



APPENDIX



KenEp Consultancy & Services



Appendix 1-1

LAND TITLES

Kanun Tanah Negara
Borang 11AK
 (Jadual Keempat Belas)

HAKMILIK SEMENTARA
 BERSAMAAN DENGAN HAKMILIK PEJABAT PENDAFTARAN

No.	H.S.(D) : 3460	Cukai Tahunan : RM6,660.00
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Negeri : Terengganu
 Daerah : Dungun
 Bandar/Pekan/Mukim : Mukim Kuala Paka
 No. PT : PT 23741
 Luas Sementara : 55407 Meter Persegi
 Kategori Penggunaan Tanah : Perusahaan
 No. Lembaran Piawai : 124-C
 No. Permohonan Ukur :
 No. Fail : PTG.TR. 02/34/2016/0002

Pajakan selama tempoh 30 tahun berakhir pada 29 April 2048.

Didaftarkan pada 30 April 2018


 T.M. *Samudung...*
 Pendaftar

Dokumen hakmilik keluaran dikeluarkan pada 30 April 2018


 T.M. *Samudung...*
 Pendaftar

Pelan lakar/pelan tanah, bagi maksud pengenalan, adalah pada Borang B2.

SYARAT-SYARAT KHAS MENGENAI HAKMILIK SEMENTARA

1. Hakmilik ini adalah tertakluk kepada peruntukan-peruntukan Kanun Tanah Negara dan kepada syarat-syarat nyata dan sekatan-sekatan berikut :

SYARAT-SYARAT NYATA

- Tanah yang diluluskan ini hendaklah digunakan semata-mata untuk perusahaan kuari.
- Dalam tempoh dua (2) tahun daripada tarikh diluluskan tanah ini hendaklah dimulakan perusahaan kuari.
- Hanya perusahaan kuari ini sahaja dibenarkan diatas tanah ini.



Hakmilik : 110207HSD00003460
 Tarikh : 30/04/2018
 No. Versi : 1
 No. Salinan :
 Muka Surat : 1 [3]

mana-mana orang yang terlebih dahulu diberi kebenaran
bertulis oleh Majlis Mesyuarat Kerajaan Negeri.

2. Dalam pelan tanah pada Borang B2, sempadan yang ditunjukkan dengan warna merah, belum
ditetapkan secara ukur, adalah sementara sahaja.

Hendaklah dipenuhi apabila hakmilik dikeluarkan bagi sambungan

Tarikh mula-mula diberi milik :
No. hakmilik asal (Tetap atau sementara) :
No. hakmilik yang terakhir sekali :
(jika bertalian daripada di atas)

REKOD KETUANPUNYAAN

HEXATREND QUARRY SDN. BHD, 1/1 bhgn.

No Syarikat : 1178486-T

LOT 14019, KAMPUNG BUKIT BERAPIT, JALAN KELANTAN, KUALA TERENGGANU, 21060 TERENGGANU

REKOD URUSAN

PERKARA LAIN YANG MELIBATKAN HAKMILIK



Hakmilik : 110207HSD00003460
Tarikh : 30/04/2018
No. Versi : 1
No. Salinan :
Muka Surat : 3 [3]

Kanun Tanah Negara
Borang B2
(Jadual Keempat Belas)

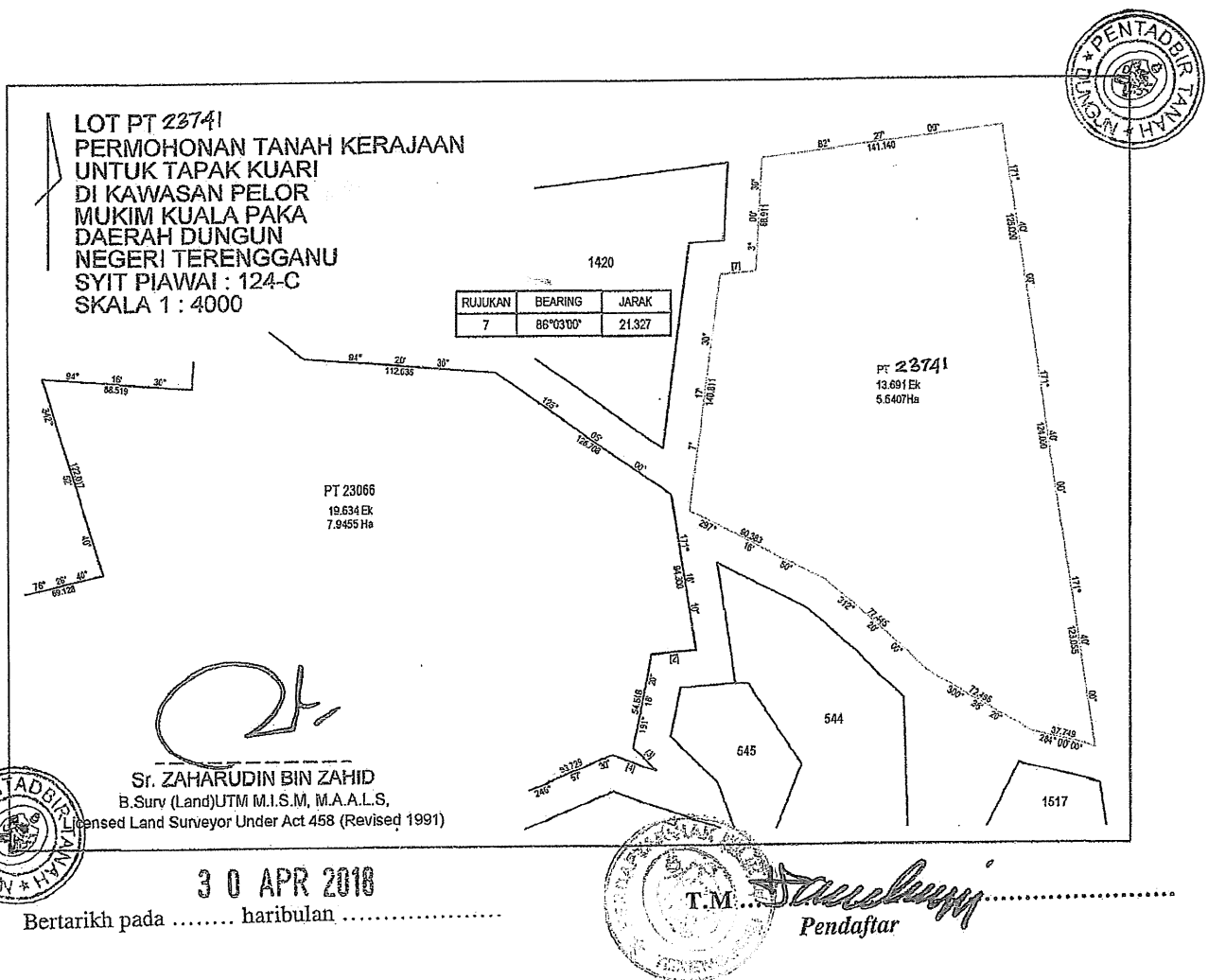
DHKK

PELAN TANAH
(Hakmilik Sementara)

Saya mengesahkan bahawa *pelan/pelan lakar yang di bawah ini adalah salinan benar *pelan/pelan lakar tanah. Butiran hakmilik adalah seperti berikut :

*H.S.(D)/H.S.(M) No.	:	HSD 3460
Negeri	:	Terengganu
Daerah	:	Dungun
*Bandar/Pekan/Mukim	:	Mukim Kuala Paka
No. Lembaran	:	124-C
No. Lot	:	PT 23741
Luas Sementara	:	55407 Meter Persegi

2. Dalam pelan yang di bawah ini, sempadan yang ditunjukkan dengan warna merah, belum ditetapkan secara ukur, adalah sementara sahaja.



Kanun Tanah Negara
Borang 11AK
 (Jadual Keempat Belas)

HAKMILIK SEMENTARA
 BERSAMAAN DENGAN HAKMILIK PEJABAT PENDAFTARAN

No.	H.S.(D) : 3459	Cukai Tahunan : RM9,540.00
-----	----------------	----------------------------

Negeri : Terengganu
 Daerah : Dungun
 Bandar/Pekan/Mukim : Mukim Kuala Paka
 No. PT : PT 23066
 Luas Sementara : 79455 Meter Persegi
 Kategori Penggunaan Tanah : Perusahaan
 No. Lembaran Piawai : 124-C
 No. Permohonan Ukur :
 No. Fail : PTG.TR. 02/34/2016/0002

Pajakan selama tempoh 30 tahun berakhir pada 29 April 2048.

Didaftarkan pada 30 April 2018



Dokumen hakmilik keluaran dikeluarkan pada 30 April 2018



Pelan lakar/pelan tanah, bagi maksud pengenalan, adalah pada Borang B2.

SYARAT-SYARAT KHAS MENGENAI HAKMILIK SEMENTARA

1. Hakmilik ini adalah tertakluk kepada peruntukan-peruntukan Kanun Tanah Negara dan kepada syarat-syarat nyata dan sekatan-sekatan berikut :

SYARAT-SYARAT NYATA

- Tanah yang diluluskan ini hendaklah digunakan semata-mata untuk perusahaan kuari.
- Dalam tempoh dua (2) tahun daripada tarikh diluluskan tanah ini hendaklah dimulakan perusahaan kuari.
- Hanya perusahaan kuari ini sahaja dibenarkan diatas tanah ini.



Hakmilik : 110207HSD00003459
 Tarikh : 30/04/2018
 No. Versi : 1
 No. Salinan :
 Muka Surat : 1 [3]

mana-mana orang yang terlebih dahulu diberi kebenaran
bertulis oleh Majlis Mesyuarat Kerajaan Negeri.

2. Dalam pelan tanah pada Borang B2, sempadan yang ditunjukkan dengan warna merah, belum ditetapkan secara ukur, adalah sementara sahaja.

Hendaklah dipenuhi apabila hakmilik dikeluarkan bagi sambungan

Tarikh mula-mula diberi milik :
No. hakmilik asal (Tetap atau sementara) :
No. hakmilik yang terakhir sekali :
(jika berlainan daripada di atas)

REKOD KETUANPUNYAAN

HEXATREND QUARRY SDN. BHD, 1/1 bhgn.

No Syarikat : 1178486-T

LOT 14019 KAMPUNG BUKIT BERAPIT, JALAN KELANTAN, KUALA TERENGGANU, 21060 TERENGGANU

REKOD URUSAN

PERKARA LAIN YANG MELIBATKAN HAKMILIK



Hakmilik : 110207HSD00003459
Tarikh : 30/04/2018
No. Versi : 1
No. Salinan :
Muka Surat : 3 [3]

Kanun Tanah Negara
Borang B2
(Jadual Keempat Belas)

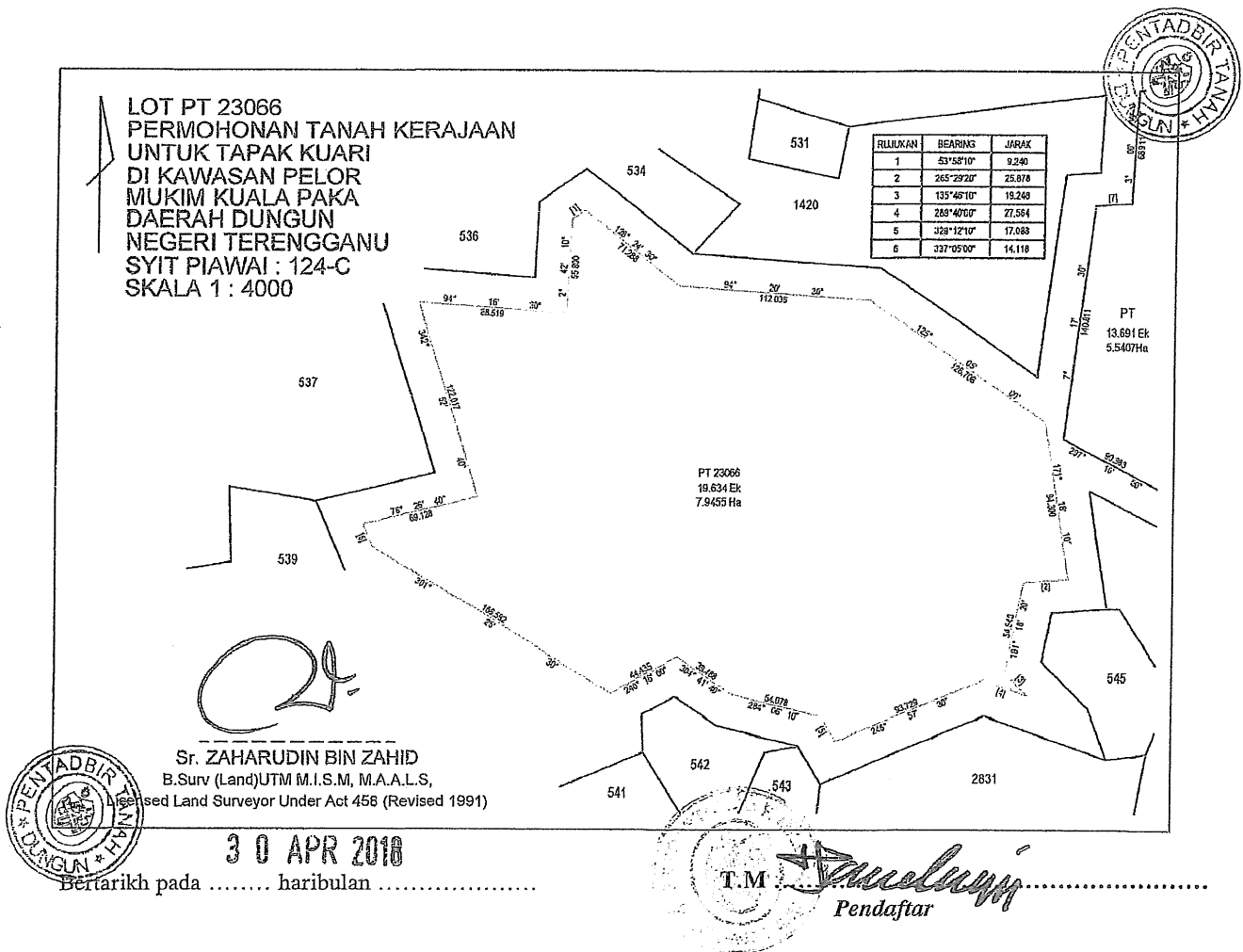
DHKK

PELAN TANAH
(Hakmilik Sementara)

Saya mengesahkan bahawa *pelan/pelan lakar yang di bawah ini adalah salinan benar *pelan/pelan lakar tanah. Butiran hakmilik adalah seperti berikut :

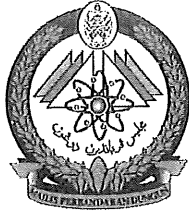
*H.S.(D)/H.S.(M) No.	:	HSD 3459
Negeri	:	Terengganu
Daerah	:	Dungun
*Bandar/Pekan/Mukim	:	Mukim Kuala Paka
No. Lembaran	:	124-C
No. Lot	:	PT 23066
Luas Sementara	:	79455 Meter Persegi

2. Dalam pelan yang di bawah ini, sempadan yang ditunjukkan dengan warna merah, belum ditetapkan secara ukur, adalah sementara sahaja.



Appendix 1-2

**LETTER FROM
MAJLIS
PERBANDARAN
DUNGUN
(REF:
MPD.08/01/2/88 (6)
DATED ON 13
FEBRUARY 2019)**



مجلس قريه دڠون
MAJLIS PERBANDARAN DUNGUN
23000 DUNGUN, TERENGGANU.
Tel.: 09-8481931, 09-8481932 Faks: 09-8483210
<http://mpd.terengganu.gov.my>
mpdungun@terengganu.gov.my

Ruj. Kami : MPD.08/01/2/88(6)
Bertarikh : 13 Februari, 2019
Bersamaan: 8 Jamadil Akhir, 1440



Pengarah Urusan,
KenEp Consultancy & Services
5-9, Jalan Jelapang Bayu 1,
Puncak Jelapang Bayu
30020 IPOH, PERAK DARUL RIDZUAN- Rujukan Tuan: KCS/HQ/472/Pt.1-50618/001/pw

Pengarah,
Jabatan Alam Sekitar,
Negeri Terengganu
Wisma Alam Sekitar
Off Jalan Sultan Omar
20300 KUALA TERENGGANU- Rujukan Tuan; AS(B)T:29/012/100/088(12)

Tuan,

PERMOHONAN MAKLUMAT DAN PENGESAHAN BERKAITAN KESESUAIAN AKTIVITI PENGKUARIAN UNTUK MELENGKAPKAN LAPORAN TERM OF REFERENCE (TOR) DAN LAPORAN PENILAIAN KESAN TERHADAP ALAM SEKELILING (EIA) BAGI CADANGAN PROJEK BERTAJUK 'PROPOSED GRANITE QUARRY OPERATION ON LOT PT 23066 WITH AN AREA OF OF 13.4862 HECTARES (33.325 ACRES) IN MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU DARUL IMAN'.

