstanding with the availability of any ESC drawing.

ESCP shall be taken care of by PBT.

Reduced the dependency to summon JPS technical personnel to be witness in proceeding case.

The effective ESCP will be used instead of ineffective LD-P2M2 by requesting the PP to revise the LD-P2M2 according to the effective one.

To avoid issues of competency or certified DOE inspector to inspect project with reference to ESCP since the DOE inspectors are not certified to the technicality of the ESCP of which designed by PE.

[Differences](#)

No	ESCP	LD-P2M2
1	Approves by JPS	Approves by DOE
	Review with full authority by JPS	Review with full authority by DOE
	Design (ESCP), Standard and specification BMPs based on JPS requirement.	LDP2M2 adopt Standard and specification BMPs from JPS requirement and others. Preparation of LDP2M2 plan involves more on the identification, placement or implementation of BMPs. Design aspect elements technically based on JPS requirement.
		LDP2M2 outlines the minimum standard of P2M2 application notwithstanding the availability of the plan or drawing.
2	Enforceable by JPS or need technical support attended by JPS personnel	Enforceable by DOE - DOE has no authority over “errors” or “inadequacies” in the approved ESCP, but with LD-P2M2 DOE is given more authority to hold project parties accountable for inaction on site.
3	Typically submitted by Contractor prior to start of work but Consultant may submit a conceptual in advance of tender award or during submission of EMP	Required to be submitted for approval at the EIA stage by the Qualified Person.
4	When Contractor prepares this document, he becomes the accountable party of the mitigation measures, without the Project Proponent’s involvement.	In line with DOE’s Guided Self-Regulation policy where all parties are involved in P2M2s, from Project Proponent up to the Contractor, since LD-P2M2 document is formulated at EIA stage and carried forward to construction stage.
5	If submitted by Contractor, there is a risk of inadequate coverage in the design and tender document, resulting in resources not allocated early enough.	Submission during EIA stage allows for mitigation measures to be incorporated into designs as well as tender document.
6	-	The approved LD-P2M2 document can be used to produce the ESCP (if required)
7	-	Will require QP to be thoroughly cognizant of the project including construction sequences, all land-disturbing activities that will cause erosion and sediment discharge, project’s critical path method
	ESCP is inevitably need revision or evolvement parallel with the site conditions or changes of site work. Amendment to the ESCP may be minor or major which need approval by JPS may take a longer processing time.	LD-P2M2 is inevitably need revision or evolvement parallel with the site conditions or changes of site work. Amendment to the LD-P2M2 may be minor or major which can be attended immediately by DOE.
8	Currently, the ESCP may address the initial and final phase of construction but may not address interim construction phases with adequate temporary BMPs	One of the main focus of LD-P2M2 will be on the progressive state of the site and interim BMPs are expected to be highlighted.
9	ESCP components are often designed as constructional features and scheduled to be built as permanent solutions typically towards the advanced stage of the civil works, not temporary solutions during early phase of the construction which involved massive clearing of earth covering vegetation, slope cutting and profiling, and earthmoving works.	One of the main focus of LD-P2M2 will be on the progressive state of the site and interim BMPs are expected to be highlighted.
10		Guidance Manual will be produced to cover the above skills for preparing this document

BMPs Categories

Five categories:

1. Site Planning & Management
2. Erosion Control
3. Runoff Control
4. Sediment Control
5. General Construction Control
6. Stormwater (Post-)

TRANSITION

TRANSITION

How to manage

Guiding On How To Manage ESC In
Land Development Project