ENVIRONMENTAL PROTECTION WORKS

25 - 26 MAC 2021

Oleh:
Cawangan Alam Sekitar dan Kecekapan Tenaga
Ibu Pejabat JKR Malaysia
Tingkat 23, Menara PJD
No 50 Jalan Tun Razak
50400 Kuala Lumpur

ENVIRONMENTAL PROTECTION WORKS (EPW)

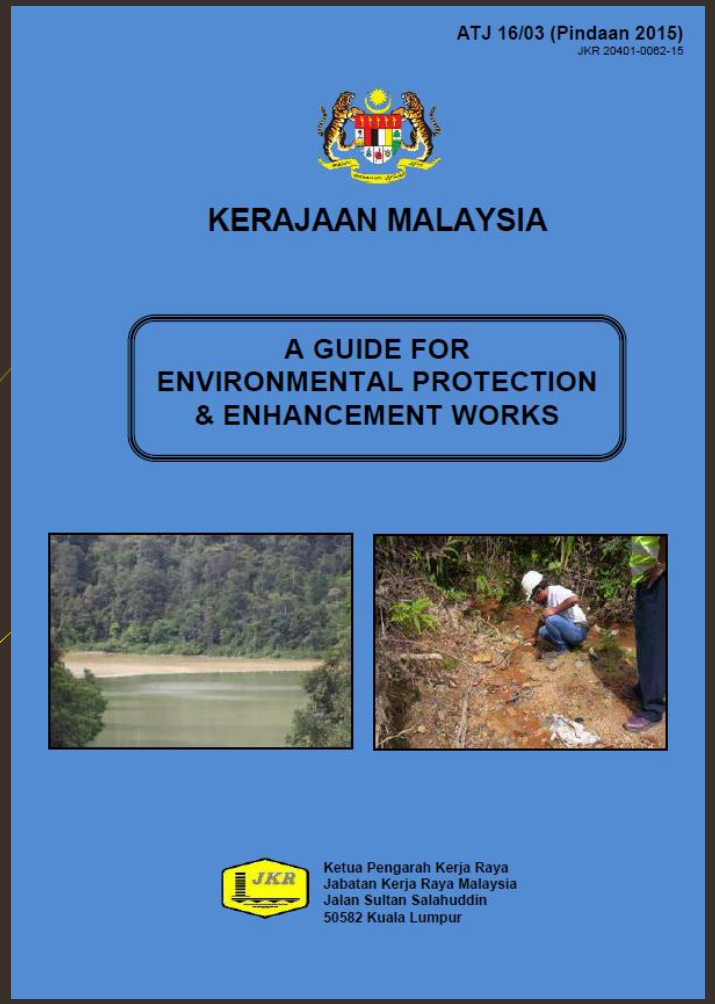
JABATAN KERJA RAYA MALAYSIA

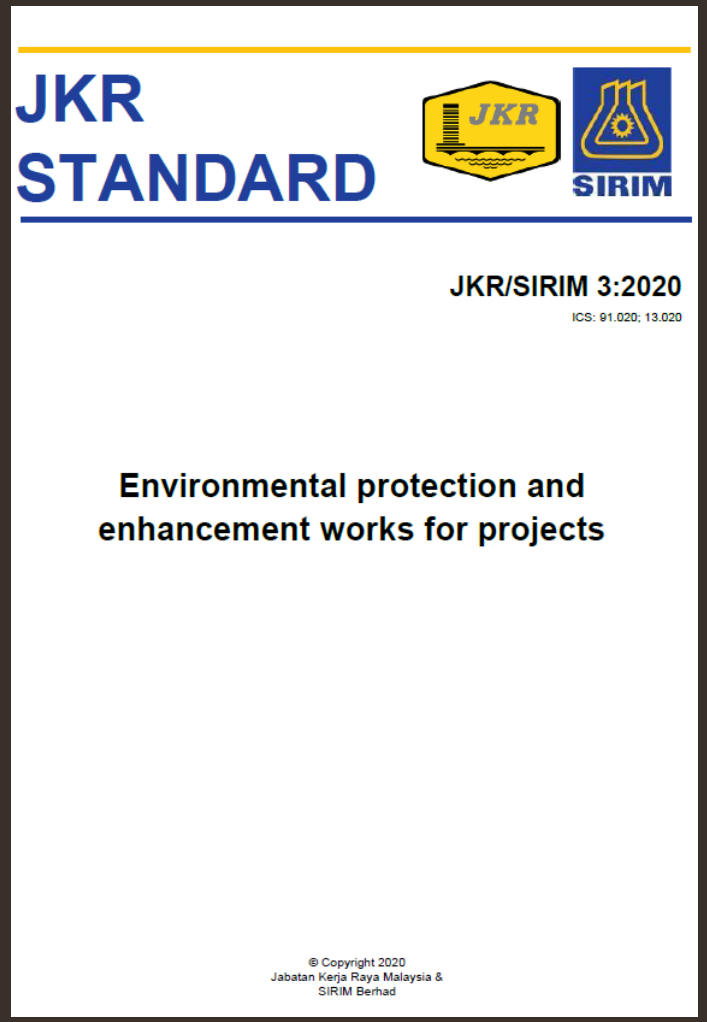
Non – Physical Works

a) Environmental Management Plan (EMP)
b) Environmental Officer (E.O)
c) Water, Air, Noise and Vibration Monitoring (EMR)
d) 3rd Party Environmental Audit (EAR & CAR)

Physical Works

a) Erosion and Sediment Control Plan (ESCP)
b) Dust and Mud Control
c) Fuel Spillage Management
d) Waste Management (Construction, Domestic and Scheduled Wastes)
e) Pengurusan Sanitasi dan Rumah Kongsi