Dengan hormatnya saya merujuk kepada perkara tersebut di atas

2. Semakan jabatan berdasarkan Peta Cadangan Guna Tanah Rancangan Tempatan Daerah (RTD) Dungun (Penggantian) 2035 mendapati cadangan di atas Lot Pt 23066 seluas 13.4862 hektar (33.325 ekar) telah di zonkan sebagai kawasan hutan.
3. Sehubungan itu, jabatan berpandangan bahawa dari segi perancangan kawasan ini boleh dimajukan.
4. Sehubungan dengan itu, secara dasarnya pihak majlis tiada halangan terhadap permohonan diatas dengan syarat-syarat berikut:-
 - 4.1 Pihak pemaju/pemohon /penggerak projek/ perunding perlu mengemukakan permohonan Kebenaran Merancang Perlombongan (aktiviti pengkuarian), pelan bangunan, pelan infrastruktur, pelan jalan dan parit dan pelan kerja-kerja tanah secara online kepada pihak urusetia OSC, MPD sebelum pelaksanaan projek dimulakan untuk kelulusan Jawatankuasa Pusat Setempat (OSC),MPD.
 - 4.2 Perlu mematuhi Garis Panduan Perancangan semasa yang digunakan oleh Pihak Berkuasa Tempatan (PBT).
 - 4.3 Lain-lain syarat teknikal dan bukan teknikal daripada Agensi Teknikal Luaran dan Teknikal Dalaman yang menganggotai Mesyuarat Jawatankuasa Pusat Setempat (OSC) Majlis Perbandaran Dungun (MPD).



4.4 Lain-lain keperluan sebagaimana yang terkandung dalam Manual Penyediaan ulasan-ulasan EIA.

5. Senarai semak dan Prosedur permohonan yang perlu dikemukakan kepada OSC,MPD secara online, pihak pemaju/pemohon/ penggerak projek/ perunding dinasihatkan supaya berhubung terus dengan Urusetia OSC, MPD ditalian 09-8481931/09-8481932 sambungan 110/148/114/178/147.

6. Sebagai peringatan, tuan dimaklumkan iaitu melaksanakan pemajuan tanpa kebenaran merancang adalah menjadi satu kesalahan sebagaimana (**Seksyen 26, Akta Perancangan Bandar dan Desa) 1976 (Akta 172)** dan sabit kesalahan dikenakan denda **Lima Ratus Ribu Ringgit** atau **dipenjara selama tempoh tidak melebihi dua tahun** atau kedua-duanya berkenaan dengan sesuatu kesalahan yang berterusan, didenda selanjutnya sehingga **lima ribu ringgit** bagi setiap hari kesalahan itu berterusan selepas sabitan yang pertama bagi kesalahan itu.

Sekian.

" TERENGGANU MAJU, BERKAT, SEJAHTERA"

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(SAFUAN BIN ISMAIL)

Penolong-Pengarah

Jabatan Perancang Bandar dan Desa

b.p. Yang Dipertua

JABATAN PERANCANGAN PEMBANGUNAN DAN LANDSKAP

Segala kennusykilan mengenai perkara ini bolehlah dikemukakan / hubungi sambungan: 179/TALLANTERUS:8403179

Appendix 1-3

**LETTER FROM
JABATAN
PERANCANG
BANDAR DAN DESA
(JPBD)
(REF:
JPBD.TR.06/9372 (3)
DATED ON 26 JUN
2018)**



**JABATAN PERANCANGAN BANDAR DAN DESA
NEGERI TERENGGANU**

Tingkat 3 dan 4, Wisma Negeri,
20646 Kuala Terengganu,
TERENGGANU DARUL IMAN.

PLANMalaysia
@Terengganu

Perancangan Melalui Kelaziman
Planning - Beyond Conventional

No. Telefon (Pegarah) : 09-630 1212
(Pentadbiran/Am) : 09-630 1214 / 09-622 2444 samb. 4293
No. Faks : 09-624 4117

Ruj. Kami : JPBD.Tr. 06/9372 (3)
Bertarikh : 26 Jun 2018
Bersamaan : 12 Syawal 1439



Pegarah Urusan
KenEp Consultancy & Services
5-9, Jalan Jelapang Bayu 1
Puncak Jelapang Bayu
30020 IPOH, PERAK DARUL RIDZUAN.

Tuan,

**PERMOHONAN MAKLUMAT DAN PENGESAHAN BERKAITAN KESESUAIAN AKTIVITI
PENGKUARIAN UNTUK MELENGKAPKAN LAPORAN TERM OF REFERENCE (TOR) DAN
LAPORAN PENILAIAN KESAN TERHADAP ALAM SEKELILING (EIA) BAGI CADANGAN
PROJEK BERTAJUK 'PROPOSED GRANITE QUARRY OPERATION ON LOT PT 23066
WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES) IN MUKIM KUALA PAKA,
DISTRICT OF DUNGUN, TERENGGANU DARUL IMAN'.**

Dengan segala hormatnya saya merujuk perkara tersebut di atas dan surat tuan melalui rujukan KCS/HQ/472/Pl.1-S0618/001/PW bertarikh 12 Jun 2018 yang diterima oleh jabatan pada 19 Jun 2018 adalah berkaitan.

2. Untuk makluman pihak tuan, penyediaan laporan EIA perlu mengambilkira perkara dan aspek-aspek berikut:-

- i. Rancangan Fizikal Negara ke-3;
- ii. Dasar Perancangan Fizikal Desa Negara;
- iii. Rancangan Struktur Negeri Terengganu;
- iv. Rancangan Tempatan Daerah Dungun;
- v. Gunatanah sekitar kawasan, ciri-ciri fizikal tapak, topografi, kecerunan serta saliran; dan
- vi. Lain-lain keperluan sebagaimana yang terkandung dalam Manual Penyediaan Ulasan-ulasan EIA.

3. Semakan jabatan berdasarkan Peta Cadangan Guna Tanah Rancangan Tempatan Daerah (RTD) Dungun (Penggantian) 2035 mendapati tapak cadangan di atas lot PT 23066 seluas 13.4862 hektar (33.325 ekar) telah dizonkan sebagai Hutan Simpan Kekal Bukit Bauk.

4. Oleh itu, secara dasarnya tapak ini boleh dimajukan dari segi perancangan dengan mengambil kira perkara berikut:-

- i. Menyediakan zon penampakan 20 meter di bahagian barat tapak cadangan memandangkan jaraknya yang berdekatan dengan kawasan penempatan penduduk.

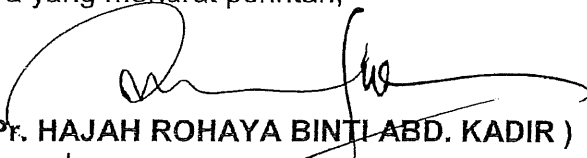
...2/-

PERMOHONAN MAKLUMAT DAN PENGESAHAN BERKAITAN KESESUAIAN AKTIVITI PENGKUARIAN UNTUK MELENGKAPKAN LAPORAN TERM OF REFERENCE (TOR) DAN LAPORAN PENILAIAN KESAN TERHADAP ALAM SEKELILING (EIA) BAGI CADANGAN PROJEK BERTAJUK 'PROPOSED GRANITE QUARRY OPERATION ON LOT PT 23066 WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES) IN MUKIM KUALA PAKA, DISTRICT OF DUNGAN, TERENGGANU DARUL IMAN'.

Sekian, terima kasih.

**"TERENGGANU MAJU, BERKAT, SEJAHTERA"
"BERKHIDMAT UNTUK NEGARA"**

Saya yang menurut perintah,


(TP. HAJAH ROHAYA BINTI ABD. KADIR)
Pengarah
PLANMalaysia Negeri Terengganu
(Jabatan Perancangan Bandar dan Desa
Negeri Terengganu Darul Iman).

s.k.

Pengarah
Hexatrend Quarry Sdn.Bhd
Lot 14019, Kampung Bukit Berapit
Jalan Kelantan
21060 KUALA TERENGGANU.

Appendix 1-4

**LETTER FROM
JABATAN
PERHUTANAN
NEGERI
TERENGGANU
(REF: PHNT
400/9/8/21 (5) DATED
ON 30 OCTOBER
2019)**



جباتن فرھوتانن نڬري، ترڠڬانو

JABATAN PERHUTANAN NEGERI
TERENGGANU

Tingkat 8, Wisma Negeri,
20200 KUALA TERENGGANU

Tel. Pejabat : 09-6222444 samb. 6808
Talian Terus : 09-6221587/6274122
Fax. : 09-6236552
Emel : phnt@forestry.terengganu.gov.my



Ruj. Kami : PHNT 400/9/8/21 (5)
Bertarikh : 30 Oktober 2019
Bersamaan : 02 Rabiulawal 1441H



Pengarah Urusan
KenEp Consultancy & Services
5-9, Jalan Jelapang Bayu 1
Puncak Jelapang Bayu
30020 Ipoh, Perak

YBhg Dato',

PERMOHONAN PENGESAHAN TENTANG STATUS SEMASA KAWASAN HUTAN DI TAPAK UNTUK MELENGKAPKAN LAPORAN PENILAIAN KESAN TERHADAP ALAM SEKELILING (EIA) BAGI CADANGAN PROJEK BERTAJUK "PROPOSED GRANITE QUARRY OPERATION ON LOT PT 23066 AND LOT PT 23741 WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES) IN MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU DARUL IMAN"

Dengan hormatnya saya diarah merujuk surat YBhg Dato' KSC/HQ/472/Pt.1-S0419/002/PW bertarikh 18 April 2019.

2. Adalah dimaklumkan, semakan dokumen dan pelan mendapati kawasan permohonan tidak terlibat dengan kawasan Hutan Simpanan Kekal. Oleh yang demikian pentadbiran ini tiada halangan ke atas permohonan tersebut.
3. Walau bagaimana pun, segala urusan ke atas hasil hutan di dalam kawasan ini hendaklah dirujuk kepada Jabatan Perhutanan dan ianya adalah tertakluk kepada undang-undang dan peraturan semasa yang berkuatkuasa dan tertakluk kepada Pekeliling Ketua Pengarah Perhutanan Semenanjung Malaysia Bil.1 2016 (Panduan Amalan Baik Hutan (*Good Forest Practices*) Untuk Pengusaha Kayu Kayan Tanah Kerajaan) yang menyatakan "Zon penampian perlu diadakan bagi kawasan pengusaha hutan yang bersempadan dengan HSK serta kawasan-kawasan perlindungan atau tanah rizab lain. Kelebaran zon penampian yang perlu diwujudkan ialah sekurang-kurang 20 meter dalam kawasan Tanah Kerajaan".

Sekian terima kasih.

"TERENGGANU MAJU, BERKAT, SEJAHTERA"
"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(HJ. WAN ABD. HAMID SHUKRI BIN WAN ABDUL RAHMAN)
Timbalan Pengarah Perhutanan (Pembangunan Hutan)
b.p. Pengarah Perhutanan Negeri Terengganu

PPPP/pphpp

Beautiful
Terengganu

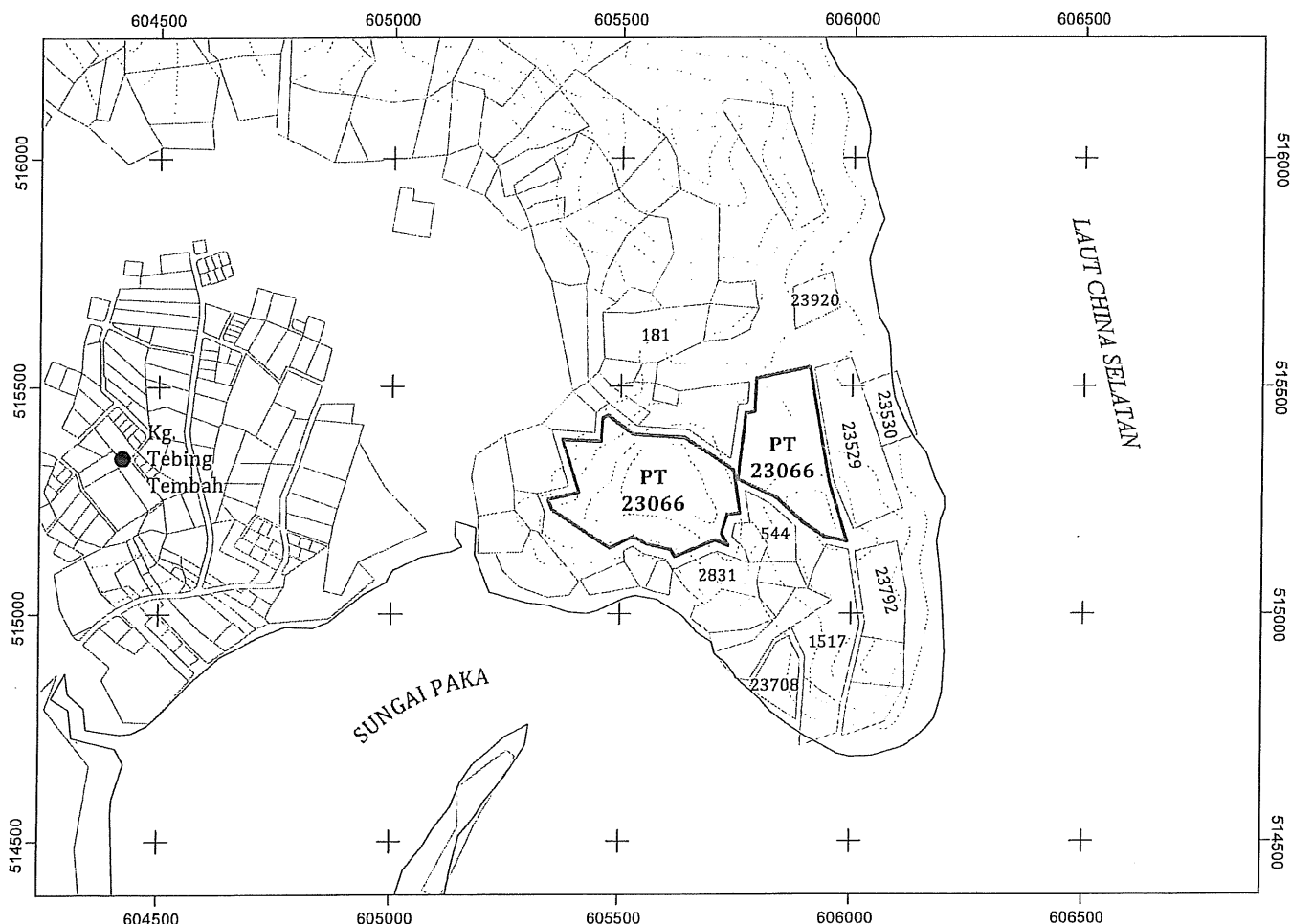
Malaysia

(Sila nyatakan rujukan Jabatan ini apabila berurusan)



PENGESAHAN STATUS SEMASA KAWASAN HUTAN BAGI CADANGAN PROJEK PERUSAHAAN KUARI

KAWASAN : Kg. Pelor
MUKIM : Kuala Paka
DAERAH : Dungun
TOPO : 4463



PELAN INDIKATIF



Kawasan yang dipohon oleh
KenEp Consultancy & Services
Seluas 13.486 Ha / 33.325 Ek (Kiraan GIS)
Tidak melibatkan kawasan Hutan Simpan



**JABATAN PERHUTANAN NEGERI
TERENGGANU**

Inilah pelan yang dimaksudkan didalam surat

Saya PHNT 40019/8/21C5

Bertarikh 30.10.2019.

Pengarah Perhutanan
Negeri Terengganu

DISEMAK OLEH

MUHAMMAD HAFIZ BIN AHMAD SARAJI
Penolong Pengarah
Perancangan dan Pengurusan Hutan
Jabatan Perhutanan Negeri
Terengganu

TARIKH

1
2019

DISEDIAKAN OLEH

Amir Nur Fuad Bin Md Yusof
Pelukis Pelan

TARIKH

11/6
2019

Appendix 1-5

**RIGHT OF WAY
(REF:
HQSB/rh/20200106)**

paka kuari

Ruj. tuan: HQSB/Paka Kuari/2019-001
Ruj. Kami: HQSB/rh/20200106

6 Januari 2020

HEXATREND QUARRY SDN. BHD. (1178486-T)
Lot 14019, Kg. Bukit Berapit, Jalan Kelantan,
21060 Kuala Terengganu,
Terengganu

Tuan

Per: **Memohon Kebenaran Untuk Laluan**

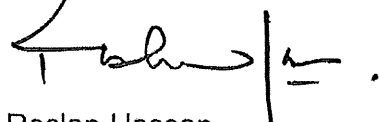
Surat tuan bertarikh 26 Disember 2019 mengenai perkara diatas dirujuk.

Mengenai permohonan tuan untuk kebenaran laluan ke tanah tuan Lot PT23741 dan Lot PT23066 melalui jalan laluan kuari yang telah dibina oleh syarikat kami sejak tahun October 2017, kami sukacita memaklumkan yang secara dasar kami bersedia memberi kebenaran untuk tuan melalui jalan tersebut dengan syarat tuan membayar balik kepada syarikat kami sebahagian daripada perbelajaan kos investasi yang telah kami keluarkan untuk membina jalan laluan tersebut dan juga kos pemeliharaan/maintenance yang telah dikeluarkan untuk menjaga baik kondisi jalan laluan tersebut sejak ianya dibina sehingga sekarang ini.

Sila berhubung terus dengan saya Roslan Hassan di nombor talipon 019-3829371 untuk butiran lanjut.

Sekian. Terima kasih.

Yang benar
PAKA KUARI SDN. BHD.



Roslan Hassan
Pengarah Urusan

PAKA KUARI SDN. BHD. (1254156-H)
Suite 601, Block B, Phileo Damansara 1,
46350 Petaling Jaya, Selangor, MALAYSIA
Tel: +603-7968 3366 Fax: +603-7968 3399

Appendix 1-6

**MEETING MINUTE
(REF:
AS(B)T:29/012/100/0
88(25) DATED ON 31
JANUARY 2019)**



JABATAN ALAM SEKITAR NEGERI TERENGGANU
WISMA ALAM SEKITAR
OFF JALAN SULTAN OMAR
20300 KUALA TERENGGANU



Telefon: 09-6261044/6247110/7159
Faks: 09-6226877/09-6227877
Laman Web: www.doe.gov.my

AS(B)T: 29/012/100/088(25)

31 Januari 2019

JABATAN/AGENSI SEPERTI SENARAI EDARAN

Tuan,

BIDANG RUJUKAN (TERMS OF REFERENCE – TOR) BAGI THE PROPOSED GRANITE QUARRY OPERATION ON PT 23066 WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES) IN MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU DARUL IMAN

Saya dengan hormatnya diarah merujuk kepada perkara di atas. Mesyuarat TORAC yang diadakan di Jabatan ini pada **30 Januari 2019** adalah berkaitan.

2. Bersama ini dikemukakan satu salinan minit mesyuarat tersebut untuk rujukan dan tindakan tuan seterusnya.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(MOHD FAIZAL BIN MOKHTAR)

b.p.: Pengarah Jabatan Alam Sekitar Negeri Terengganu

"Pemuliharaan Alam Sekitar, Tanggungjawab Bersama"



PENGIKTIRAFAN MS ISO 9001 : 2008
NO. SIJIL : AR 5141

(Silalah catat rujukan jabatan ini apabila berhubung)

SENARAI EDARAN

1. Yang Di Pertua
Majlis Perbandaran Dungun
Jalan Yahaya Ahmad
23000 DUNGUN
2. Pengarah
Jabatan Perancang Bandar dan Desa
Tingkat 4, Wisma Negeri
20646 KUALA TERENGGANU
3. Pengarah
Jabatan Pengairan Dan Saliran
Negeri Terengganu
Tingkat 6, Wisma Negeri
20626 KUALA TERENGGANU
4. Pentadbir Tanah
Pejabat Daerah Dan Tanah Dungun
Jalan Yahaya Ahmad
23000 DUNGUN
5. Pengarah
Jabatan Mineral & Geosains Terengganu
TT3102K Jalan Sultan Sulaiman
21300 KUALA TERENGGANU
6. Pengurus Urusan
Hexatrend Quarry Sdn. Bhd.
No.1, Lot 14019, Kg. Bukit Berapit
Jalan Kelantan
21060 KUALA TERENGGANU
7.  Pengurus
KenEp Consultancy & Services Sdn. Bhd.
31 & 33, Persiaran Jelapang Maju 2
Taman Perindustrian Ringan Jelapang Maju
30020 IPOH

No. Tel : 09-8481931
No. Faks : 09-8483210

No. Tel: 09-627 4292
No. Faks: 09-624 4117

No. Tel: 09-627 4167
No.Faks: 09-623 2646

No. Tel : 09-8481616
No. Faks : 09-8452217

No. Tel: 09-625 1000
No. Faks: 09-625 1100

TANDAIKANGAN:		TARIKH:
CATATAN:		
TANDAIKANGAN:		
TARIKH TERIMA	20.2.19	

**MINIT MESYUARAT *TERMS OF REFERENCE ADEQUACY CHECK (TORAC)* BAGI
BIDANG RUJUKAN (*TERMS OF REFERENCE – TOR*) *THE PROPOSED GRANITE
QUARRY OPERATION ON PT 23066 WITH AN AREA OF 13.4862 HECTARES
(33.325 ACRES) IN MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU
DARUL IMAN OLEH HEXATREND QUARRY SDN. BHD.***

TARIKH : 30 Januari 2019
MASA : 10.00 Pagi
TEMPAT : Bilik Mesyuarat Utama, Jabatan Alam Sekitar Terengganu

KEHADIRAN :

1. En. Ramli bin Abd Rahman - Pengerusi
Pengarah Jabatan Alam Sekitar Terengganu
2. Mohd Norli bin Abdullah
Jabatan Alam Sekitar Terengganu
3. Pn. Nurwani bt. Mat Nashir
Plan Malaysia Terengganu
4. En. Muhamad Suhardi bin Mohamad
Majlis Perbandaran Dungun
5. En. Abdillah bin Jaafar
Pejabat Tanah Dungun

PENGERAK PROJEK - Hexatrend Quarry Sdn. Bhd.

6. En. Yip Kong Wah
7. En. Omar bin Mohamad

PERUNDING EIA - Kenep Consultancy & Services

8. Ir. Fakhrol Zakee
9. Cik Wong Yuen Key

TIDAK HADIR

10. Jabatan Pengairan dan Saliran Terengganu
11. Jabatan Mineral dan Geosains Terengganu

URUSETIA

12. En. Mohd Faizal bin Mokhtar
13. Pn. Siti Rusliza binti Mokhtar

1.0 PERUTUSAN Pengerusi

- 1.1 Tuan Pengerusi memulakan mesyuarat dengan bacaan Al-Fatihah dan mengalu-alukan kedatangan semua ahli mesyuarat.
- 1.2 Tuan Pengerusi memaklumkan bahawa mesyuarat diadakan untuk membincangkan TOR bagi cadangan aktiviti pengkuarian batu granit di PT 23066 mukim Kuala Paka oleh Hexatrend Quarry Sdn. Bhd. Laporan TOR bagi projek ini disediakan oleh Ir. Fakhru Zakee dari Kenep Consultancy & Services.

Makluman

2.0 TAKLIMAT PERUNDING/PENGGERAK PROJEK

- 2.1 Pembentangan Laporan TOR telah disampaikan oleh Ir. Fakhru Zakee selaku Ketua Jururunding EIA.

Makluman

3.0 ISU-ISU BERBANGKIT

- 3.1 Ringkasan isu-isu yang telah dibangkitkan di dalam mesyuarat ini adalah seperti di **LAMPIRAN .**

Tindakan: Penggerak projek/Jururunding EIA dan makluman semua ahli

4.0 KEPUTUSAN MESYUARAT

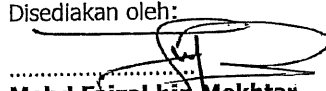
- 4.1 Mesyuarat memutuskan bahawa berdasarkan penilaian pada laporan TOR yang dikemukakan dan isu-isu yang dibangkitkan ahli mesyuarat, TOR bagi aktiviti ini perlu dikemaskini dengan maklumat tambahan dan dikemukakan semula dalam tempoh 10 hari.

Tindakan: Penggerak projek/Jururunding EIA dan makluman semua ahli.

5.0 PENUTUP

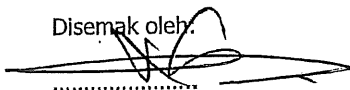
- 5.1 Mesyuarat ditangguhkan pada jam 12.00 tengahari dengan ucapan terima kasih kepada semua ahli mesyuarat yang hadir.

Disediakan oleh:


Mohd Faizal bin Mokhtar
Penolong Pengarah Kanan

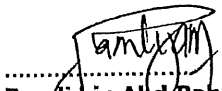
30/1/19

Disemak oleh:


Mohd Norli bin Abdullah
Ketua Penolong Pengarah

31/1/2019

Diluluskan oleh:


Ramli bin Abd Rahman
Pengarah Jabatan Alam Sekitar Terengganu

31/1/19

ISU-ISU YANG TELAH DIBANGKITKAN DALAM MINIT MESYUARAT *TERMS OF REFERENCE ADEQUACY CHECK (TORAC)* BAGI LAPORAN TERMA RUJUKAN (*TERMS OF REFERENCE – TOR*) BAGI *THE PROPOSED GRANITE QUARRY OPERATION ON PT 23066 WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES)* IN MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU DARUL IMAN OLEH HEXATREND QUARRY SDN. BHD.

BIL.	PERKARA	AGENSI	TINDAKAN
1.	a. Tuan Pengerusi memaklumkan cadangan projek merupakan tambahan kepada dua kuari sedia ada di kawasan tersebut dan akan memberi impak kepada keadaan trafik. Penggerak projek perlu menjalankan penilaian berkaitan trafik sedia ada dan impak selepas projek dijalankan serta merujuk kepada JKR semasa menjalankan kajian EIA. b. Tuan Pengerusi juga memaklumkan operasi kuari dijangka akan beri kesan kepada <u>kualiti Sungai Dal dan Sungai Paka</u>. Kajian perlu memberi penekanan berkaitan impak dan langkah kawalan terhadap sungai tersebut. c. Perunding diminta untuk menjalankan <u>engagement program</u> dengan semua Jabatan yang terlibat dalam kajian EIA ini. Antaranya adalah Jabatan Perhutanan bagi mengetahui <u>status</u> sebenar kawasan hutan dalam tapak. d. Wakil JAS memaklumkan <i>study boundries</i> untuk kajian ini perlu dibuat 5 km radius untuk memastikan impak kepada penempatan terdekat dibuat. e. Selain itu, data meteoreologi daripada stesen terdekat perlu digunakan dalam permodelan <u>kualiti udara</u> yang akan dijalankan. f. Mengambil kira operasi kuari Paka Kuari sedia ada, perunding perlu menjalankan kajian secara kumulatif bagi semua impak Langkah kawalan yang akan dicadangkan perlu mengambilkira magnitud impak.	JAS	Penggerak projek/Jururunding

	g. <i>Statement of need</i> laporan juga perlu menyatakan dengan jelas mengapa aktiviti kuari projek ini perlu dilaksanakan.		
2.	a. Wakil Plan Malaysia memaklumkan zoning mengikut RT Daerah Dungun adalah perhutanan dan masih tiada perubahan. Aktiviti kuari adalah boleh dijalankan berdasarkan kelas kegunaan tanah kawasan tersebut. b. Perunding perlu menyatakan kesesuaian projek dengan Rancangan Fizikal Negara 3, Rancangan Struktur Negeri dan Rancangan Tempatan Daerah dalam laporan EIA. c. Perunding juga diminta untuk memasukkan cadangan kajian sosioekonomi di dalam TOR seperti kaedah kaji selidik yang akan digunakan dan bilangan sampel untuk kajian hendaklah sesesuai dengan bilangan penduduk di kawasan tersebut.	Plan Malaysia Terengganu	Penggerak projek/Jururunding
4.	a. Wakil Pejabat Tanah Dungun memaklumkan kelulusan tanah telah diberikan kepada Hexatrend untuk dua lot iaitu Lot PT 23066 dan Lot PT 23741. b. Selain itu, terdapat hanya satu jalan masuk ke tapak yang disediakan oleh Paka Kuari. Penggerak projek perlu berbincang dengan Pejabat Tanah Dungun dan Paka Kuari untuk penggunaan jalan tersebut. c. Wakil JAS memaklumkan, perunding perlu meminda tajuk TOR dengan memasukkan ke dua-dua nombor lot seperti mana input Pejabat Tanah Dungun.	Pejabat Tanah Dungun	Penggerak projek/Jururunding
5.	a. Wakil Majlis Perbandaran Dungun memaklumkan tiada halangan ke atas laporan. b. Penggerak projek perlu mengemukakan Kebenaran Merancang untuk cadangan kuari tersebut.	Majlis Perbandaran Dungun	Penggerak projek/Jururunding

	c. Wakil JAS memaklumkan penggerak projek untuk menyelesaikan isu berkaitan zoning dengan MPD sebelum laporan EIA dikemukakan.		
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Appendix 1-7

**TOR ENDORSED
LETTER
(REF:
AS(B)T:29/012/100/
088(31) DATED ON
18 FEBRUARY
2019)**



JABATAN ALAM SEKITAR NEGERI TERENGGANU
WISMA ALAM SEKITAR
OFF JALAN SULTAN OMAR
20300 KUALA TERENGGANU



Telefon: 09-6261044/6247110/7159
Faks: 09-6226877/09-6227877
Laman Web: www.doe.gov.my

AS(B)T: 29/012/100/088(31)

18 Februari 2019



Pengurus Urusan
Hexatrend Quarry Sdn. Bhd.
No.1, Lot 14019, Kg. Bukit Berapit
Jalan Kelantan
21060 KUALA TERENGGANU

No. Faks: 09-6664862

Tuan,

BIDANG RUJUKAN (TERMS OF REFERENCE – TOR) BAGI THE PROPOSED GRANITE QUARRY OPERATION ON PT 23066 AND PT 23741 WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES) IN MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU DARUL IMAN - FEBRUARY 2019

Saya dengan hormatnya merujuk kepada surat tuan, HQSB/JAS/2018-003 bertarikh 30 Januari 2019 yang diterima pada 10 Februari 2019 dan Mesyuarat *Terms of Reference Adequacy Check (TORAC)* yang telah diadakan pada 22 Januari 2019 berkaitan perkara di atas.

2. Setelah menyemak dan meneliti Bidang Rujukan tersebut, sukacita dimaklumkan bahawa Bidang Rujukan bagi cadangan projek di atas adalah **DISAHKAN**.

3. Sehubungan itu, **pihak tuan boleh meneruskan kajian dan penyediaan Laporan EIA** dengan berpandukan Bidang Rujukan yang disahkan dan senarai semak seperti di **Lampiran 1** bagi memastikan kesemua skop kajian dinyatakan diambil kira di dalam laporan EIA kelak. Laporan EIA perlu disediakan mengikut garispanduan *Environmental Impact Assessment Guideline in Malaysia 2016* terbitan Jabatan Alam Sekitar.

4. Tuan juga perlu memastikan isu berkaitan aktiviti projek yang tidak selaras dengan pengezonan dalam Rancangan Tempatan Daerah Dungun diselesaikan sebelum laporan EIA dikemukakan.