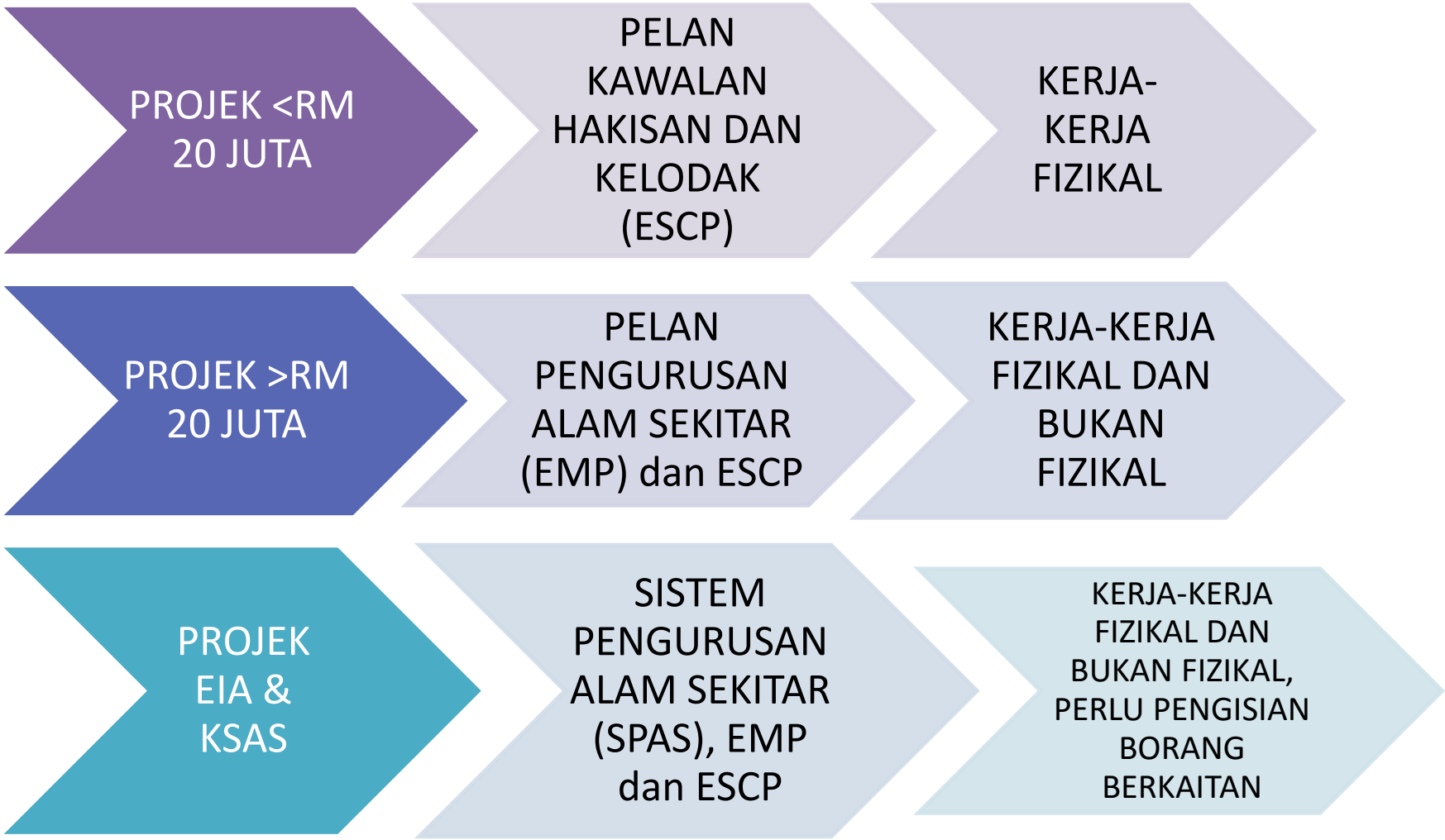


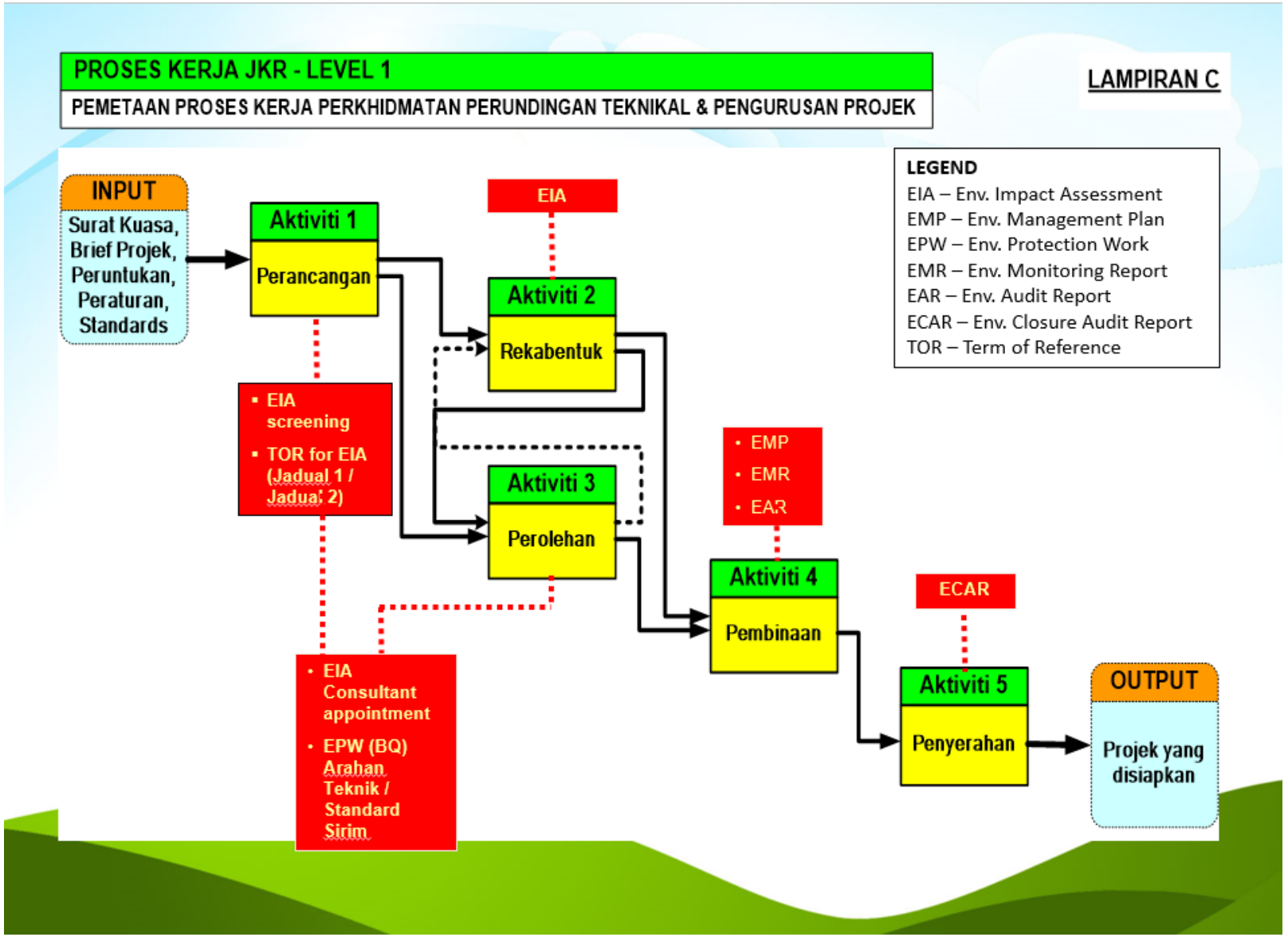
ARAHAN TEKNIK (JALAN) 16/03
PINDAAN 2015