5. Pengesahan ke atas Bidang Rujukan ini hanya sah diterima pakai dalam tempoh **satu (1) tahun dari tarikh surat ini dikeluarkan dan akan terbatal sekiranya kajian EIA tidak dilaksanakan dalam tempoh tersebut**.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(ZAKARIA BIN AHMAD MOHD)

Pemuliharaan Alam Sekitar, Tanggungjawab Bersama"
b.p. Pengarah Jabatan Alam Sekitar Negeri Terengganu



Appendix 1-6

EIA CHECKLISTS

PLANNING AND EIA CHECKLIST FOR QUARRIES

	ITEM	REQUIREMENT	REFERENCE	REMARK
1	REGISTRATION REQUIREMENTS			
a)		Is proposed quarry within 5 km of existing residential, commercial or industrial area	Para 1.1, 5.1.1, 6.13, 6.14, 6.15 Fig 1-2,6-8(a)	
b)		Has proponent registered and reviewed EIA requirements with DOE?	Para 1.3	
2	GENERAL DATA			
a)	Initiator	Name, address and telephone, telex numbers. Name of contact person	Para 1.1, 1.2	
b)	Project objective	Brief statement of objective of the project	Para 1.4, 2.1	
c)	Location	Location map and co-ordinates	Para 1.1, 5.1 Fig 1-1, 1-2, 5-1, 5-2, 5-3	
d)	Area	Bounds and size of quarry site area, loading areas and transportation routes.	Fig 5-2 App 5-1	
e)	Schedule	Development schedule showing phases of development and timeframe involved.	Para 5.6 Fig 5-4	
g)	EIA Consultant	Name(s), areas of expertise, academic qualifications	Para 1.1, 1.2	
h)	Other Support Groups	Name and address of other supporting consultants and companies (ie. testing laboratories, soil surveyor, and others).	-	
3	INFORMATION OF THE PROJECT			
a)	Type of Quarry	Type of rock material to be produced	Para 5.1.5, 5.1.6	
		Quarry production rate	Para 5.1.6	
		Number of employees	Para 5.1.11	
		Quarrying method	Para 5.6.2	
		Layout diagram of site including key features such as quarry crusher, admin buildings, waste rock/stockpiles etc., haul roads, water intake, discharge point(s), pipelines, living quarters, other facilities	App 5-1	

	ITEM	REQUIREMENT	REFERENCE	REMARK
3	INFORMATION OF THE PROJECT			
a)	Type of Quarry	Crushing, screening and other processing	Para 5.1.8	
		Transportation system(s)	Para 5.6.2	
b)	Project Planning	Describe existing land use	Para 6.15	
		Proposed post-production land use	Para 5.4	
		Review of rehabilitation plan and quarrying plan	Para 5.4	
		Economic analysis to demonstrate project viability	Para 3.1.1	
c)	Geology	Describe geological structure and setting	Para 6.3 Fig 6-2	
		Identify rock material types present	Para 6-4 Fig 6-3	
		Define estimated reserves	Para 5.1.5	
		Overburden type and depth	Para 5.6.3	
		Are sulfides present in ore and waste rock? (if so and any strata acid generating? - present test data)	Para 6.3	Sulfide present unlikely
d)	Quarry Detail	Quarry type and capacity	Para 5.1.6, 5.6.2	
		Quarrying method proposed	Para 5.1.4, 5.6.2	
		Quarrying equipment to be used	Para 5.1.8	
		Physical dimensions to proposed quarry	App 5-1	
		Volume of rock material product to be quarried per day	Para 5.1.4	
		Stripping ratio	Para 5.6.1	
		Number of persons to be employed in the quarry	Para 5.1.11	
		Number of hours per week to be operated	Para 5.1.6	
		Will blasting be used	Para 5.6.2	
		If so, blasting method and frequency	Para 5.6.2	
		Estimated pit water volume and quality	-	
		Has pit wall stability been investigated	-	
		See Section 3j for rehabilitation		
e)	Beneficiation	What beneficiation is provided on site eg. crushing, grinding, screening, washing, other	Para 5.6	

	ITEM	REQUIREMENT	REFERENCE	REMARK
3	INFORMATION OF THE PROJECT			
e)	Beneficiation	type of products, rate of production, chemical characteristics.	Para 5.1.6	
		How stored and storage volume	-	
		Water demand, percent from recycles	Para 5.6.2	Sprinkler
		Wastewater volume and quality	-	
		are tailings acid generating?	-	
		are reagent used, if so type, volume, toxicity	-	No reagent involved
		are tailing produced, if so characteristics inc, volume slurry solids concentration, classification, chemical characteristics	-	Siltation and sedimentation
		any other wastes?	Para 5.6.3	
		power needs	Para 5.1.10	
		any stack emissions?	-	No stack emissions
		dust and noise levels and controls	Para 6.9, 6.10, 6.11	
		hours per week of operation	Para 5.1.4	
f)	Waste and Stock Piles	type of waste and stock piles	Para 5.6.3	
		volumes, production rate, max. size	Para 5.6.3	
		chemical characteristics of stored material	-	Normal rock aggregates products
		is it acid generating?	-	No acid generating
		any other leachate problems?	-	No leachate material
		is ground water protected?	Para 7.4.4	
		what are rehabilitation and land use plans?	Para 5.4, 5.1.2	
	Waste and Stock Piles	any aesthetic problems?	Para 7.4.19	
		transportation and construction methods	Para 5.6.1	
		noise and dust management methods.	Para 8.2.8, 8.2.9	

	ITEM	REQUIREMENT	REFERENCE	REMARK
3	INFORMATION OF THE PROJECT			
g)	Tailing Disposal	most quarries do not produce tailings. If so, use mines checklist (Table 1-3).	-	No tailing generated
h)	Water Management	have site water balances been prepared? - average, peak and low flow scenarios	-	
		what are reuse and recycle opportunities?	Para 5.6.2	Potential reuse and recycle of water
		define water withdrawals including volume and source	-	
		what percentage of dry weather flow is the withdrawal?	-	
		volume and quality of discharge(s)	Para 5.6.2	
		are clean and contaminated flows segregated?	Para 5.6.2	
		what type of treatment is required/provided?	Para 5.6.2	
		how are peak flows managed?	-	
		are pumping capacities adequate?	-	-
		what monitoring is proposed or provided?	Para 9.3	
i)	Transportation System	type of <u>on-site</u> transportation system eg. trucks, conveyor, rail, tramway, etc.	Para 5.6.2	
		capacity, rate, unit, sizes	Para 5.6.2	
		type of <u>off-site</u> transportation system	Para 5.6.2	
		type of product shipped	Para 5.6.2	
		any hazardous material?	-	No hazardous mat.
		describe any offsite transfer facilities	-	Not available
		highway capacity, traffic loading and condition	Para 7.4.14	
		shipping contract arrangement	-	
		any impact from dust, noise, spillage, leachates, runoff etc.	Para 7.4.9, 7.4.10, 7.4.11	
j)	Rehabilitation	is the rehabilitation plan compatible with long term land use, the mining plan and local planning objectives?	Para 5.6.1	

	ITEM	REQUIREMENT	REFERENCE	REMARK
3	INFORMATION OF THE PROJECT			
		is progressive rehabilitation provided?	Para 5.6.1	
		are all quarry site elements addressed and integrated eg. quarry, waste dumps, etc?	Para 5.6.1	
		are disruptive forces provided for, incl. slope stability and flood routing?	Para 8.2.5	
		provision for safety of the site after closure	Para 8.2.19	
		is there provision for access and egress from flooded pits?	-	
j)	Rehabilitation	define ongoing treatment and maintenance requirements after closure	Para 5.6.3	
		have social attitudes and requirements been addressed?	Para 6.14	
		define value of rehabilitation bond and its administration	-	No requirement for such bond.
4	DESCRIPTION OF THE ENVIRONMENTAL			
a)	Maps and Plans	topographical map of project region to at least 1:50,000 with contours, river basins other major features and infrastructure	Fig 6-1	
		site survey plan of 1:5,000 or larger showing features and proposed layout	App 5-1	
		land use map showing land use within 5 km radius of the project.	Fig 6-8(a)	
		map showing geological and soil types	Fig 6-2, 6-3	
b)	Geological Setting	description of regional geological setting including bedrock and surficial geology	Para 6.3	
		description of the ore body	-	No ore body.
c)	Climate	presentation of meteorological data on wind, temperature, precipitation, weather pattern.	Para 6.5	
d)	Air Quality	data on existing air quality such as TSP, SO_x, NO, noise level, dispersion characteristics, existing emissions.	Para 6.9, 7.4.9,	

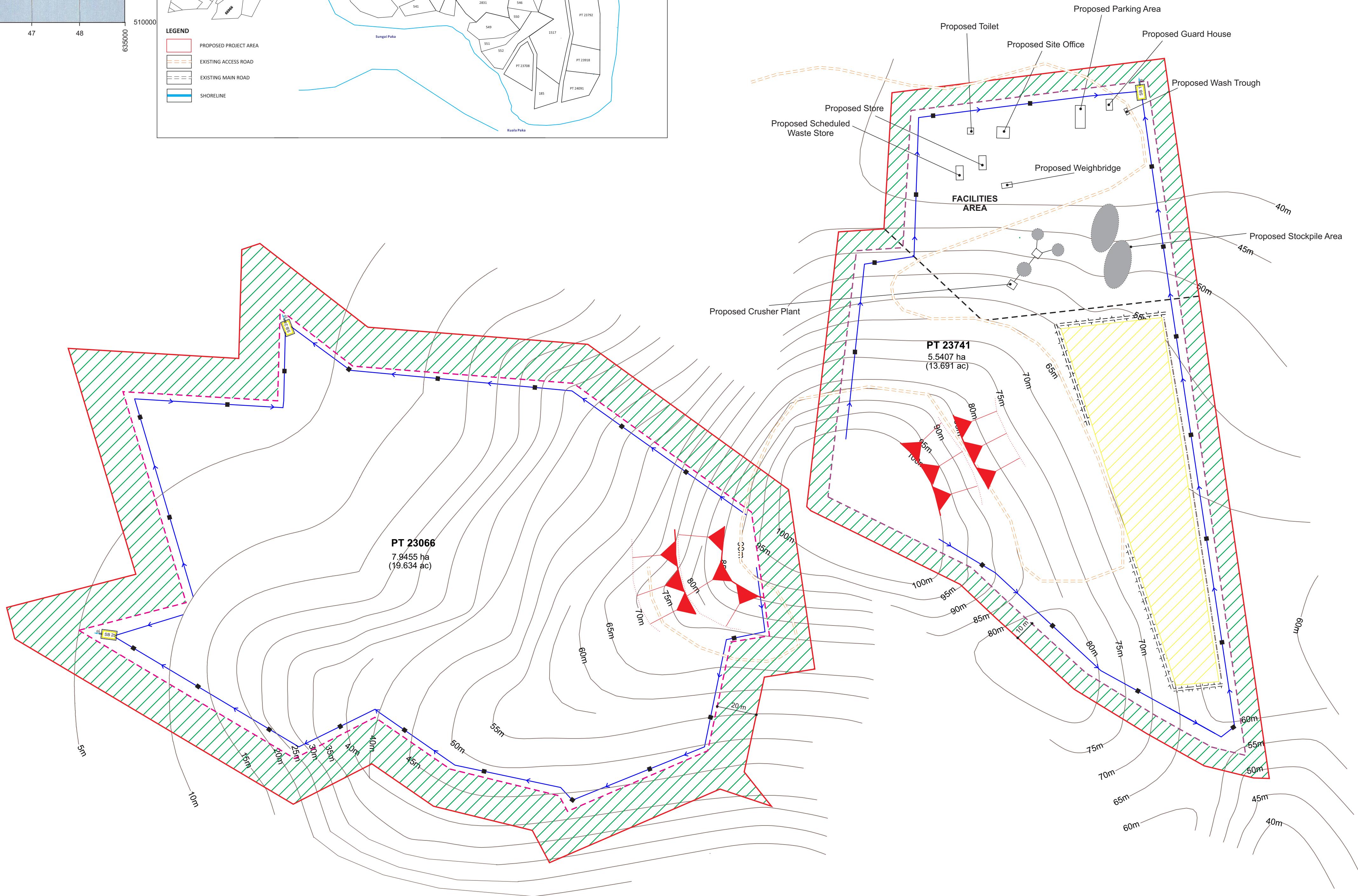
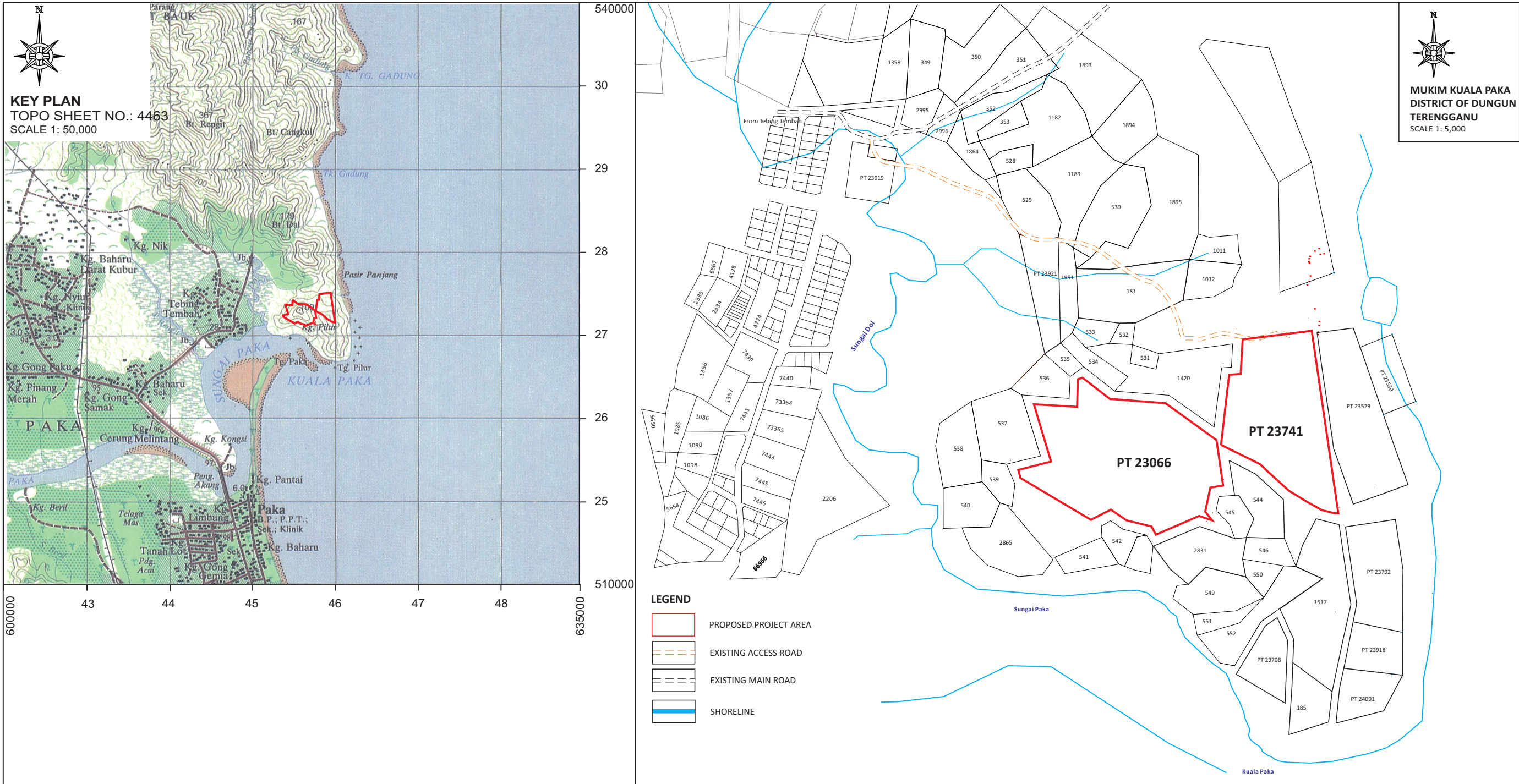
	ITEM	REQUIREMENT	REFERENCE	REMARK
4	DESCRIPTION OF THE ENVIRONMENTAL			
e)	Water Resource	description of the groundwater regime, local wells, quality and potential	Para 6.7, 7.4.4,	
		description of the surface water resource inc. hydrological data on rivers, streams, lakes and wetlands	Para 6.6	
		presentation of surfaces water quality data	Para 6.8.4	
		identification of existing water user and discharges	Para 6.8.2	
f)	Coastal/Marine	describe wave climate, currents, tides, surges	Not relevant	located on land.
		sediment dynamics and stability	Not relevant	located on land.
		describe coastal ecological setting including estuaries, mangroves, coral areas, beaches, etc.	Not relevant	located on land.
		present data on water quality, fish and wildlife	Not relevant	located on land.
g)	Flora and Fauna	presentation of data to define the aquatic ecological systems in the area including any critical elements in the food chain	Para 6.13, 7.4.16	
		as above for terrestrial ecological systems	Para 6.13, 7.4.16	
		definition of bird and waterfowl present and their habitat.	Para 6.12, 7.4.16	
h)	Socio-Economy	presentation of a demographic profile for the area including population, employment and income	Para 6.14	
		cultural / heritage profile for the region	-	
		economic profile	Para 6.14	
		description of land use in the area	Para 5.1.2	
		identification of religious and archaeological sensitive sites	-	
		description of public communication relative to the project	Para 6.14	
i)	Valued Environmental Components	identification of VECs which will become focus of the impact analysis	Para 7.3	

	ITEM	REQUIREMENT	REFERENCE	REMARK
5	IMPACT ANALYSIS			
a)	Matrix	- presentation of an impact matrix for each phase of the project including: - pre-production activities - operational (ie. Production) phase - post-production phase	Para 7.2, 7.3	a)
b)	VEC Review	- Description of impacts on all VECs identified in the matrix as potentially impacted by the project, possibly including: - surface water quality and quantity - air quality inc. dust and noise - land use during and after operation - economic and social impacts - operational and post-closure impacts of the quarry, waste rock, vibration and airblast during blasting, rehabilitation programme, any other key components	Para 7.4.1 – Para 7.4.20	b)
6	MITIGATION MEASURES			
a)	Identification and Review	- Describe proposed mitigative measures to address all potential impacts, possibly including: - long-term land use plan - rehabilitation plan - progressive rehabilitation - surface erosion minimization - surface water management and treatment - groundwater protection measures - ADM management and treatment - waste pile management - tailing disposal area operation and rehabilitation - noise minimization - dusting control	Para 8.2.1 – Para 8.2.20	

	ITEM	REQUIREMENT	REFERENCE	REMARK
6	MITIGATION MEASURES			
a)	Identification and Review	- transportation impact management - post-closure site stabilization - post-closure social transitions	Para 8.2.1 – Para 8.2.20	
b)	Residual impacts	• identify and describe all impacts remaining for each phase after application of mitigative measures	Para 8.3	
7	ENVIRONMENTAL MANAGEMENT PLAN (EMP)			
a)	Key Environmental issue	• Define key environmental issues based on VEC and project activities	Para 9.1.2	
b)	Action	• summarize mitigative measures described in item 6(a)	Para 8.3	
c)	Monitoring	• Describe environmental monitoring program proposed for air, surface water, groundwater, flora, fauna, noise, subsidence, etc.	Para 9.3	
		• Describe environmental auditing program.	Para 9.2	

Appendix 5-1

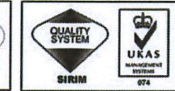
**PROPOSED
QUARRY SCHEME
PLAN**



LEGEND	
	Proposed Quarry Area
	Proposed Access/ Haulage Road
	Proposed Sediment Basin
	Proposed Overburden and Biomass Dumping Area
	Proposed Buffer Zone (10 m)
	Proposed Buffer Zone (20 m)
	Proposed Final Spillway
	Proposed Temporary Drainage with Check Dam
	Chain Link Fencing
	Proposed Quarry Face
	Proposed Dykes/ Earth Bund
	Proposed Silt Fence
	Proposed Vegetation Strips
CONSULTING ENGINEER	
PROJECT PROPONENT	
PROJECT PROPONENT HEXATREND QUARRY SDN. BHD.	
DRAWING TITLE PROPOSED QUARRY SCHEME PLAN	
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**LAND DISTURBING
POLLUTION
PREVENTION AND
MITIGATION
MEASURES
(LDP2M2)**

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



***Proposed Granite Quarry Operation on PT 23066 and PT 23741
With An Area of 13.4862 Hectares (33.325 Acres)
In Mukim Kuala Paka, District of Dungun,
Terengganu Darul Iman***

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LD-P2M2 SUBMISSION CHECKLIST

ITEM	PAGE	MARK √ — Yes X — No NA — Non Applicable	REMARKS
1.0 Project Activity and Implementation			
(a) Phasing plan if relevant	Appendix 1	√	
(b) Project implementation schedule	Table 3	√	
(c) Description of the construction activity	9-11	√	
(d) Construction schedule for each major land disturbance complete with timeline or chart for the installations of P2M2s	Table 3	√	
(e) Typical method statement for site clearing, cut and fill, excavation of foundation, drilling of borehole, in-stream works and construction of temporary/permanent stream/ river crossing and diversion that incorporate the significance elements of pollution prevention and mitigation measures.	3-11	√	
(f) Estimated start date, completion date and stabilization schedule for each major land-disturbing activities or construction activities phases, stages and sequences.	Table 3	√	
2.0 Information and Analysis on Project Development			
These information and analysis shall contain the following:			
(a) Weather and rainfall data	12-14 Appendix 2	√	
(b) Site runoff velocity and flow rate, both pre and during development	Table 7 & Table 8	√	
(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	Figure 4	√	
(d) Description of adjacent areas, such as streams, lakes, residential areas, and roads that might be affected by the land disturbance	Table 5 & Figure 6	√	
(e) List of streams and rivers identified on site. (Use coding for unnamed streams and rivers).	Figure 3	√	Tributaries of Sg Dol & Sg. Paka
(f) List of receiving streams and rivers. (Use coding for unnamed streams and rivers).			
(g) List of existing drainage identified on site		X	

ITEM	PAGE	MARK ✓ — Yes X — No NA — Non Applicable	REMARKS
(h) List of P2M2 proposed. Please also make reference to P2M2s Description can be accessed through: https://enviro.doe.gov.my			P2M2s related to the principles in erosion and sediment control have been proposed for this development project: i. <i>Integrate project design with site constraints:</i> Project phasing has been planned and divided into Phase 1 to Phase 2 as shown in attached drawings (Appendix 1). ii. <i>Preserve and stabilize drainageways:</i> Drainage within the project site will be lined to minimize erosion of their banks. iii. <i>Minimize the extent and duration of disturbance:</i> Exposed ground surfaces will be covered by stabilization materials such as by hydoseeding or gravel if surfaces will be left open for more than 14 days. iv. <i>Control runoff flows onto, through and from the site in stable drainage structures:</i> Various drainage structures are being proposed to convey potential runoffs. v. <i>Install perimeter control:</i> Perimeter controls are provided to control both surface runoff from outside the site to enter the project site and prevent runoff from project site to discharge to outside the site. vi. <i>Stabilized disturbed areas promptly in a timely manner:</i> Stabilization provided to areas being disturbed to minimize erosion potentials. vii. <i>Use sediment controls to prevent off-site damage:</i> Sediment basin, silt traps and silt fences provided to control sediment. viii. <i>Provide access and general construction controls:</i> One of the first controls that shall be provided.
(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			There is currently an existing access road, previously constructed as part of adjacent development.
(j) Earthworks cut and fill volume.			NA
(k) Availability of rocks material			Limited to none.
(l) Biomass management			Forest and bushes covering the project site will be cleared and felled. Some of the biomass will be used as BMPs for erosion controls and will be used as logging.
(m) Solid (construction waste) and domestic waste management.			Dedicated stockpile areas and solid waste management areas will be provided in the project site.
(n) Spill Prevention and Control from fuel and chemical use or storage			Dedicated central liquid waste and scheduled waste storage area will be provided in the project site.
(o) Hazardous Waste Management			Provided that any hazardous wastes generated from the construction activities are stored, transported and disposed in accordance with regulations and appropriate measures, then associated impacts should be minor.

ITEM	PAGE	MARK √ — Yes X — No NA — Non Applicable	REMARKS
(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 LDP2M2s. 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.	18-26	√	
3.0 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	Appendix 1	√	
(b) Geological Terrain Mapping (if relevant)	-	NA	
(c) Erosion risk map	-	NA	
(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.	Figure 3 & 6	√	The runoff discharge from the Project area will be discharged into proposed sediment basin before flowing into seasonal waterways, Sungai Dol and Sungai Paka then eventually flow into Kuala Paka.
(II) Land use showing: i. Road and infra-structures (inclusive of drainage system). ii. Buildings. iii. Utilities.			
(II) 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	Figure 6	√	
(III) Use map scale and size of: i. 1:500 for area less than 20 hectares; ii. 1:1000 for area more than 20 hectares iii. Size A3 or A1	-	√	

ITEM	PAGE	MARK √ — Yes X — No NA — Non Applicable	REMARKS
4.0 Map of site development plan			
(a) Depict the existing contour and proposed level.	Appendix 1	√	
(b) Indicate the total site area		√	13.4862 ha (33.325 ac)
(c) Indicate the total disturbance area with line showing the area to be disturbed.		√	
(d) Show the cut and fill area.		X	
(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.		X	
(p) Identify and mark generators set and/or motorized equipment area		√	
(q) Identify and mark Vehicle and Equipment Washing Facility.		X	
(r) Identify and mark petroleum-based material/refuelling, chemicals and skid tank area.		X	
(s) Identify and mark schedule waste storage area		√	
(t) Identify and mark workers camp location		X	
(u) Identify and mark sanitary facilities location.		√	
(v) Identify and mark batching plant location.	-	NA	
(w) Identify and mark concrete wash P2M2 location.	Appendix 1	√	
(x) Identify and mark spoil (unsuitable material) area or disposal area.		√	

ITEM	PAGE	MARK √ — Yes X — No NA — Non Applicable	REMARKS
(y) Identify and mark borrow area	-	NA	
(z) Identify and mark the location(s) of all proposed P2M2s application.	Appendix 1 & Figure 3	√	
(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	-	X	
(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	-	NA	

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APPENDIX 3- Design Calculation
APPENDIX 4- Inspection and Maintenance Checklist

1.0 PROJECT DESCRIPTION

1.1 Background of Project

The proposed granite quarry operation is located on Lot PT 23066 and Lot PT 23741 With an Area of 13.4862 Hectares (33.325 Acres) In Mukim Kuala Paka, District of Dungun, Terengganu Darul Iman. The location of the proposed quarry area is at Latitude N 4°39'39.28" – N 4°39'35.49" and Longitude E 103°26'30.12" – E 103°26'31.41". The proposed Project area is located within forestry area. No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western and Kampung Baharu and Kampung Kongsu which situated about 1.75km southwest from the proposed Project site respectively. There were an existing quarry located adjacent to the proposed project area which is Paka Kuari Sdn. Bhd. and 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. The quarry is currently operating. The key and location plan is shown in **Figure 1**.

1.2 Land

The Project site encompasses a total area of about 13.4862 Hectares (33.325 Acres). The remaining shall be utilized as site for proposed crusher plant, proposed stockpile area, proposed sediment basin, proposed buffer zone, proposed haulage road, proposed site office, proposed store, proposed scheduled waste store, proposed toilet, proposed parking area, proposed weighbridge and proposed guard. Details on the land utilization of the proposed quarry operation are shown in **Table 1**. The Land Disturbing- Pollution Prevention and Mitigation Measures (LD-P2M2) is attached in **Appendix 1**.

Table 1: Land Utilization of the Proposed Quarrying Operation

Lot No.	Existing Land Use	Proposed Intended Use	Area
PT 23066	Forestry	Proposed haulage road, site offices, stores scheduled waste store, toilet, parking area, weighbridge, guard house and overburden dumping area	2.8358 ha (7.007 ac)
		Proposed haulage road, Proposed working area 1	2.7049 ha (6.684 ac)
PT 23741		Proposed working area 2, proposed haulage road	7.9455 ha (19.634 ac)
Total			13.4862 ha (33.325 ac).

1.3 Scope of Project

The scope of this project is for the construction, testing and commissioning of the following quarrying activities elements:

- i) Excavation and loading equipments
- ii) Haulage equipment
- iii) Drilling and Blasting Equipment
- iv) Crusher plant facilities
- v) Diesel storage facility
- vi) Infrastructure such as access road, site office and workshop
- vii) Procurement of Utilities such as water supply, wastewater and sewerage, electrical supply
- viii) Rehabilitation activities

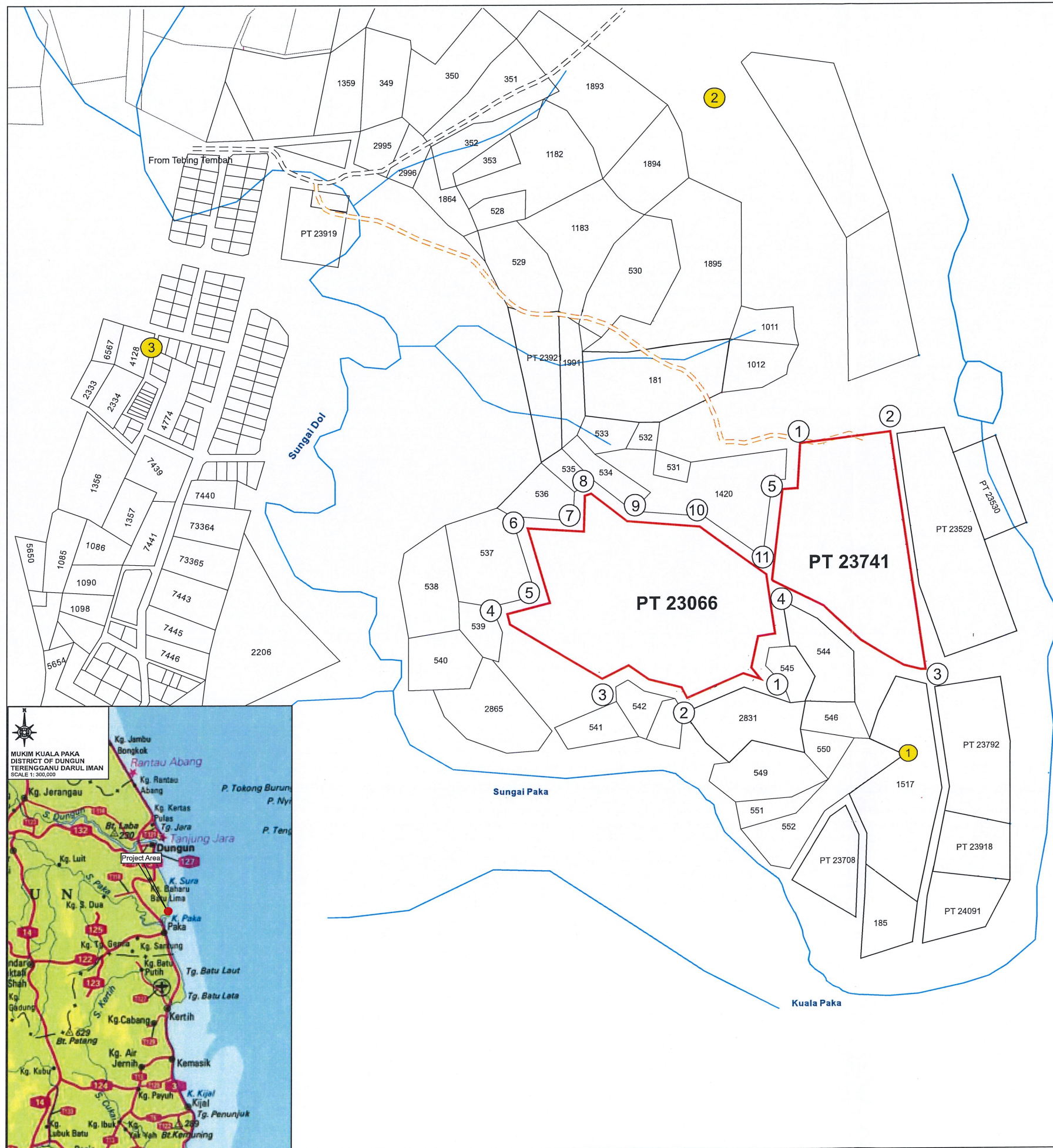
2.0 PROJECT ACTIVITY AND IMPLEMENTATION

2.1 Project Work Breakdown Structure

Based on the works to be provided by the scope of this project, the proposed WBS of the project as shown in **Figure 2**. In this figure, the proposed project components, project activities, scope of work and environmental method statements are included. The consideration factors for the purposes of phasing of the project is shown in **Table 2**.

2.2 Project Implementation Schedule

The proposed quarry is scheduled to commence in the year, upon obtaining the necessary approval from the relevant authorities. The project The proposed implementation schedule is shown in **Table 3**.




MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU
 SCALE 1: 5,000

LEGEND

	PROPOSED PROJECT AREA
	EXISTING ACCESS ROAD
	EXISTING MAIN ROAD
	SHORELINE

No.	Location
①	Paka Kuari Sdn Bhd
②	Hardy Builder Sdn Bhd
③	Kampung Tebing Tembah

PROJECT PROPONENT

HEXATREND QUARRY SDN. BHD.

DRAWING TITLE

FIGURE 1
KEY AND LOCATION PLAN OF THE
PROJECT AREA

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Table 2: Consideration Factors for Phasing of Quarry Activities

Factors	Description
Size of Site	Overall project size: 13.4862 hectares (33.325 acres)
Existing Land Use	- Located within forestry area. - No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western and Kampung Baharu and Kampung Kongsu which situated about 1.75km southwest from the proposed Project site respectively. There were an existing quarry located adjacent to the proposed project area which is Paka Kuari Sdn. Bhd. and 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. The quarry is currently operating. - The runoff discharge from the Project area will be discharged into proposed sediment basin before flowing into seasonal waterways, Sungai Dol and Sungai Paka then eventually flow into Kuala Paka. (refer Figure 3: General Drainage of The Project Site)
Types of land disturbance activities	- Site clearance for temporary / permanent road and drainage, treatment facilities and various buildings. - Site grading for temporary / permanent road and drainage, quarry facilities. - Excavations for road and drainage - Quarry faces and benches development - Drilling and blasting. - Stockpile management. - Disposal area management.
Topography	Generally the project site is located within partial agriculture and forestry area
Weather	No meteorological observations are available at the Project site. However, the Malaysian Meteorological Services (MMS) maintains two principal meteorological stations at Hospital Dungun and Ampangan Kuala Terengganu. For the purpose of this study, meteorological observations taken at the Hospital Dungun station (Latitude N 4°45'07" and Longitude E 103°24'53"), elevation 3 m above MSL and Ampangan Kuala Terengganu station (Latitude N 5°23" and Longitude E 103°6"), elevation 5.2 m above MSL can be considered as representative of the Project site. Detailed refer on Item 3.1 Available Data for Analysis
Type of soil	Steepland (Refer Figure 4: Regional Soil of the Project Site)
Environmental sensitive areas	- Existing site currently consists of disturbed of forested areas. - Public hazards.
Practicality of BMP installation	Temporary roads need to be created to access during preliminary works to install suitable BMPs along the perimeter of the site.