JKR/SIRIM 3 : 2020
Environmental protection and enhancement works for projects

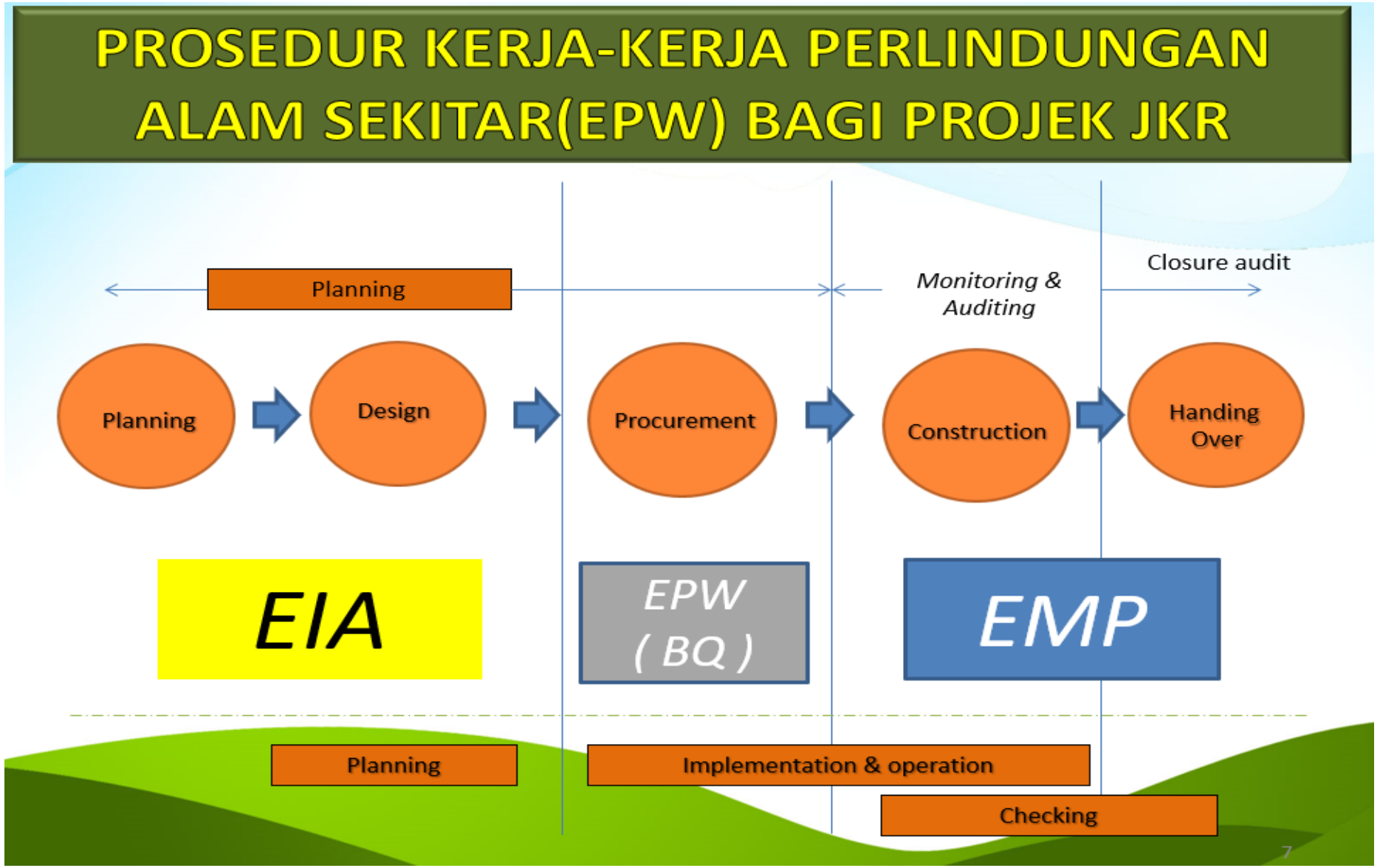
Non Physical Works

SKOP KERJA ALAM SEKITAR UNTUK PROJEK JKR

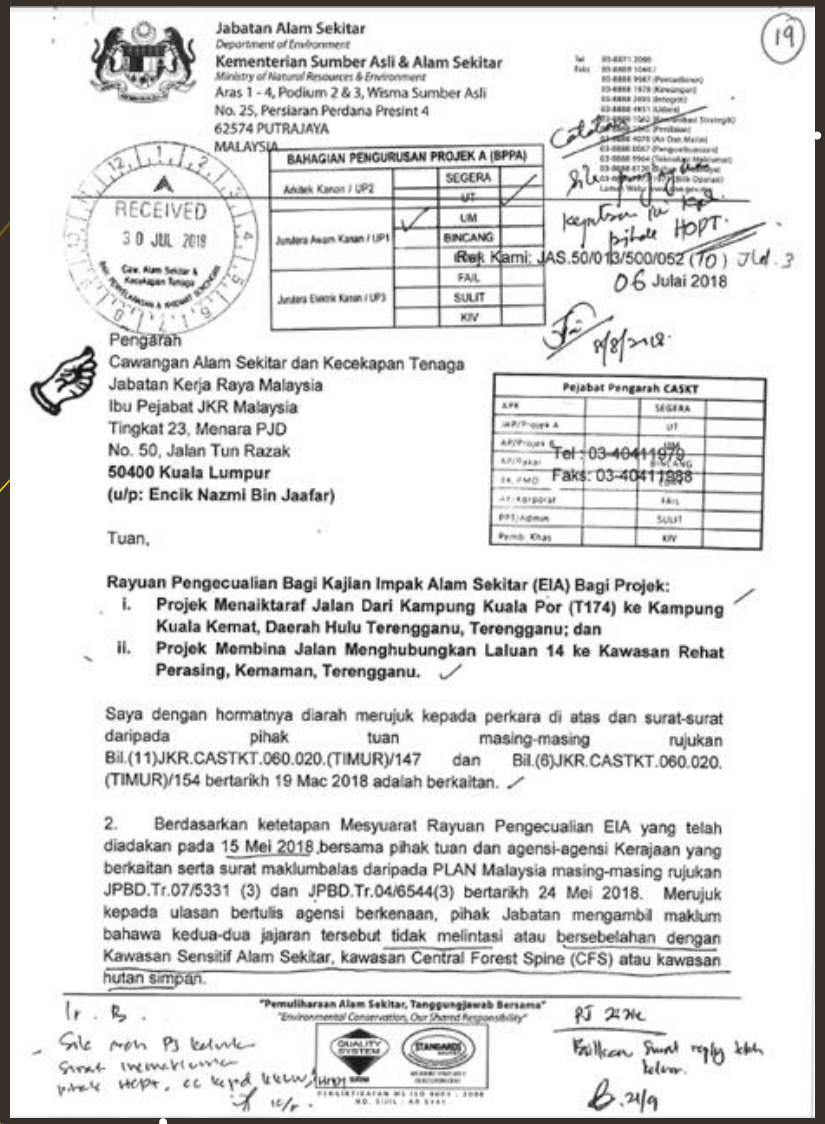



PROSES KERJA JKR - LEVEL 1
PEMETAAN PROSES KERJA PERKHIDMATAN PERUNDINGAN TEKNIKAL & PENGURUSAN PROJEK
LAMPIRAN C
LEGEND
EIA – Env. Impact Assessment
EMP – Env. Management Plan
EPW – Env. Protection Work
EMR – Env. Monitoring Report
EAR – Env. Audit Report
ECAR – Env. Closure Audit Report
TOR – Term of Reference
INPUT
Surat Kuasa, Brief Projek, Peruntukan, Peraturan, Standards
Aktiviti 1
Perancangan
EIA
Aktiviti 2
Rekabentuk
EIA screening
TOR for EIA (Jadual 1 / Jadual 2)
Aktiviti 3
Perolehan
EMP
EMR
EAR
Aktiviti 4
Pembinaan
ECAR
Aktiviti 5
Penyerahan
OUTPUT
Projek yang disiapkan
EIA Consultant appointment
EPW (BQ) Arahan Teknik / Standard Sirim

PROSEDUR KERJA-KERJA PERLINDUNGAN ALAM SEKITAR(EPW) BAGI PROJEK JKR



SURAT PENGESAHAN EIA DARIPADA JAS



Jabatan Alam Sekitar
Department of Environment
Kementerian Sumber Asli & Alam Sekitar
Ministry of Natural Resources & Environment
Aras 1 - 4, Podium 2 & 3, Wisma Sumber Asli
No. 25, Persiaran Perdana Presint 4
62574 PUTRAJAYA
MALAYSIA

(19)

BAHAGIAN PENGURUSAN PROJEK A (BPPA)

Arkitek Kanan / UP2		SEGERA
		UT
Jurutera Awam Kanan / UP1	✓	UM
		BINCANG
Jurutera Elektrik Kanan / UP3		FAIL
		SULIT
		KIV

RECEIVED
30 JUL 2018
Cawangan Alam Sekitar & Kecekapan Tenaga

Rujukan Kami: JAS.50/013/500/052 (10) Jld.3
06 Julai 2018

Pengarah
Cawangan Alam Sekitar dan Kecekapan Tenaga
Jabatan Kerja Raya Malaysia
Ibu Pejabat JKR Malaysia
Tingkat 23, Menara PJD
No. 50, Jalan Tun Razak
50400 Kuala Lumpur
(u/p: Encik Nazmi Bin Jaafar)

Pejabat Pengarah CASKT

KPK		SEGERA
JKP/Projek A		UT
KP/Projek B		UM
KP/Pakar		BINCANG
Ir. PMO		FAIL
KP/Korporat		SULIT
PPT/Admin		KIV
Pemb. Khas		

Tel : 03-40411979
Faks: 03-40411988

Tuan,

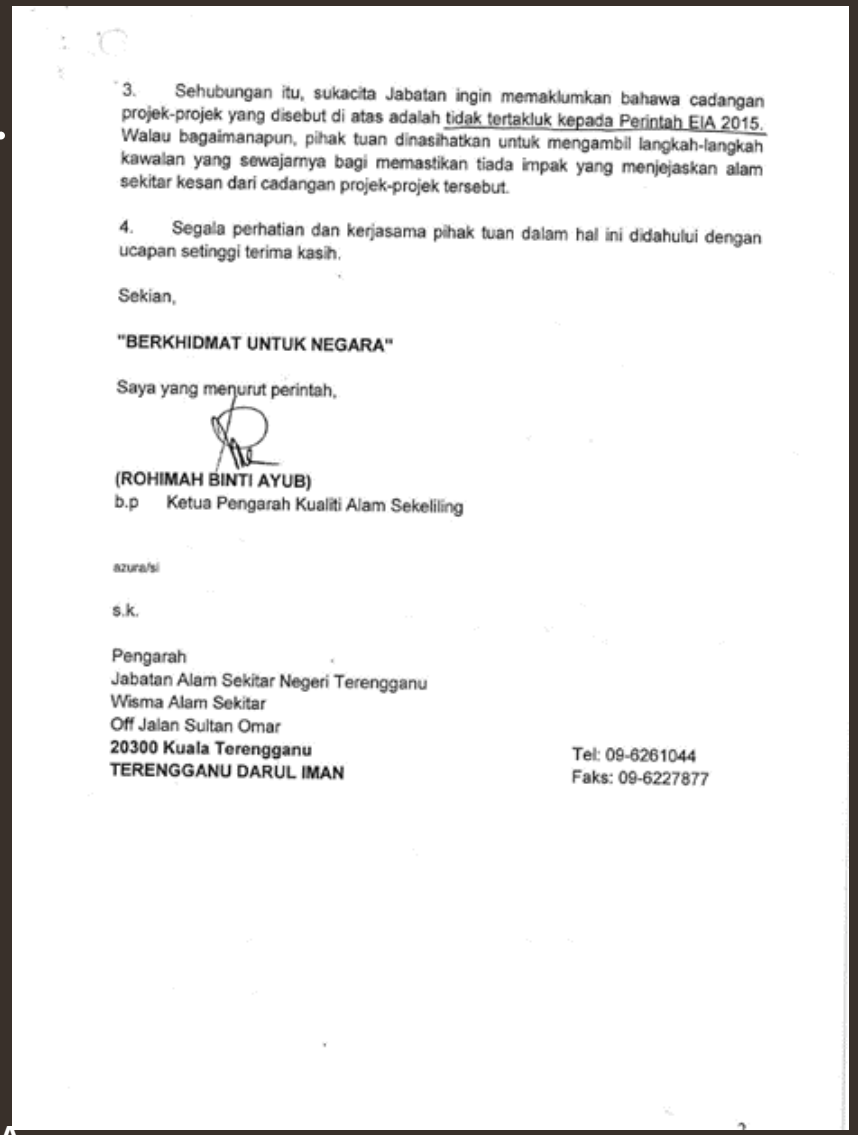
Rayuan Pengecualian Bagi Kajian Impak Alam Sekitar (EIA) Bagi Projek:

i. **Projek Menaiktaraf Jalan Dari Kampung Kuala Por (T174) ke Kampung Kuala Kemat, Daerah Hulu Terengganu, Terengganu; dan**
ii. **Projek Membina Jalan Menghubungkan Laluan 14 ke Kawasan Rehat Perasing, Kemaman, Terengganu.**

Saya dengan hormatnya diarah merujuk kepada perkara di atas dan surat-surat daripada pihak tuan masing-masing rujukan Bil.(11)JKR.CASTKT.060.020.(TIMUR)/147 dan Bil.(6)JKR.CASTKT.060.020.(TIMUR)/154 bertarikh 19 Mac 2018 adalah berkaitan.

2. Berdasarkan ketetapan Mesyuarat Rayuan Pengecualian EIA yang telah diadakan pada 15 Mei 2018 bersama pihak tuan dan agensi-agensi Kerajaan yang berkaitan serta surat maklumbalas daripada PLAN Malaysia masing-masing rujukan JPBD.Tr.07/5331 (3) dan JPBD.Tr.04/6544(3) bertarikh 24 Mei 2018. Merujuk kepada ulasan bertulis agensi berkenaan, pihak Jabatan mengambil maklum bahawa kedua-dua jajaran tersebut tidak melintasi atau bersebelahan dengan Kawasan Sensitif Alam Sekitar, kawasan Central Forest Spine (CFS) atau kawasan hutan simpan.

"Pemuliharaan Alam Sekitar, Tanggungjawab Bersama"
"Environmental Conservation, Our Shared Responsibility"



3. Sehubungan itu, sukacita Jabatan ingin memaklumkan bahawa cadangan projek-projek yang disebut di atas adalah tidak tertakluk kepada Perintah EIA 2015. Walau bagaimanapun, pihak tuan dinasihatkan untuk mengambil langkah-langkah kawalan yang sewajarnya bagi memastikan tiada impak yang menjejaskan alam sekitar kesan dari cadangan projek-projek tersebut.

4. Segala perhatian dan kerjasama pihak tuan dalam hal ini didahului dengan ucapan setinggi terima kasih.

Sekian,

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(ROHIMAH BINTI AYUB)
b.p Ketua Pengarah Kualiti Alam Sekeliling

azura/si

s.k.