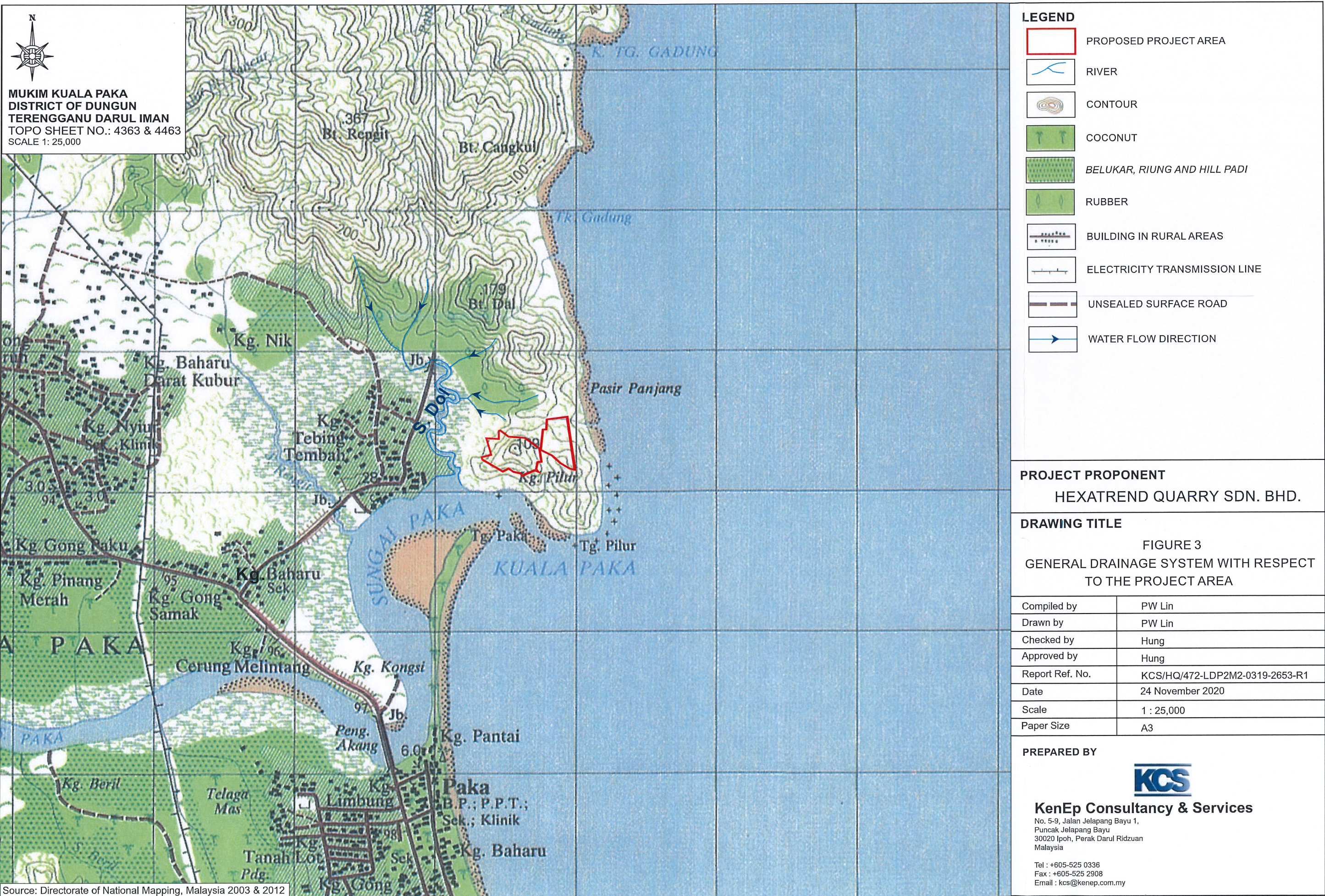
Table 3: Implementation Schedule for Proposed Project

Description	Months												Status of work as to..
	1	2	3	4	5	6	7	8	9	10	11	12	Year 2-7
Proposed Quarry Facilities Area Lot PT 23066													
Mobilization equipment and development													
Site Survey													
Site Clearing													
Earthwork													
Silt Trap & Sedimentation Pond -Maintenances of BMPs													
Drainage													
Haulage Road to Platform													
Progressive Rehabilitation (Trees planting)													
Proposed Working Area Lot PT 23066													
Site Survey													
Site Clearing													
Earthwork													
Silt Trap & Sedimentation Pond -Maintenances of BMPs													
Drainage													
Haulage Road to Platform													
Drilling and Blasting (NONEL Blasting Design)													
Overburden Stripping													
Bench Development													
Production (78,000 TPM)													
Progressive Rehabilitation (Trees planting)													

Table 3: Implementation Schedule for Proposed Project (Cont')

Description	Months												Status of work as to..
	1	2	3	4	5	6	7	8	9	10	11	12	Year 6-7
Proposed Working Area (Phase 2) Lot PT 23741													
Site Survey													
Site Clearing													
Earthwork													
Silt Trap & Sedimentation Pond -Maintenances of BMPs													
Drainage													
Haulage Road to Platform													
Drilling and Blasting (NONEEL Blasting Design)													
Overburden Stripping													
Bench Development													
Production (80,000 TPM)													
Progressive Rehabilitation (Trees planting)													

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MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU DARUL IMAN
TOPO SHEET NO.: 4363 & 4463
SCALE 1: 25,000

- LEGEND**
- PROPOSED PROJECT AREA
 - RIVER
 - CONTOUR
 - COCONUT
 - BELUKAR, RIUNG AND HILL PADI
 - RUBBER
 - BUILDING IN RURAL AREAS
 - ELECTRICITY TRANSMISSION LINE
 - UNSEALED SURFACE ROAD
 - WATER FLOW DIRECTION

PROJECT PROPONENT
HEXATREND QUARRY SDN. BHD.

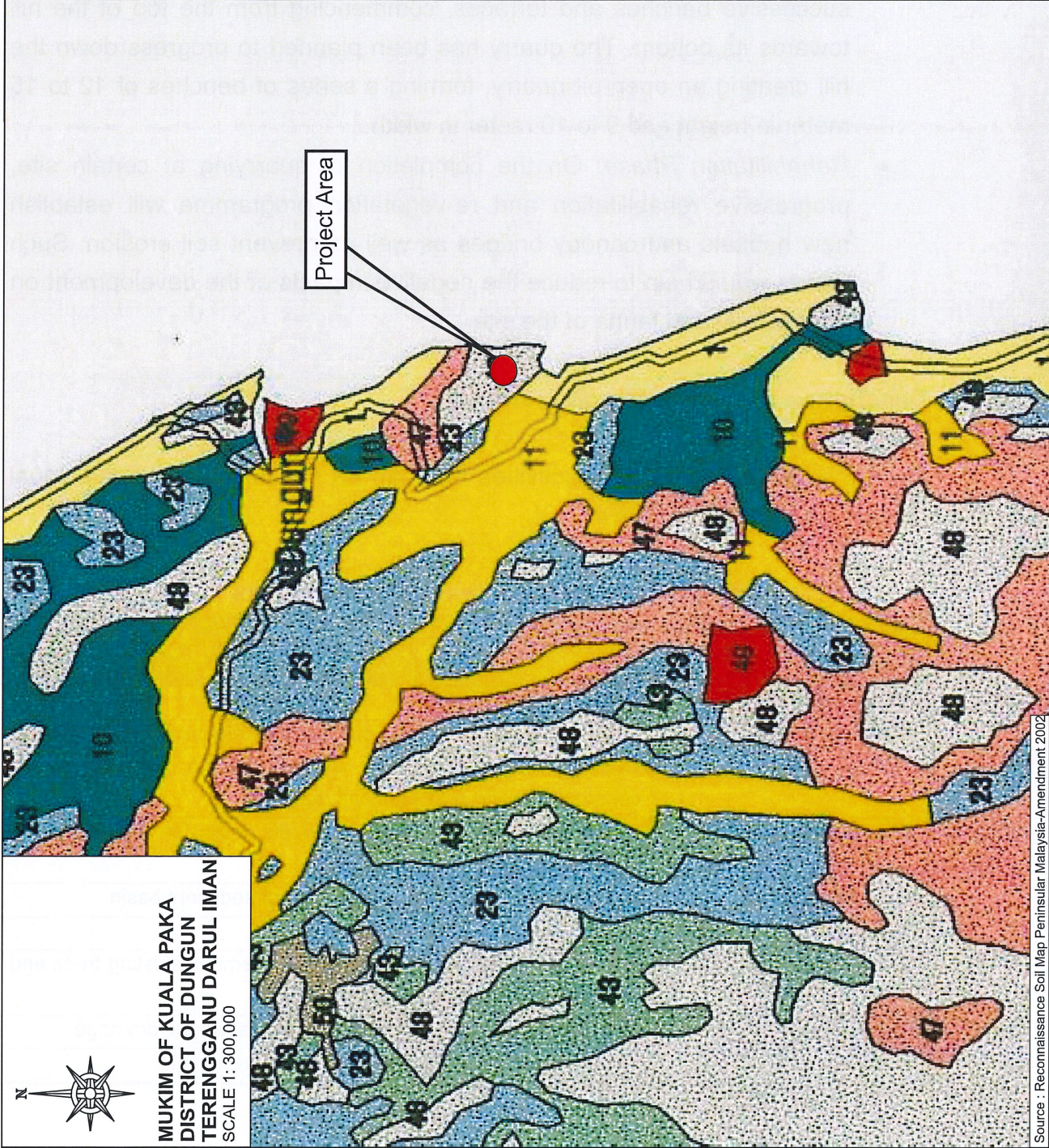
DRAWING TITLE
FIGURE 3
GENERAL DRAINAGE SYSTEM WITH RESPECT
TO THE PROJECT AREA

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Drawn by	PW Lin
Checked by	Hung
Approved by	Hung
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In view of the above consideration and considering the site is small and manageable, it can be proposed for the quarry project to be broken down into the following phases, namely:

- *Pre-development Phase:* To provide and install all the necessary protection and mitigation measures prior to commencement of Phase 1;
- *Phase 1 & Phase 2:* Involve multi-tiered activities, ranging from site clearance to make way for the overburden excavation to infrastructure construction for the entire quarrying operation. The reserve of this quarry is situated on a slope of a hill, staging is achieved by extracting from successive benches and terraces, commencing from the top of the hill towards its bottom. The quarry has been planned to progress down the hill creating an open-pit quarry, forming a series of benches of 12 to 15 meter in height and 9 to 10 meter in width.
- *Rehabilitation Phase:* On the completion of quarrying at certain site, progressive rehabilitation and re-vegetation programme will establish new habitats and canopy bridges as well as prevent soil erosion. Such efforts would help to reduce the negative impacts of the development on the ecology and fauna of the site.

2.3 Description of the Construction Activity

The potential land disturbing activities that can be identified for the individual phases are shown in **Table 4**.

Table 4: Identified Land Disturbing Activities

Land Disturbing Activities	Description
Pre-Development Prior to Phase 1 commencement	
Minor site clearing	Initial site clearance works but of lesser extent to be provided to establish site entry point, as well as to form temporary construction road accesses and drainage
Minor site grading	Minor site grading to prepare works area for the temporary construction roadworks
Minor excavation	Localised excavation for construction of sediment basin
Phase 1	
Site Clearing	Site clearance works to be provided to remove existing trees and vegetation from the project site
Site grading	Site grading to prepare works area for roadworks, drainage
Excavation	Excavation for drainage and overburden removal

Table 4: Identified Land Disturbing Activities (Con't)

Land Disturbing Activities	Description
Quarry face and benches development	As the reserve of this quarry is situated on a high wall, staging is achieved by extracting from successive benches and terraces, commencing at the top of the hill and moving towards its bottom, creating a hillside quarry.
Drilling and Blasting	Blast design is always in a constant state of adjustment, reflecting changes at the site. It involves the manipulation of numerous variables that influence the eventual outcome of using explosives to break rock.
Crushing	Fragmented rocks of larger sizes produced by blasting are further broken down by hydraulic breaker. The suitably sized rock fragments are being transported to the crusher plant.
Phase 2	
Site Clearing	Site clearance works to be provided to remove existing trees and vegetation from the project site
Site grading	Site grading to prepare works area for roadworks, drainage
Excavation	Excavation for drainage and overburden removal
Quarry face and benches development	As the reserve of this quarry is situated on a high wall, staging is achieved by extracting from successive benches and terraces, commencing at the top of the hill and moving towards its bottom, creating a hillside quarry.
Drilling and Blasting	Blast design is always in a constant state of adjustment, reflecting changes at the site. It involves the manipulation of numerous variables that influence the eventual outcome of using explosives to break rock.
Crushing	Fragmented rocks of larger sizes produced by blasting are further broken down by hydraulic breaker. The suitably sized rock fragments are being transported to the crusher plant.

2.4 Description of the Construction Sequences

Based on the site conditions and on the requirements to control erosion and sediment issues for this project, the proposed construction sequences of works are listed below.

Construction Sequencing for Pre-Development Phase

- i) Survey and identify project boundary and site limits.
- ii) Upgrading of haulage roads and working platform.
- iii) Improvement of watercourses and drainage system
- iv) Quarry face development and overburden removal
- v) Survey and identify environmental sensitive receivers.

- vi) Mark environmental buffer zones.
- vii) Install sediment basin.
- viii) Site clearing and grading for road and drainage.
- ix) Install check dam for earth drains.
- x) Managing waste at the Project site.

Construction Sequencing for Phase 1

- i) Clearing of quarry involving vegetation clearing
- ii) Upgrading of haulage roads and working platform.
- iii) Overburden stripping and waste disposal involving the stripping, haulage and stockpiling of soil and overburden
- iv) Rock blasting and extraction
- v) Loading and transportation of blasted rock to the processing plant
- vi) Rock crushing and stockpiling
- vii) Improvement of watercourses and drainage system.
- viii) Upgrading of sediment basin.
- ix) Compaction, levelling, grading and top soiling.
- x) A forestation by re-vegetate the quarried out area or any identified area which are not affected by quarrying activities with fast growing trees and suitable grasses or leguminous cover crops.

Construction Sequencing for Phase 2

- i) Clearing of quarry involving vegetation clearing
- ii) Upgrading of haulage roads and working platform.
- iii) Overburden stripping and waste disposal involving the stripping, haulage and stockpiling of soil and overburden
- iv) Rock blasting and extraction
- v) Loading and transportation of blasted rock to the processing plant
- vi) Rock crushing and stockpiling
- vii) Improvement of watercourses and drainage system.
- viii) Upgrading of sediment basin.
- ix) Compaction, levelling, grading and top soiling.
- x) A forestation by re-vegetate the quarried out area or any identified area which are not affected by quarrying activities with fast growing trees and suitable grasses or leguminous cover crops.

3.0 INFORMATION AND ANALYSIS ON PROJECT DEVELOPMENT

3.1 Available Data for Analysis

3.1.1 Climate

The Project area experiences an equatorial type of climate, which is characterized by warm and humid weather all year round. As with the rest of the country, it is under the influence of the Asian Monsoon system. There are two distinct monsoon seasons, the Northeast Monsoon (from November to March) and the Southwest Monsoon (from May to September). In between these cycles, the area experiences inter-monsoon or transition month.

3.1.2 Source of Data

No meteorological observations are available at the Project site. However, the Malaysian Meteorological Services (MMS) maintains two principal meteorological stations at Hospital Dungun and Kuala Terengganu. For the purpose of this study, meteorological observations taken at the Hospital Dungun station (Latitude N 4°45'07" and Longitude E 103°24'53"), elevation 3 m above MSL and Kuala Terengganu station (Latitude N 5°23" and Longitude E 103°6"), elevation 5.2 m above MSL can be considered as representative of the Project site. The raw meteorological data is attached in **Appendix 2**.

The meteorological observations taken at the MMS meteorological station include surface winds, temperature, rainfall and relative humidity. The climate of the area is of the equatorial type, which is characterized by relatively high and uniform temperatures throughout the year, high rainfall, high humidity and light winds. The meteorology of areas under this climate regime is influenced very much by local factors such as the topography of the area, land cover and water bodies.

3.1.3 Temperature and Relative Humidity

General, the daily mean temperature fluctuates in a small range between 26.1°C to 28.6°C, with fluctuation of 2.7°C. Maximum mean relative humidity recorded on October 81.9% while minimum relative humidity recorded on April 74.4%. The daily mean temperature for year 2018 and the 24 hours mean relative humidity records for 2018 are shown in **Figure 5(a)** and **Figure 5(b)**, respectively. The monthly variations coincide with the dry and wet seasons. It is expected that the Project site should experience a similar range of humidity.

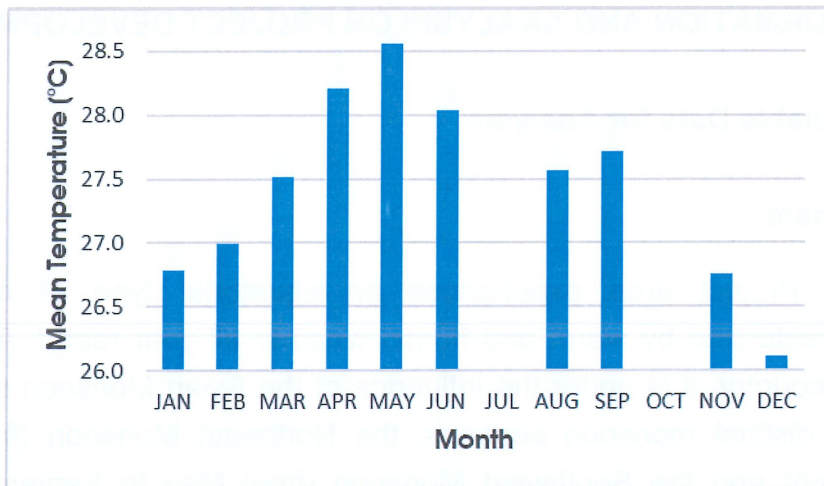


Figure 5(a): Records of 24 hours Temperature (°C) at Hospital Dungun (2018)

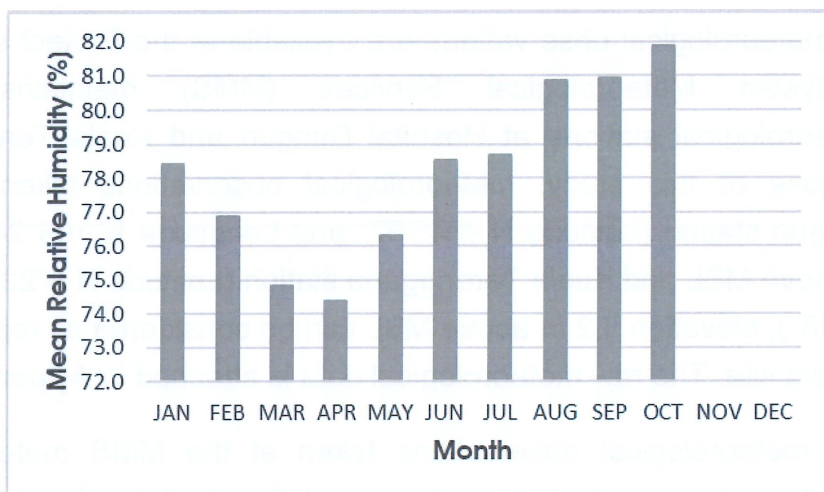


Figure 5(b): Records of 24 hours Mean Relative Humidity (%) at Hospital Dungun (2018)

3.1.4 Rainfall

Figure 5(c) shows annual rainfall recorded by the meteorological station in Hospital Dungun from year 2007-2017. It shows that highest rainfall (4006.4 mm) recorded at year 2009 and the lowest rainfall (1936.0 mm) recorded at year 2015. The heaviest total annual rainfall is about 2981.7 mm from the year 2007 to year 2017.

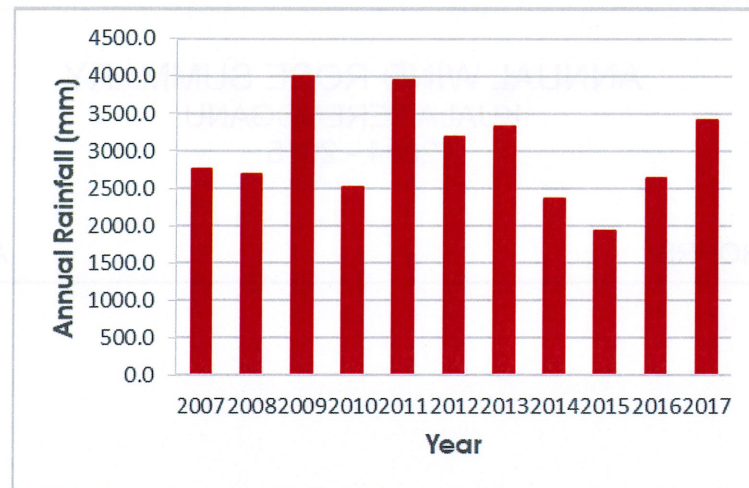


Figure 5(c): Records of Total Annual Rainfall at Hospital Dungun (2007-2017)

3.1.5 Wind Profiles

Wind observations at Kuala Terengganu Station, averaged over the period of 2018 are summarized in an annual wind rose and presented in **Figure 5(d)**. The north east, east, south and south-western wind had the highest velocity which ranges from 1.4 m/s to 7.9 m/s (meter per second), when compared to other wind direction. The highest frequency of wind occurrence is from 3.1%.

3.2 Surface Hydrology

The proposed Project site is located out of catchments area of Sungai Dol and Sungai Paka. The runoff discharge from the Project area will be discharged into proposed sediment basin before flowing into seasonal waterways, Sungai Dol and Sungai Paka then eventually flow into Kuala Paka. Referring to the Environmental Quality Act 1974 (Act 127), Third Schedule, Regulation 7, there is no water supply scheme listed in Sg. Dol and Sg. Paka, therefore, Standard B applies. There was one (1) listed nearest water intake at Loji Air Bukit Bauk is located in different catchment about 9.8KM from the project site. **Figure 3** shows the general drainage system with respect to the Project site.

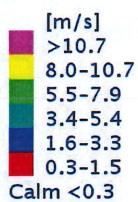
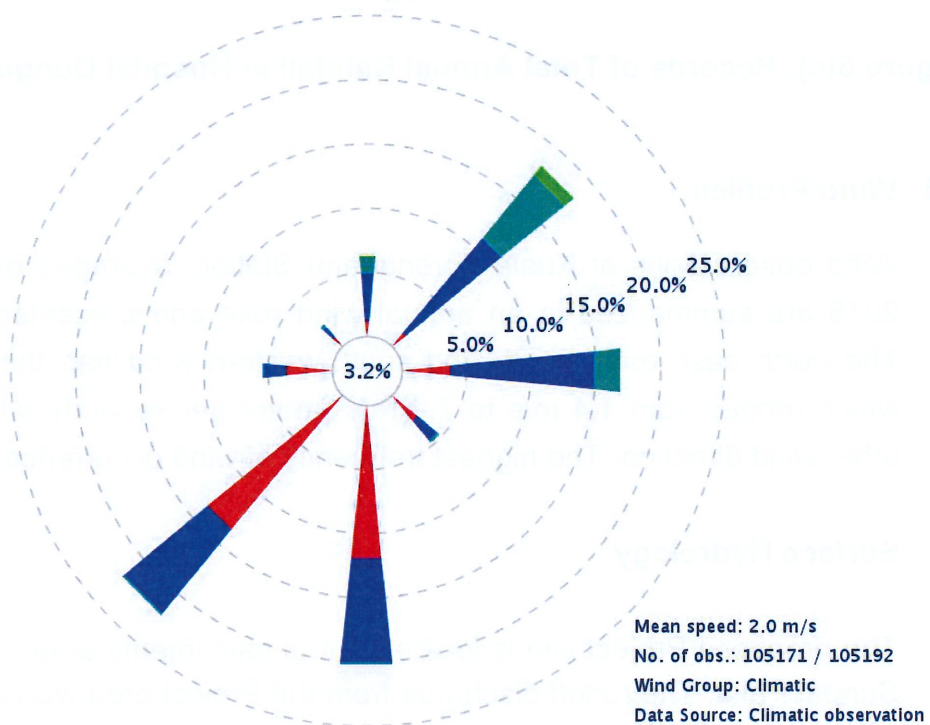
ANNUAL WIND ROSE SUMMARY

KUALA TERENGGANU

2004 - 2015

TIME : 24 HOURS

ANNUAL



HEXATREND QUARRY SDN. BHD.

FIGURE 5(d)
ANNUAL 24-HOURS WIND
ROSE SUMMARY



KenEp Consultancy & Services

Report Ref. No.: KCS/HQ/472-LDP2M2-0319-2653-R1

Scale as Shown

3.3 Groundwater Hydrology

The general trend of the groundwater flow at the Project site is from the hills towards the valleys where run-off tends to flow. The groundwater flow is generally localized, controlled by local topography and soil characteristics. On regional scale, the flow pattern is anticipated to be towards Sg. Paka which located out of the Project site.

3.4 Existing and Future Land Use

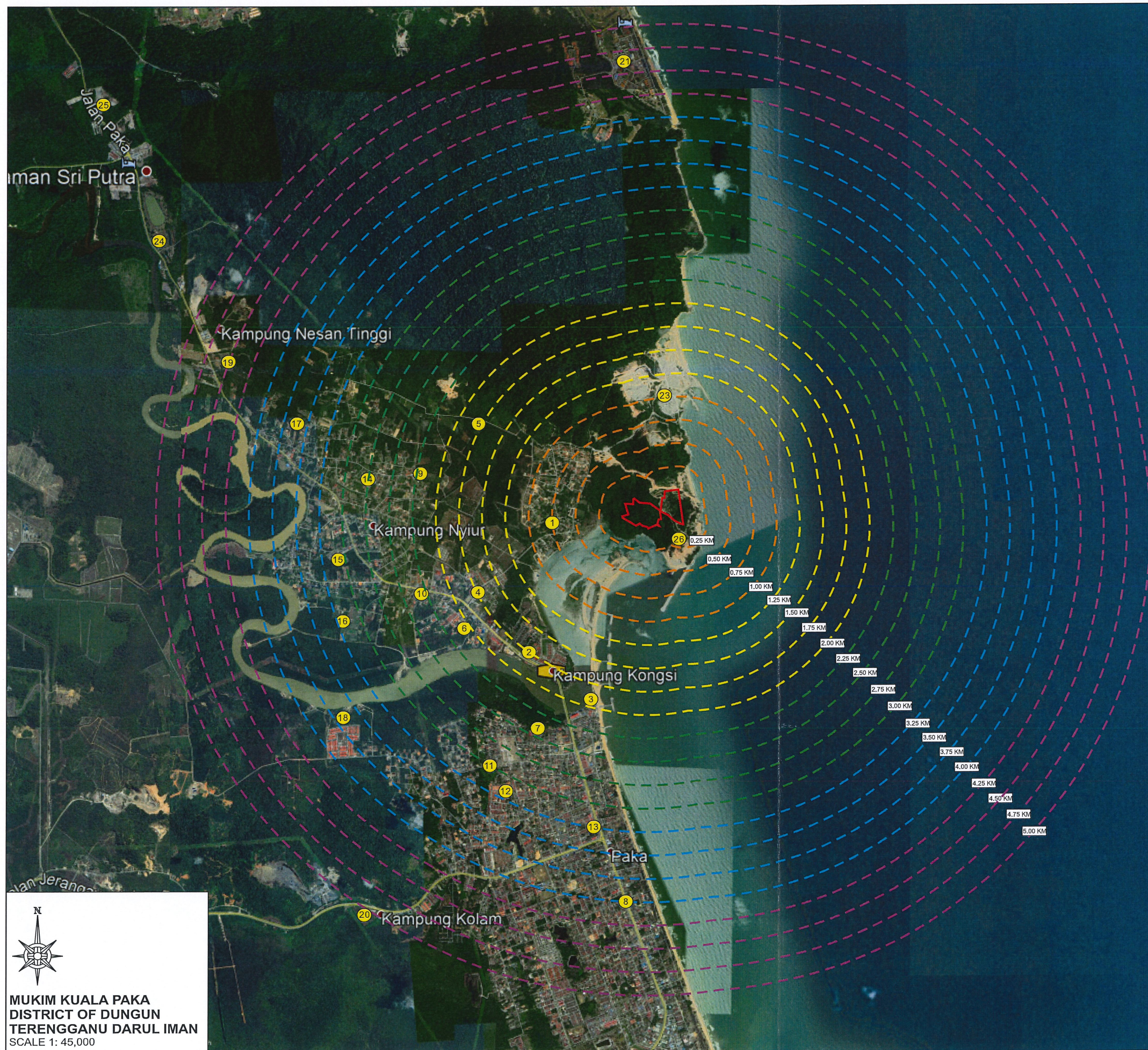
The proposed Project area is located within forestry area. No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western and Kampung Baharu and Kampung Kongsu which situated about 1.75km southwest from the proposed Project site respectively. There were an existing quarry located adjacent to the proposed project area which is Paka Kuari Sdn. Bhd. and 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. The quarry is currently operating. Therefore, the proposed Project is seen to be compatible with the existing land use. However, there was a *Jabatan Bekalan Air Dungun* which is located 5.7KM north western from the proposed project site.

Apart from that, there is a Terowong Dungun which located 7.0KM north western from the proposed Project Site. Terowong Dungun is one of the tunnels for the East Coast Rail Link (ECRL) construction site at Bukit Bauk. ECRL is a high impact project under the *Rancangan Malaysia Ke-11 (RMK11)* which is a construction of rail route that will connect the East Coast states with the Klang Valley. The project is divided into three phases, from the Klang Valley to Kuantan, Kuantan to Kuala Terengganu and Kuala Terengganu to Kota Baru and Tumpat in Kelantan.

Viewing to the situation, areas particularly in vicinity of the Project site shall be enjoying the progressive economic growth, directly or indirectly in the near future. The existing land use profile within 5-km radius of the Project site is summarized in **Table 5**. Meanwhile, **Figure 6** show 5km radius of the proposed Project site.

Table 5: General Land Use Profile Surrounding the Project Site

Sector	Land Use Profile	
0 km – 0.5 km	North	Hilly area, Shrub and Bushes
	Northeast	Pasir Panjang, South China Sea, Shoreline
	Northwest	Hilly area, Shrub and Bushes, Sg. Dol
	South	Tanjung Paka, Hilly area, Sg. Paka, Paka Kuari Sdn Bhd
	Southeast	Tanjung Pilur, South China Sea, Hilly area, Shoreline
	Southwest	Tanjung Paka, Sg. Paka
	East	Shoreline, South China Sea
	West	Hilly area, Shrub and Bushes, Sg. Dol
0.5 km - 1 km	North	Hilly area, Hardy Builder Sdn. Bhd.
	Northeast	South China Sea
	Northwest	Shrub and Bushes, Sg. Dol
	South	Kuala Paka, South China Sea
	Southeast	South China Sea
	Southwest	Sg. Paka, Tanjung Paka
	East	South China Sea
	West	Shrub and Bushes, Kg. Tebing Tembah
1 km - 2 km	North	Tk. Gading, Shoreline, Hilly area
	Northeast	South China Sea
	Northwest	Kg. Nik, Shrub and Bushes, Secondary forest, Hilly area
	South	South China Sea
	Southeast	South China Sea
	Southwest	Kg. Pantai, Kg. Kongs, Kg. Baharu, Kg. Cerung Melintang
	East	South China Sea
	West	Shrub and Bushes
2 km – 3 km	North	Shoreline, Hilly area
	Northeast	South China Sea
	Northwest	Hilly area
	South	South China Sea, Kg. Baharu, Shrub and Bushes
	Southeast	South China Sea
	Southwest	Kg. Limbung, Kg. Tanah Lot, Kg. Gong Samak, Kg. Gong Gemia
	East	South China Sea
	West	Kg. Baharu Darat Kubur, Kg. Nyiur, Kg. Gong Paku
3 km - 4 km	North	Tg. Gadung, Hilly area, Shrub and Bushes, Kuala sura
	Northeast	South China Sea
	Northwest	Shrub and Bushes, Hilly areas, Kg. Gong Gemuruh
	South	South China Sea, Kg. Cacar
	Southeast	South China Sea
	Southwest	Kg. Beril, Shrub and Bushes
	East	South China Sea
	West	Sg. Paka, Shrub and Bushes
4 km – 5 km	North	Institut Teknologi Mara, Shoreline, Shrub and Bushes
	Northeast	South China Sea
	Northwest	Hilly areas, Hutan Rizab Bukit Bauk, Kg. Nesan Tinggi, Kg. Dusun Besar
	South	Shoreline, Shrub and Bushes, South China Sea
	Southeast	South China Sea
	Southwest	Secondary forest, Shrub and Bushes, Kg. Kolam
	East	South China Sea
	West	Sg. Paka, Secondary forest, Shrub and Bushes



LEGEND

PROPOSED PROJECT AREA

No.	Location
1	Kampung Tebing Tembah
2	Kampung Kongs
3	Kampung Pantai
4	Kampung Baharu
5	Kampung Nik
6	Kampung Cerung Melintang
7	Kampung Limbung
8	Kampung Baharu
9	Kampung Baharu Darat Kubur
10	Kampung Gong Samak
11	Kampung Lot Tanah
12	Kampung Gong Gemia
13	Kampung Cacar
14	Kampung Nyiur
15	Kampung Gong Paku
16	Kampung Pinang Merah
17	Kampung Gong Gemuruh
18	Kampung Beril
19	Kampung Nesan Tinggi
20	Kampung Kolam
21	Institut Teknologi Mara
22	Kampung Dusun Besar
23	Hardy Builder Sdn. Bhd.
24	Loji Air Bukit Bauk (Jabatan Bekalan Air Dungun)
25	ECRL Terowong Dungun
26	Paka Kuari Sdn Bhd

PROJECT PROPONENT

HEXATREND QUARRY SDN. BHD.