Pengarah
Jabatan Alam Sekitar Negeri Terengganu
Wisma Alam Sekitar
Off Jalan Sultan Omar
20300 Kuala Terengganu
TERENGGANU DARUL IMAN

Tel: 09-6261044
Faks: 09-6227877

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

NON PHYSICAL WORKS

- Pengesahan EIA oleh Jabatan Alam Sekitar selaras dengan Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015.

- Sekiranya projek tidak tertakluk EIA, rujukan dibuat berdasarkan :-
  i. Environmental Quality Act 1974, Department of Environment (JAS)
  ii. Guideline for Erosion and Sediment Control In Malaysia – October 2010, Department of Irrigation & Drainage (JPS)
  iii. JKR/SIRIM 3 : 2020 Environmental protection and enhancement works for projects

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

NON PHYSICAL WORKS

An EMP shall be prepared for any project that falls under one of the following categories:

a) project classified either under Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015 or The Natural Resources and Environment (Prescribed Activities) Order 1994 (Sarawak), which the EMP shall be submitted to DOE/NREB and its ESCP shall be submitted to Department of Irrigation and Drainage;

b) project not subject to EIA, based on the discretion of the Controller of Environmental Quality Sarawak. NREB shall be consulted prior to determining whether an EMP is required. The format of submission shall comply to the requirement stipulated by NREB;

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

NON PHYSICAL WORKS

c) project not subject to EIA, for which the EMP shall be submitted to JKR Malaysia and its ESCP shall be submitted to local authority. Projects under the following categories:

i) project sites located in Environmental Sensitive Areas (ESAs) identified by relevant state authority; and

ii) projects that cost RM20 million and above including earthworks.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

NON PHYSICAL WORKS

- The EMP shall be approved prior to commencement of any works on site.
- The Contractor shall prepare an EMP by an environmental consultant registered with DOE for approval.
- The earthwork can only be commenced after EMP is approved by S.O
- EMP is a life document, amended if necessary by an appointed Environmental Consultant.
- The format of EMP preparation is according to JKR/SIRIM 3:2020 Environmental protection and enhancement works for projects

EROSION SEDIMENT CONTROL PLAN (ESCP)

NON PHYSICAL WORKS

- For development sites involving 1 hectare or more, the ESCP shall be submitted to:

  a) local authority, for any non-EIA development proposal; or
  b) Department of Irrigation and Drainage, for any EIA development proposal

- The contractor shall prepare an ESCP Certified by a professional Engineer and submit for approval

Statement of no objection for the ESCP shall be obtained from the relevant authority at least 14 calendar days before the beginning of any construction activity including earthwork.

Upon receipt of the statement of no objection from the relevant authority, the ESCP shall be submitted to the Superintendent Officer or Project Director (S.O/P.D.) prior to commencement of any earthwork activity at project site.

ENVIRONMENTAL OFFICER (E.O)

NON PHYSICAL WORKS

- The contractor shall appoint competent personnel as an Environmental Officer (EO).The EO shall have:

— a Degree in environmental management/science/engineering or other related to the environment; or

— a Diploma in environmental management/ science/engineering with minimum 3 years of working experience; or

— Certified Inspector of Sediment and Erosion Control (CISEC), Certified Erosion, Sediment, Stormwater Inspector (CESSWI) Certification or LDP2M2 Certification or its equivalent certification recognised by DOE/EPD/NREB; or

— any qualification as required by DOE/EPD/NREB.

ENVIRONMENTAL MONITORING, AUDIT AND REPORTS

NON PHYSICAL WORKS

ENVIRONMENTAL MONITORING

- The contractor shall monitor water and air quality, noise and vibration, if required.
  - Water (monthly)
  - Air (quarterly)
  - Noise (quarterly)
  - Vibration (if required)

- All samples taken must be tested by an accredited laboratory Skim Akreditasi Makmal Malaysia (SAMM).

KAWALAN KUALITI AIR

- Semua kawalan hakisan dan kelodak dalam lukisan pembinaan perlu dibina dan diselenggara oleh kontraktor.
- Lokasi pemantauan air seperti di dalam ESCP/EMP.
- Kebiasaannya lokasi persampelan air untuk sungai di hulu dan hilir.
- Kualiti air dari perangkap kelodak/ longkang/ sungai perlu dipantau dan mematuhi piawaian yang ditetapkan.
- Minyak yang telah digunakan tidak boleh dibuang ke dalam *watercourse*.

KAWALAN KUALITI UDARA

Debu di Tapak Bina

Ia dapat dikurangkan/dicegah dengan kaedah:

a)Menyiram air secara kerap semasa musim kering

b)Menetapkan had laju kenderaan kepada <30 km/jam

c)Melakukan kerja tanah secara berkala

d) Pastikan tayar kenderaan yang keluar dari tapak pembinaan bersih. Contohnya: *wash trough, water jet.*

KAWALAN KUALITI UDARA

Pembakaran di Tapak Bina

- Pembakaran terbuka adalah tidak dibenarkan di tapak pembinaan kecuali mendapat kelulusan Jabatan Alam Sekitar.
- Kelulusan dari JAS diperlukan sekiranya hendak melaksanakan pembakaran di tapak.
- Berdasarkan kepada A.K.A.S 1974, Seksyen 29A, denda RM500,000 atau 5 tahun penjara.

LOKASI PEMANTAUAN UDARA, BUNYI, GETARAN

- Lokasi pemantauan terletak di *sensitive receptor* seperti berikut:

  -Kawasan perumahan, sekolah, hospital, klinik, tempat tinggal pekerja

  di tapak bina.

- Kontraktor memastikan semua peralatan dan mesin dalam keadaan yang baik.

ENVIRONMENTAL QUALITY STANDARD TO BE COMPLIED

Table 2. Water quality standard

Aspects	Parameter	Recommended limit for non-EIA projects	Environmental Quality (Sewage) Regulations, 2009[a]		National Water Quality Standards (NWQS)[b]	
			Standard A	Standard B	Class IIA	Class IIB
Water [a, b]	Turbidity	-	-	-	≤ 50 NTU	≤ 50 NTU
	Suspended solids	-	≤ 50 mg/l	≤ 100 mg/l	≤ 50 mg/l	≤ 50 mg/l
	Biochemical oxygen demand$_5$ @ 20°C (BOD_5)	-	≤ 20 mg/l	≤ 50 mg/l	≤ 3 mg/l	≤ 3 mg/l
	Chemical oxygen demand (COD)	-	≤ 120 mg/l	≤ 200 mg/l	≤ 25 mg/l	≤ 25 mg/l
	pH	-	6 – 9	5.5 – 9	6 – 9	6 – 9
	E-Coli	-	-	-	≤ 100 counts/ 100 ml	≤ 400 counts/ 100 ml
	Dissolved oxygen (DO)	-	-	-	5 – 7 mg/l	5 – 7 mg/l
	Oil and grease	-	≤ 5 mg/l	≤ 10 mg/l	≤ 40 µg/l, N	≤ 40 µg/l, N
	Ammoniacal nitrogen (river)	-	≤ 10 mg/l	≤ 20 mg/l	≤ 0.3	≤ 0.3
Silt trap and sediment basin discharge	Turbidity	≤ 250 NTU	-	-	-	-
	Total suspended solids	≤ 50 mg/l	-	-	-	-

[a] Second Schedule (Regulation 7), Environmental Quality (Sewage) Regulations 2009, Environmental Quality Act 1974.

Standard A: For the areas upstream of surface or above subsurface water supply intakes
Standard B: Applicable to any other inland waters or Malaysian waters

[b] National Water Quality Standards for Malaysia. Refer to Annex H for details.

Class IIA: Water Supply II – conventional treatment required
Fishery II – sensitive aquatic species
Class IIB: Recreational use with body contact

N - No visible floatable materials or debris or no objectionable odour, or no objectionable taste.

Table 3. Ambient air quality standard

Aspects	Parameter	New Malaysia Ambient Air Quality Standard (2020)
Ambient air	Particulate Matter (PM_{10}) (24 hr)	≤ 100 µg/m^3
	Particulate Matter ($PM_{2.5}$) (24 hr)	≤ 35 µg/m^3
	SO_2 (24 hr)	≤ 80 µg/m^3
	NO_2 (24 hr)	≤ 70 µg/m^3
	O_3 (8 hr)	≤ 100 µg/m^3
	CO (8 hr)	≤ 10 µg/m^3

ENVIRONMENTAL QUALITY STANDARD TO BE COMPLIED

Table 4. Noise limits and control standard

Time	Noise sensitive receptors	Suburban residential	Urban residential	Commercial and mixed development	Industrial
FIRST SCHEDULE - NEW DEVELOPMENT					
Day (7.00 am – 10.00 pm)	L_{Aeq}[a] ≤ 55 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 70 dBA
Night (10.00 pm – 7.00 am)	L_{Aeq} ≤ 50 dBA	L_{Aeq} ≤ 55 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 65 dBA
FOURTH SCHEDULE - NEW ROADS AND/OR REDEVELOPMENT OF EXISTING ROADS					
Day (7.00 am – 10.00 pm)	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 70 dBA	L_{Aeq} ≤ 75 dBA
Night (10.00 pm – 7.00 am)	L_{Aeq} ≤ 55 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 70 dBA
FIFTH SCHEDULE - NEW RAILWAY & TRANSIT LINES AND RE-ALIGNMENTS					
Day (7.00 am – 10.00 pm)	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 70 dBA	L_{Aeq} ≤ 75 dBA
Night (10.00 pm – 7.00 am)	L_{Aeq} ≤ 55 dBA	L_{Aeq} ≤ 55 dBA	L_{Aeq} ≤ 60 dBA	L_{Aeq} ≤ 65 dBA	L_{Aeq} ≤ 75 dBA
SIXTH SCHEDULE - CONSTRUCTION, MAINTENANCE AND DEMOLITION WORK					
Day (7.00 am – 7.00 pm)	L_{10} ≤ 75 dBA L_{max} ≤ 90 dBA	-	-	L_{10} ≤ 80 dBA	L_{10} ≤ 80 dBA
Evening (7.00 pm – 10.00 pm)	L_{10} ≤ 70 dBA L_{max} ≤ 85 dBA	-	-	L_{10} ≤ 80 dBA	L_{10} ≤ 80 dBA
Night (10.00 pm – 7.00 am)	L_{10} ≤ 70 dBA L_{max} ≤ 85 dBA	-	-	L_{10} ≤ 75 dBA	L_{10} ≤ 80 dBA
* Recommended Permissible Sound Levels.					
NOTE. Refer Guidelines for Environmental Noise Limits & Control 2019.					

Table 5. Vibration limits and control standard

Aspects	Parameter	Planning Guidelines for Vibration Limits and Control of the Environment (Department of Environment)
Vibration	Vertical Vibration Peak Velocity (mm/s)	Not more than 3 mm/s at receiver location or across real property boundary.

ENVIRONMENTAL MONITORING, AUDIT AND REPORT

NON PHYSICAL WORKS

Table 8. Period for submission of documents by the contractor

Documents	No. of copies	Reporting frequency	Duration (as required by JKR MALAYSIA)	Report submission
For Peninsular, including Federal Territories				
Environmental Management Plan (EMP)	5 hardcopies	Once only (to be updated when necessary)	EMP shall be approved before commencement of site clearing and earthwork activities on site[a]	For EIA, submission to DOE and JKR Malaysia For non-EIA, submission to JKR Malaysia only
Environmental Monitoring Report (EMR)	3 hardcopies, 1 softcopy or as required by DOE	Monthly	14 days after monitoring[b]	For EIA, submission to DOE and JKR Malaysia For non-EIA, submission to JKR Malaysia only
Environmental Audit Report (EAR)	3 hardcopies, 1 softcopy	Quarterly	14 days after audit[c]	For EIA, submission to DOE and JKR Malaysia For non-EIA, submission to JKR Malaysia only
Environmental Closure Audit Report (ECAR)	3 hardcopies, 1 softcopy	Once only	14 days prior to issuance of Certificate of Practical Completion (CPC)[c]	For EIA, to DOE and JKR Malaysia For non-EIA, Submission to JKR Malaysia
For Sarawak				
Environmental Management Plan (EMP)	5 hardcopies	Once only (to be updated when necessary)	As directed by S.O./P.D.[a]	For EIA, submission to NREB and JKR Malaysia For non-EIA, submission to JKR Malaysia
Environmental Monitoring Report (EMR)	5 hardcopies	Quarterly	14 days after monitoring[b]	For EIA, submission to NREB and JKR Malaysia For non-EIA, submission to JKR Malaysia only
Environmental Compliance Audit Report (ECAR)	4 hardcopies, 1 softcopy	2 times internal audit and 1 time external audit	30 days after audit[c]	For EIA, submission to NREB and JKR Malaysia For non-EIA, submission to JKR Malaysia only

Table 8. Period for submission of documents by the contractor *(continued)*

Documents	No. of copies	Reporting frequency	Duration (as required by JKR MALAYSIA)	Report submission
For Sabah				
Environmental Compliance Report (ECR)	1 hardcopy	Monthly to quarterly (depends on duration of the project)	Not applicable	Submission to EPD Sabah. Additional 1 hardcopy to Sandakan Branch (for EIA/PMM projects located at the East Coast Region of Sabah)

[a]To be carried out by registered environmental consultant and shall be approved prior to commencement of any works on site.

[b]To be carried out by accredited laboratory.

[c]To be carried out by registered third-party environmental auditor.

CONTOH PERSAMPELAN AIR DI KAWASAN BERHAMPIRAN TAPAK PROJEK

PEMANTAUAN KUALITI UDARA DI KAWASAN BERHAMPIRAN TAPAK PROJEK

PEMANTAUAN BUNYI

ENVIRONMENTAL MONITORING, AUDIT AND REPORT

NON PHYSICAL WORKS

ENVIRONMENTAL AUDITING

- The Contractor shall engage a third party DOE/approving authorities - registered Environmental Auditor to audit all activities on site as per requirements quarterly.

- The Contractor shall carry out closure audit before Certificate of Practical Completion (CPC).

- Reference shall be made to SIRIM 3 : 2020 Environmental protection and enhancement works for projects

AUDIT ALAM SEKITAR

Pematuhan Lain-lain

i. Pelan Kawalan Hakisan Tanah dan Sedimen *(Erosion and Sediment Control Plan-ESCP)* hendaklah disediakan sebagaimana yang telah ditetapkan di dalam *Guideline for Erosion and Sediment Control in Malaysia - October 2010* yang diterbitkan oleh pihak JPS. *ESCP* juga hendaklah disediakan oleh perekabentuk dan diluluskan oleh pihak JPS berkaitan serta melaksanakan *Best Management Practice (BMPs)* bagi kawalan hakisan dan kelodak sepertimana kehendak *ESCP* tersebut ;

ii. Sebarang aktiviti pembakaran terbuka adalah dilarang sama sekali selaras dengan kehendak Seksyen 29A Akta Kualiti Alam Sekeliling 1974 (Akta 127);

iii. Sistem Pengurusan Buangan Terjadual yang baik hendaklah disediakan di tapak projek dan Buangan Terjadual hendaklah dikendalikan mengikut Peraturan-Peraturan Kualiti Alam Sekeliling (BuanganTerjadual), 2005;

iv. Segala pelepasan sisa kumbahan perlu mematuhi Standard A, Peraturan 7(1)(a) Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan) 2009-P.U.(A) 432 ;

v. Pemasangan alat pembakaran bahanapi seperti janakuasa tunggusedia dan sebagainya hendaklah/perlu mengemukakan pemberitahuan bertulis terlebih dahulu kepada Ketua Pengarah Kualiti Alam Sekeliling seperti yang dikehendaki di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 2014;

vi. Bunyi Bising hendaklah sentiasa dikawal supaya tidak melebihi paras 65 dB(A) pada sepanjang masa di sempadan kawasan projek semasa kerja-kerja pembinaan dijalankan;

vii. Permukaan tanah, terutamanya di kawasan-kawasan laluan utama jentera pembinaan, hendaklah sentiasa dibasahkan sehingga tidak berhabuk/berdebu disepanjang tempoh/semasa aktiviti kerja-kerja tanah dan pembinaan dijalankan;

viii. Roda-roda jentera dan kenderaan kerja tanah hendaklah/sentíasa dibersihkan terlebih dahulu sebelum dibenarkan bergerak di atas jalanraya awam; dan

ix. Mematuhi Arahan JAS, JPS dan JKR dari semasa ke semasa.

Physical Works

ENVIRONMENTAL PROTECTION WORKS (EPW)

PHYSICAL WORKS

1. DUST AND MUD CONTROL
2. EROSION CONTROL
3. SEDIMENT CONTROL
4. FUEL SPILLAGE MANAGEMENT
5. WASTE MANAGEMENT
6. MANAGEMENT OF DISPOSAL FOR SURPLUS MATERIAL

Dust and Mud Control

- *Water Bowser Truck*
- *Tyre Washing Facilities*
  - *Portable Water Jet*
  - *Wash Trough*
- *Water Sprinkler (At Quarry/Batching Plant)*

Dust and Mud Control

- *Water Bowser Truck*
- *Tyre Washing Facilities*
  - *Portable Water Jet*
  - *Wash Trough*
- *Water Sprinkler (At Quarry/Batching Plant)*

DUST AND MUD CONTROL

Wash bay

Wash trough

WATER JET

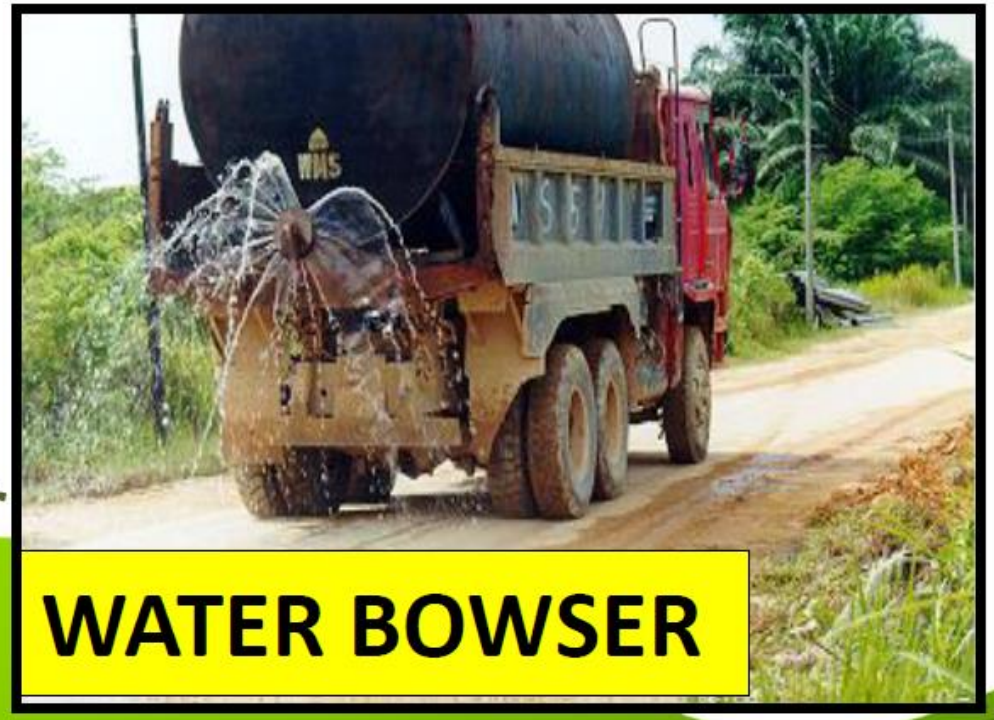
B

- Used to clean dirty vehicles to remove sediment from tires and under carriages and to prevent sediment from being transported onto public roadways.

WATER BOWSER

C

- function to control the dirt and dust from construction site being trailed into surrounding area causing contamination .



D

WATER SPRINKLER

BEST MANAGEMENT PRACTICE

1. EROSION CONTROL
2. RUNOFF MANAGEMENT
3. SEDIMENT CONTROL

Erosion Control

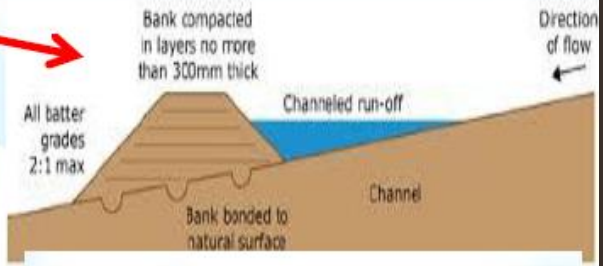
- *Turfing*
- *Hydroseeding*
- *Erosion Control Blanket (ECB)*

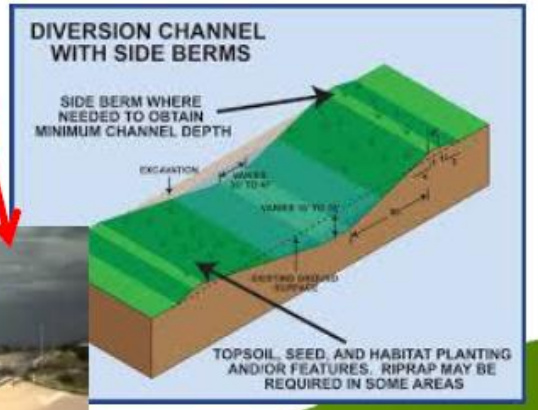
EROSION & SEDIMENT CONTROL

EROSION AND SEDIMENT CONTROL FACILITIES	
EROSION CONTROL FACILITIES	SEEDING AND PLANTING
	MULCHING
	GEOTEXTILE AND MATS

RUNOFF MANAGEMENT

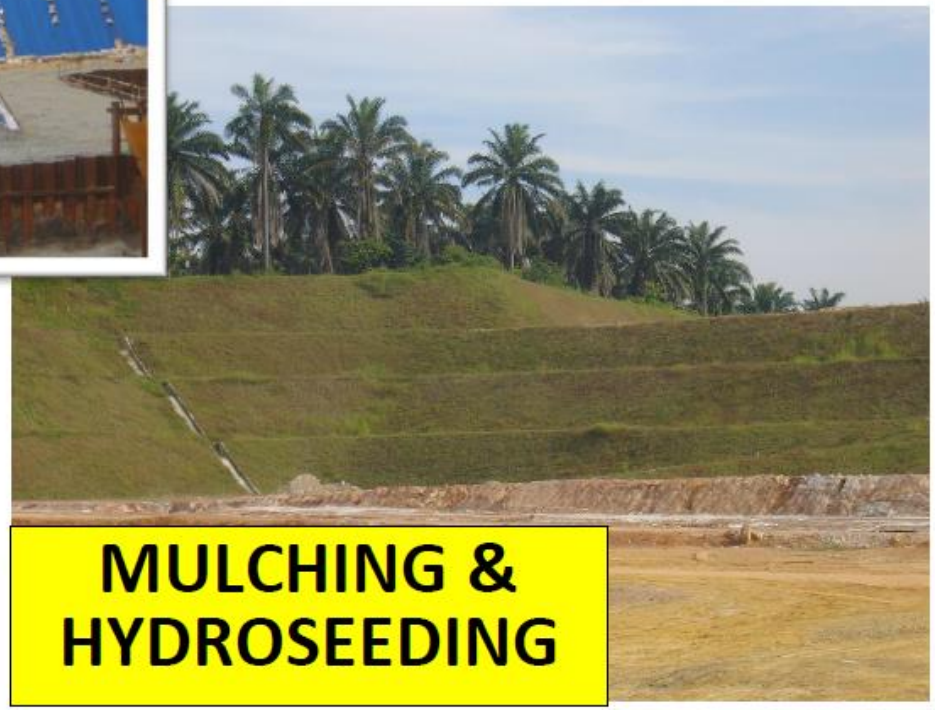
Runoff Management Facilities	Earth Bank
	Diversion Channel
	Drainage Outlet Protection
	Temporary waterway Crossing





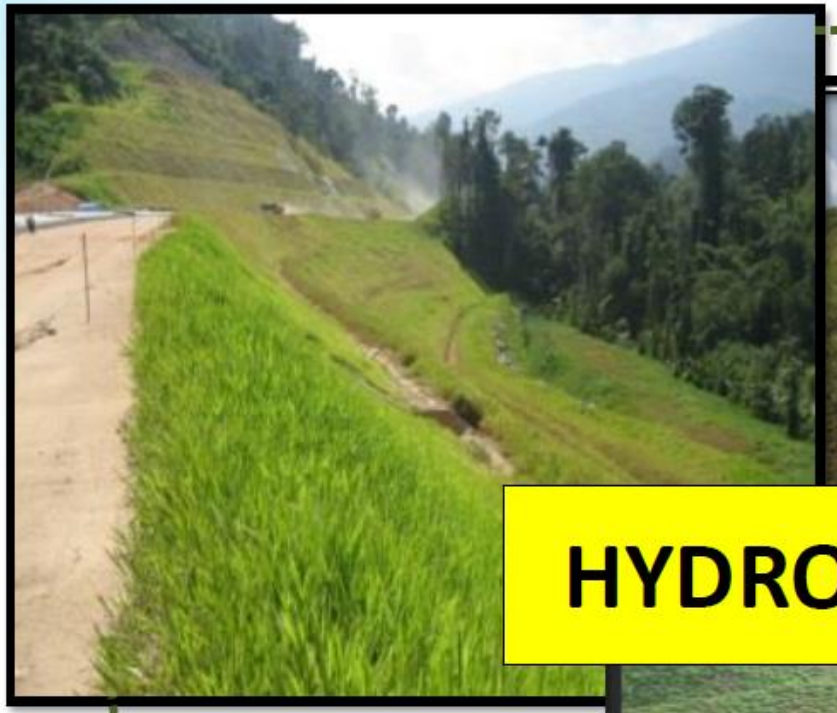
SLOPE PROTECTION

COVERED SLOPE



MULCHING & HYDROSEEDING

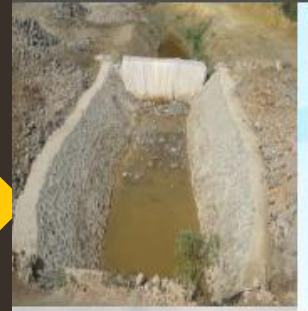
SLOPE PROTECTION



HYDROSEEDING

Sediment Control

- *Earth Drain*
- *Silt Fence*
- *Sand Bags*
- *Silt trap and Sediment Basin*
- *Gabion Wall*
- *Check Dam*
- *Silt Curtain*




SILT TRAP / SEDIMENT BASIN

- to prevent sediment carried by sheet flow from leaving the site and entering natural drainage system by **slowing storm water** runoff and causing the deposition of sediment at the structure
- provide additional **protection** for a water body or for reducing sediment before it enters a drainage system.
- Silt trap/sediment basin shall be designed according to *Jabatan Pengairan dan Saliran*'s latest edition of 'Urban Stormwater Management Manual (**MSMA**)' and Local Authority requirement.
- Silt trap/sediment basin comprises **rocks in gabions**, shall be constructed in respective catchment area to collect and store sediment prior to entering natural waterways.
- The silt traps/sediment basins shall be **inspected** regularly especially **after heavy rain** and any damages shall be rectified. The sediment accumulated in the silt traps/sediment basins shall be removed when it has reached 2/3 of its depth and disposed at designated site.

SILT TRAP / SEDIMENT BASIN





SILT FENCE

- temporary sediment barrier
- to prevent sediment carried by sheet flow from leaving the site and entering natural drainage system by slowing storm water runoff and causing the deposition of sediment at the structure
- Shall be constructed as close as possible, parallel to the contours of the site with a setback of at least 0.9 m (3 ft) from the toe of the slope.
- The silt fence shall be inspected after every rain event.
- The silt accumulated behind the fence shall be removed when it has reached 2/3 of the fence filter height and disposed at designated site.
- The geotextile shall be checked for rips, tears and other types of deterioration and replaced as needed.

SILT FENCE

SILT CURTAIN

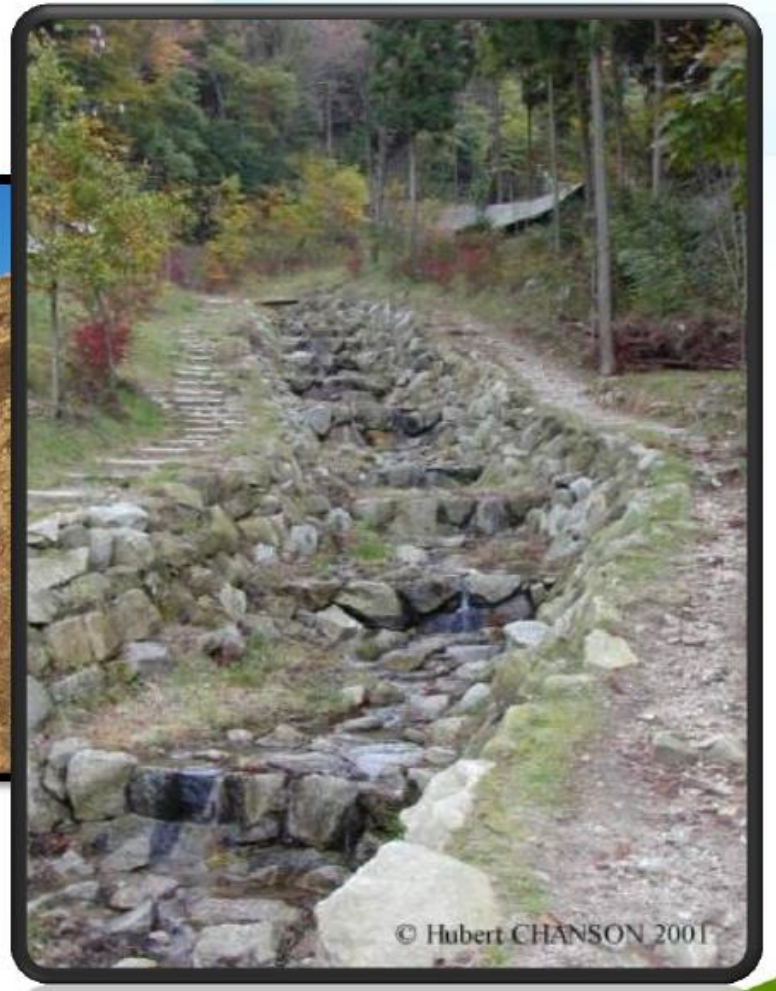
- A temporary sediment control barrier consisting of a vertically suspended geosynthetic fabric installed within a body of water.
- To provide sediment containment within a body of water for work in or near the body of water, as well as to deflect natural flow around the work area.
- Shall be used to mitigate sediments by confining sediments and prevent dispersal and contamination of the water body for example in lakes and riverbanks and sea.
- Any problem or failure of the curtain shall be repaired or replaced immediately.

SILT CURTAIN

CHECK DAM

- Which is a small, temporary or permanent dam shall be constructed across a drainage ditch, swale or channel for the purpose of lowering the speed of concentrated flows.
- Shall be inspected regularly after rain and any damages shall be rectified.
- The sediment accumulated behind the check dams shall be removed when it has reached 2/3 of its height and disposed at designated site.
- The height of the check dam shall be maintained to be the same at all time.

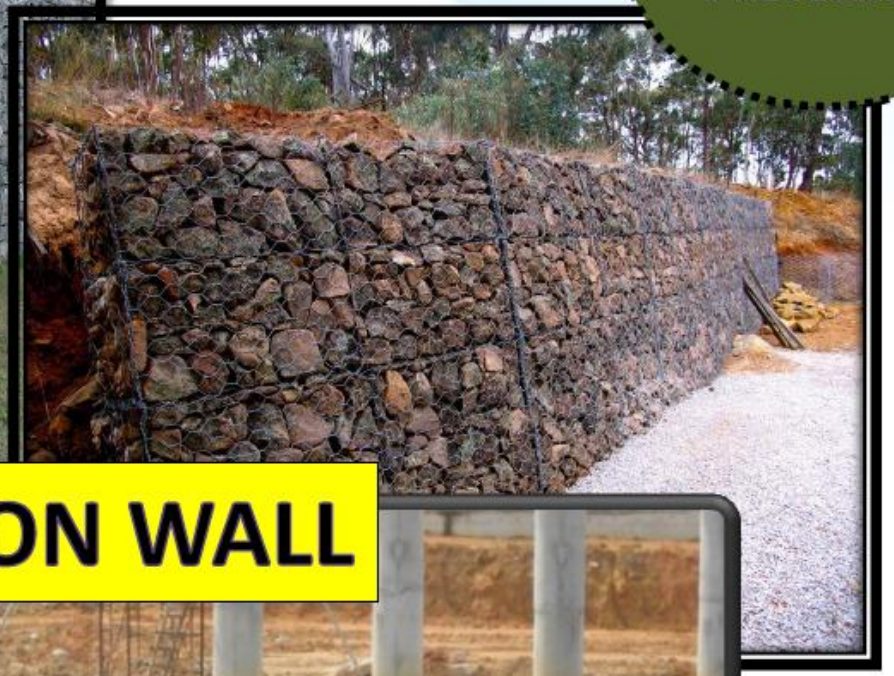
CHECK DAM



GABION WALL

- A gabion wall which comprises rocks in gabions but of smaller nature compared to silt trap, shall be constructed in difficult terrains such as on slopes and narrow valleys for the purpose of collecting and storing sediment prior to entering natural waterways.

SLOPE PROTECTION

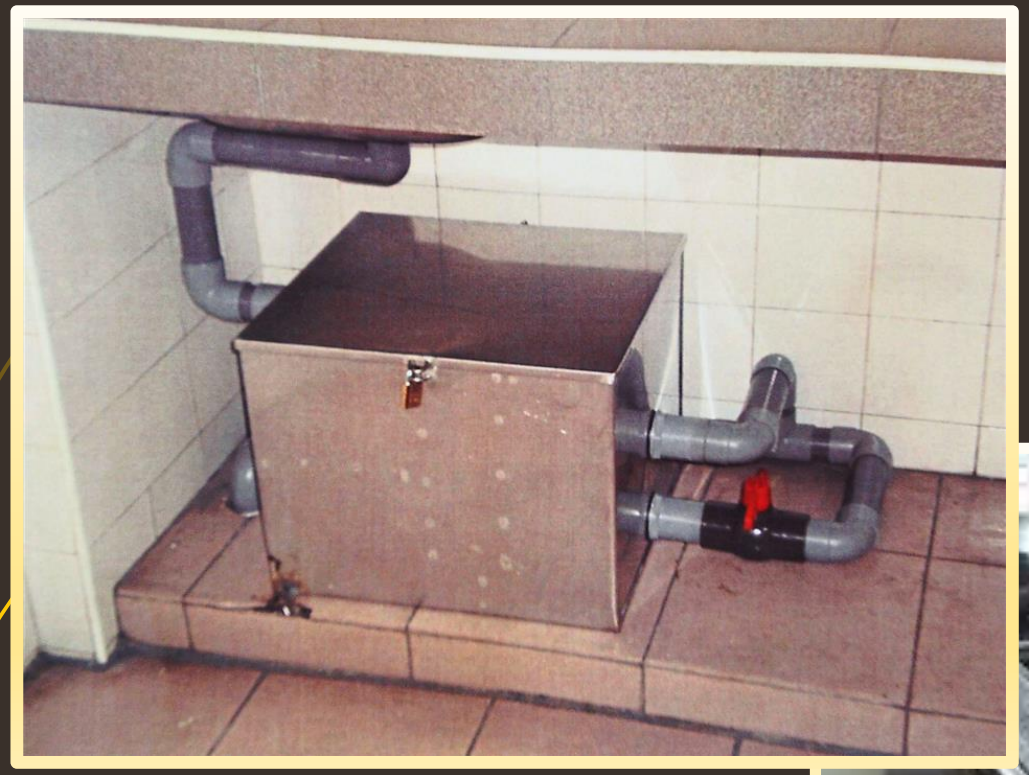


GABION WALL

GREASE TRAP

- function to trap oil and grease waste from sinks, especially from the canteen

WASTE MANAGEMENT (Grease Trap)



Grease trap (workshop)

Grease trap (kitchen)

Fuel Spillage Management

- Containment Bund for Bulk Fuel Tank

Construct impervious concrete base to contain 110% volume of stored fuel including grease trap.

FUEL SPILLAGE MANAGEMENT

Containment Bund for Skid Tank

FUEL SPILLAGE MANAGEMENT

Containment Bund for bar bender

Containment Bund for Genset

Waste Management

- **Construction Waste**
- **Domestic Waste**
- **Scheduled Waste**

- Reference shall be made to the:-

- Akta Pengurusan Sisa Pepejal Dan Pembersihan Awam 2007, Jabatan Pengurusan Sisa Pepejal Negara (JPSPN).
- Akta Kualiti Alam Sekeliling 1974, Peraturan-peraturan Kualiti Alam Sekeliling Buangan Terjadual) 2005.

WASTE MANAGEMENT (Construction Waste)

Construction Waste

Roll on-Roll off (Tong RORO)

WASTE MANAGEMENT (Domestic Waste)

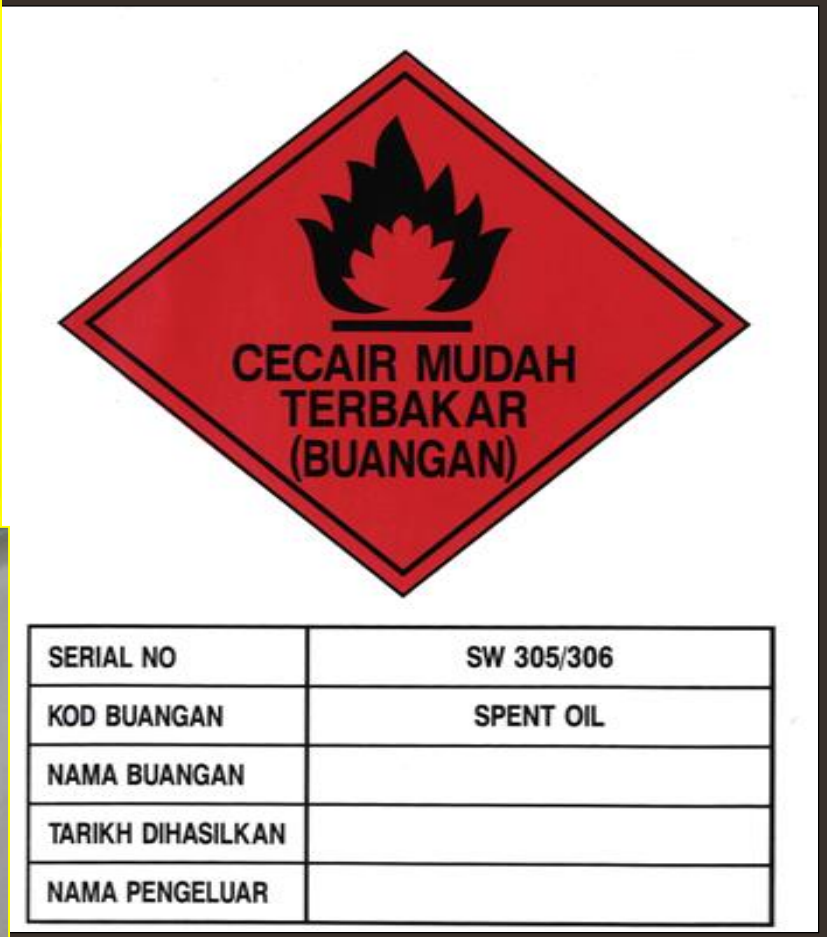
Domestic waste

Mobile Garbage Bin (MGB)

WASTE MANAGEMENT (Scheduled Waste)

Storage

Label



WASTE MANAGEMENT (Segregation of Waste)

3R Waste

Construction Waste

Do's & Don'ts

A Kawalan Hakisan dan Mendakan

B Pengurusan Sisa Bahan Buangan

C Pengurusan Bahan Api *(Fuel)*

D *Housekeeping*

E Kualiti Udara

KAWALAN HAKISAN DAN KELODAK

Membina Perangkap kelodak (*Silt trap*) yang sentiasa diselenggara dan berfungsi dengan baik.

Membiarkan perangkap kelodak (*Silt trap*) dipenuhi kelodak dan ditumbuhi semak samun.

KAWALAN HAKISAN DAN KELODAK

Memasang pagar kelodak (*Silt Fence*) yang di selenggara dengan baik semasa kerja-kerja tanah dijalankan di tapak projek.

Pagar kelodak (*Silt Fence*) yang rosak semasa kerja- kerja masih dijalankan di tapak projek.

KAWALAN HAKISAN DAN KELODAK

Pembinaan perangkap kelodak (*Silt trap*) yang lengkap dengan *Turfing Bund* di sekelilingnya.

Tebing perangkap kelodak (*Silt Trap*) tersebut distabil menggunakan *Sand Filling Mattress*.

KAWALAN HAKISAN DAN KELODAK

Menanam rumput/ *Hydroseeding* dengan segera bagi cerun yang telah mencapai *Formation Level*.

Membiarkan perangkap kelodak (Silt trap) dipenuhi kelodak dan mengalami hakisan tebing.

Membiarkan cerun terdedah tanpa sebarang langkah tebatan.

KAWALAN HAKISAN DAN KELODAK

Membina sistem perparitan sementara dan Pagar kelodak (*Silt Fence*) di sekitar tapak projek.

Sistem perparitan sementara yang TIDAK sempurna dikawasan tapak projek menyebabkan air bebas mengalir di permukaan.

KAWALAN HAKISAN DAN KELODAK

Silt Curtain di sepanjang sistem saliran seperti tasik atau sungai membantu mengurangkan kelodak mencemari sepanjang saliran tersebut.

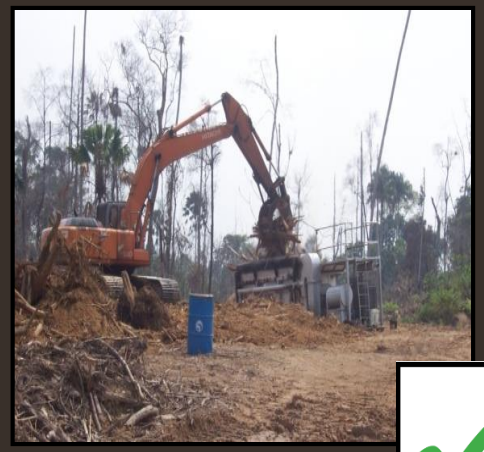
Air kelodak mengalir secara terus ke sistem saliran.

KAWALAN HAKISAN DAN KELODAK

Menutup permukaan cerun yang terdedah secara SEGERA dengan *Plastic Cover*.

Membiarkan permukaan cerun terdedah tanpa langkah-langkah tebatan.

PENGURUSAN SISA BAHAN BUANGAN



Menggunakan *Air Curtain Burner* bagi mengawal pembakaran *Biomass Disposal*.

Burner perlulah mendapatkan lesen daripada pejabat Jabatan Alam Sekitar (JAS) Negeri.

Membakar sisa bahan binaan secara terbuka dalam kawasan pembinaan.

PENGURUSAN SISA BAHAN BUANGAN

Sisa bahan buangan ditempatkan pada satu bekas yang besar dan dibuang keluar oleh kontraktor yang telah dilantik.

Membiarkan sisa bahan binaan berselerak dan tidak terurus.

PENGURUSAN SISA BAHAN BUANGAN

Membina / Menyediakan tandas lengkap dengan tangki septik dan bekalan air bersih mengikut keperluan SPAN (Suruhanjaya Perkhidmatan Air Negara).

Sentiasa diselenggara dan *Regular Desludging* oleh kontraktor berlesen.

Membina / menyediakan tandas tiada tangki septik dan pembuangan sisa kumbahan secara terus ke dalam sistem saliran.

PENGURUSAN BAHAN API (*FUEL*)

Mesin diletakkan di atas tapak berkonkrit dilapisi dengan pasir bagi mengelakkan sisa minyak meresap ke tanah.

Mesin diletakkan secara terus di atas tanah.

PENGURUSAN BAHAN API (*FUEL*)

Membina *Skid Tank* yang dilengkapi dengan *Concrete Bund*, mempunyai tangki minyak diletakkan untuk *Nozzle* bagi mengelak sebarang kebocoran minyak dan cerun dilapisi *Fibromat* dan *Hydroseed* untuk mengurangkan hakisan.

Meletakkan *Skid Tank* secara terus di atas tanah dan berdekatan antara satu sama lain.

PENGURUSAN BAHAN API (*FUEL*)

Menyimpan minyak dan gris yang telah digunakan di dalam tong, menggunakan *metal tray* atau konkrit bagi menggelakkan minyak meresap ke tanah dan di label dengan betul

Membiarkan tong-tong minyak dan gris terdedah kepada tanah.

* Minyak dan gris dikategorikan sebagai sisa bahan berjadual yang mana perlu dikendalikan mengikut syarat-syarat yang telah ditetapkan.

HOUSEKEEPING

Menyediakan kawasan penyimpanan yang teratur bagi bahan-bahan pembinaan.

Membuang tayar-tayar terpakai ke dalam sistem saliran.

HOUSEKEEPING

Menyediakan rumah kongsi yang teratur dilengkapi bekalan air dan fasiliti sanitari. Contohnya: Kuarters buruh berpusat (*Centralized Labour Quarters*).

Membina / menyediakan Rumah kongsi yang tidak teratur dan sampah sarap di buang di merata-rata tempat.

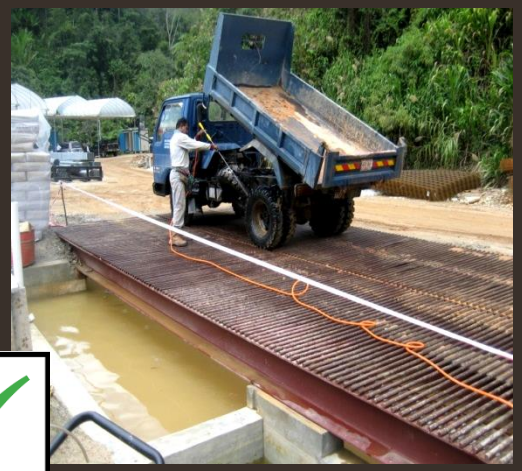
KUALITI UDARA

Water Bowser **digunakan untuk mengawal debu di sekitar tapak pembinaan.**

Pembinaan jajaran jalan berdebu mencemarkan udara.

KUALITI UDARA

Sediakan fasiliti bagi pembersihan tayar di *Exit Point* kawasan pembinaan sebagai contoh menggunakan *Wash Trough* dan *Water Jet.*



Membiarkan jalan raya kotor setelah kenderaan keluar dari tapak.

"Only one earth, we do not inherit it from our ancestors but we borrow it from our children"

Pemuliharaan Alam Sekitar Tanggungjawab Bersama

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