DRAWING TITLE

FIGURE 6
5 KM RADIUS GOOGLE PLAN OF THE
PROPOSED PROJECT AREA

Compiled by	PW Lin
Drawn by	PW Lin
Checked by	Ooi
Approved by	YK Wong
Report Ref.	KCS/HQ/472-LDP2M2-0319-2653-R1
Date	24 November 2020
Scale	1 : 45,000
Paper Size	A3

PREPARED BY



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MUKIM KUALA PAKA
DISTRICT OF DUNGU
TERENGGANU DARUL IMAN
SCALE 1: 45,000

4.0 Soil Erosion Modelling

4.1 Universal Soil Loss Equation (USLE)

Significant advances have been made in our knowledge of the mechanics of soil erosion and the interrelationships between the erosion processes. As a result, some form of soil erosion modelling may predict the anticipated amount of soil erosion. There are a few predictive models that could be used, but the most widely used and perhaps the most reliable method is based on the so-called **Universal Soil Loss Equation (USLE)** (Wischmeier and Smith, 1962). The **USLE** predicts soil loss as a function of six factors, each of which may be calculated and expressed numerically. It is represented by the equation below:

$$E = R.K.L.S.C.P \quad \text{(Equation 1)}$$

Where,

- E - Mean Annual Soil Loss
- R - Rainfall Erosivity Index
- K - Soil Erodibility Index
- L - Slope Length Factor
- S - Slope Steepness Factor
- C - Vegetation/Cover Factor
- P - Soil Conservation Practice Factor

The rainfall erosivity index, R is actually a compound index of rainfall kinetic energy and the maximum 30-minute rainfall intensity. The values for all storm events have to be summed to obtain the annual value. The computation is therefore lengthy and requires comprehensive rainfall records from autographic gauges. Therefore, R factor can be refer to **Figure 7: Rainfall erosivity Map for Terengganu State** (*Guideline for Erosion and Sediment Control in Malaysia, DID 2010*). Since this project site is located at Paka, Terengganu, the rainfall erosivity factor is,

$$R = 19,000 \text{ MJ.mm/ha/yr}$$

Soil erodibility: K defines the resistance of the soil to both detachment and transport. In the absence of empirical value, the K factor of a soil is usually determined on the basis of percent sand, percent silt plus very fine sand, percent organic matter, soil structure and permeability. Limited information is available on

the erodibility of Malaysian soils. For this modelling exercise, an average K value of 0.051 is based on soil erodibility factors in Malaysia soil series.

The factors of slope length (L) and slope steepness (S) are normally combined into a single index, LS. The appropriate value may be obtained from the following equation:

$$LS = (0.065 + 0.045S + 0.0065S^2) \times (L/22.13)^n \quad (\text{Equation 2})$$

Where L is in meter and S is in percent. Slope length is defined as the distance from the point of origin of overland flow to the point where the slope decreases sufficiently for deposition to occur or to the point where runoff enters a defined channel (wet or dry). The slope steepness is the segment or site slope, usually expressed as a percentage. Slope length and slope steepness strongly influence the transport of soil particles once the soil particles are dislodged by raindrop impact or runoff.

The vegetation/ cover factor, C represents the ratio of soil loss under a given crop or vegetation cover to that from bare soil. For bare soil, C is 1.0. In forested areas, C is 0.001-0.002 with undergrowth, and 0.01-0.10 without undergrowth (Morgan, 1986).

The soil conservation practice factor, P is the ratio of soil loss where contouring is practised to that where it is not. When the soil is ploughed up and down the steepest slope with no soil conservation measure, P is 1.0. The effect of contouring is not independent of the slope factor, so that different P values are obtained for different slope gradient (Wischmeier and Smith, 1978). Terracing and contour ridges effectively change the slope characteristics. The best procedure then is to use the same P value for contouring and then adjust the LS value according to the spacing between the terraces.

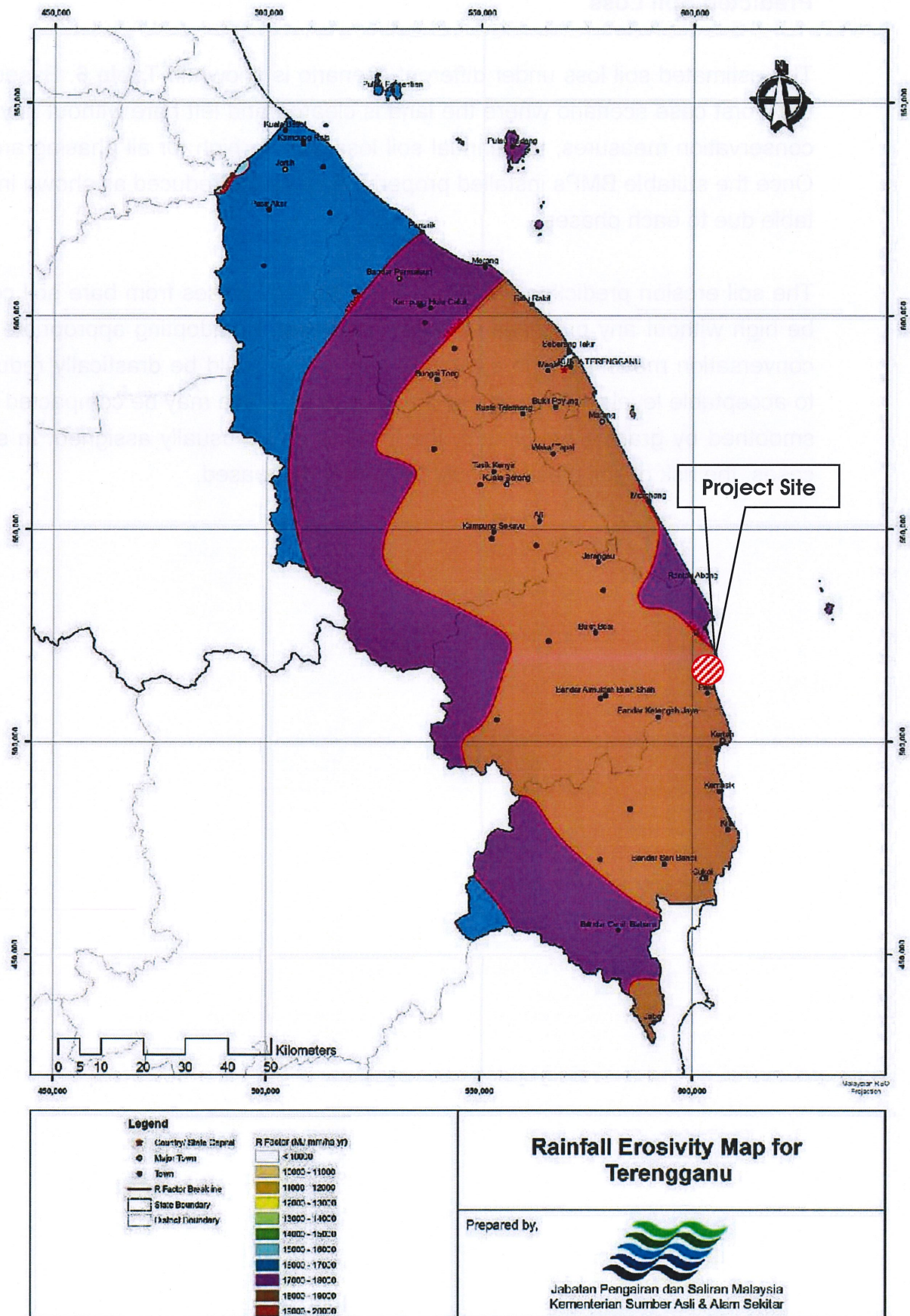


Figure 7: Rainfall Erosivity Map for Terengganu State

Predicted Soil Loss

The estimated soil loss under different scenario is shown in **Table 6**. Based on the worst case scenario where the land is cleared and left bare without any soil conservation measures, the annual soil loss, will be high for all phasing areas. Once the suitable BMPs installed properly, A would be reduced as shown in the table due to each phases.

The soil erosion prediction risk has shown that soil losses from bare soil could be high without any practices of BMPs. However, by adopting appropriate soil conversation measures, the estimated soil losses could be drastically reduced to acceptable levels. At site where the bare soil surface may be compacted and smoothed by grading equipment, the P value of 1.0 usually assigned. In such cases, the risk of soil erosion would be further decreased.

Table 6: Estimation of Potential Soil Erosion Using USLE

Condition	Parameters	Phasing Area	
		Phase 1 (5.5407 ha)	Phase 2 (7.9455 ha)
Pre-Development Existing	R	19,000	19,000
	K	0.051	0.051
	Slope, L(m)	27	60
	Slope, S(%)	18.50	8.330
	LS	3.449	1.467
	C	0.03	0.03
	P	1.0	1.0
	A (t/ha/yr)	100	43
	E (t/yr)	555	339
Earthwork (Uncontrolled)	R	19,000	19,000
	K	0.051	0.051
	Slope, L(m)	27	60
	Slope, S(%)	18.50	8.330
	LS	3.449	1.467
	C	1.0	1.0
	P	1.0	1.0
	A (t/ha/yr)	3342	1421
	E (t/yr)	18515	11294
Earthwork (Controlled)	R	19,000	19,000
	K	0.051	0.051
	Slope, L(m)	27	60
	Slope, S(%)	18.50	8.330
	LS	3.449	1.467
	C	0.25	0.25
	P	0.32	0.20
	A (t/ha/yr)	267	71
	E (t/yr)	1481	565
Post Development	R	19,000	19,000
	K	0.051	0.051
	Slope, L(m)	27	60
	Slope, S(%)	18.50	8.330
	LS	3.449	1.467
	C	0.10	0.10
	P	0.16	0.10
	A (t/ha/yr)	53	14
	E (t/yr)	296	113

R: Rainfall Erosivity Factor;

LS: Slope Length and Steepness Factor;

P: Soil Conservation Practice Factor; (Table 12.5, MSMA 2012)

Bare soil = 1.00

Sediment containment system (Sediment basin/trap),
Check dam

= 0.50 x 0.80

= 0.40

Contour furrow surface; 6 to 8, 60m = 0.50

17 to 20, 20 m = 0.80

Terracing; 3 to 8 = 0.10

17 to 20 = 0.16

E: Mean Annual Soil Loss

A: Annual Soil Loss;

K: Soil Erodibility Factor

C: Soil Cover Management Factor; (Table 12.4c MSMA 2012)

Forest 100% cover = 0.03

Bare soil/newly cleared land = 1.0

Mulch (50 % cover)= 0.25

Grass-seeding & sod = 0.10

4.2 **Modified Universal Soil Loss Equation (MUSLE)**

The Modified Universal Soil Loss Equation (MUSLE) is perhaps the most frequently used equations for sediment yield estimation. It is developed by Williams (1975) to calculate sediment yields of a catchment as a result of a specific storm event. This empirical relationship is expressed by the following equation for individual storm events:

$$Y = 89.6(VQ_p)^{0.56} (K.L.S.C.P) \quad \text{(Equation 3)}$$

Where,

- Y - Sediment yields per storm event (tonnes)
- V - Runoff volume in cubic meter
- Q_p - Peak discharge in m³/s

The approach has seen widespread application, but should be used with caution as it was developed empirically based on limited data for Texas and the southwestern United States. The procedure should only be used on small catchments, and considerable judgement is required in selecting an appropriate slope length when determining the LS topographic factor.

Design Storm

Phase 1 = 5.5407 ha

Phase 2 = 7.9455 ha

The peak flow and runoff volume for construction area is shown in **Table 7** and the sediment yield estimation using MUSLE is shown in **Table 8**. The peak discharge is related to the rainfall intensity and catchment area via the Rational Method:

$$Q = (C.i.A)/360 \quad \text{(Equation 4)}$$

Where,

- Q - Peak flow (m³/s)
- C - Runoff coefficient
- i - Average rainfall intensity (mm/hr)
- A - Drainage area (ha)

Table 7: Peak Flow & Runoff Volume for Construction Area

Phasing	Area (ha)	Existing Condition					Earthwork					Post Development				
		Runoff Coeff. C	i (mm/h)	Q _{pre} (m ³ /s)	t _c (min)	V _{pre} (m ³)	Runoff Coeff. C	i (mm/h)	Q _{cons} (m ³ /s)	t _c (min)	V _{cons} (m ³)	Runoff Coeff. C	i (mm/h)	Q _{post} (m ³ /s)	t _c (min)	V _{post} (m ³)
Phase 1	5.5407	0.3	259	1.195	14	980	0.5	306	2.354	8	1155	0.4	208	1.281	23	1802
Phase 2	7.9455	0.3	249	1.649	15	1500	0.5	306	3.376	8	1656	0.4	208	1.837	23	2585

Runoff volume using Rational Hydrograph Method

$$V = 0.5 \times (2 \times 60 \times t_c) \times Q_p$$

Table 8: Sediment Yield Estimation Using MUSLE

Condition	Parameters	Phasing	
		Phase 1 (5.5407 ha)	Phase 2 (7.9455 ha)
Pre-Development (Existing)	V (m ³)	980	1500
	Q _{pre} (m ³ /s)	1.195	1.649
	K	0.051	0.051
	LS	3.449	1.467
	C	0.03	0.03
	P	1.00	1.00
	Y (tonnes)	25	16
Earthwork (Controlled)	V (m ³)	1155	1656
	Q _{cons} (m ³ /s)	2.354	3.376
	K	0.051	0.051
	LS	3.449	1.467
	C	1.00	1.00
	P	1.00	1.00
	Y (tonnes)	1320	841
Earthwork (Controlled)	V (m ³)	1155	1656
	Q _{cons} (m ³ /s)	2.354	3.376
	K	0.051	0.051
	LS	3.449	1.467
	C	0.25	0.25
	P	0.32	0.20
	Y (tonnes)	106	42
Post Development	V (m ³)	1802	2585
	Q _{post} (m ³ /s)	1.281	1.837
	K	0.051	0.051
	LS	3.449	1.467
	C	0.10	0.10
	P	0.16	0.10
	Y (tonnes)	19	8

V: Runoff Volume;

K: Soil Erodibility Factor;

C: Soil Cover Management Factor;

(Table 12.4a-c, MSMA 2012)

Bare soil = 1.00

Grass-seeding & sod = 0.10

Mulch (50 % cover) = 0.25

P: Soil Conservation Practice Factor;

(Table 12.5, MSMA 2012)

Bare soil = 1.00

Sediment containment system (Sediment basin/trap),

Check dam

= 0.50 x 0.80

= 0.40

Contour furrow surface; 6 to 8, 60m = 0.50

17 to 20, 20 m = 0.80

Terracing; 3 to 8 = 0.10

17 to 20 = 0.16

Y: Sediment Yield per Storm Event

Q: Peak Discharge;

LS: Slope Length and Steepness Factor;

Summary of Soil Yields

Sedimentation control BMPs trap sediment on the site in selected locations and minimize sediment transfer off the site. Sedimentation controls are generally passive systems that rely on filtering or settling of soil particles out of the water or air. Sediment control BMPs are the last line of defence against erosion and sedimentation before sediment reaches natural water courses.

The estimated sediment yield under different scenario is shown in **Table 8**. Based on the worst case scenario where the land is cleared and left bare without any soil conservation measures, the sediment yield will be high for all phasing areas. Once the suitable BMPs installed properly, the sediment yield would be reduced as shown in the table due to each phases.

5.0 DESIGN CONCEPT

The drainage design is based on URBAN STORMWATER MANAGEMENT MANUAL FOR MALAYSIA or also known as MSMA. A sediment basin will be provided in order to maintain in the status-quo. The Average Recurrence Interval (ARI) for the Pre and Post Development is considered as 50 years. A control outlet and temporary drain will be provided at the final discharge to maintain the status-quo. In additional, checking on the emergency spillway and temporary earth drain capacity of flow will also be calculated.

The proposed sediment basin shall be designed in accordance to “Urban Stormwater Management Manual for Malaysia (Manual Saliran Mesra Alam 2) 2012” produced by Jabatan Pengairan dan Saliran, Malaysia. The measuring area is 13.4862 ha (33.325 ac), is protected by buffer zone (10 meters) which is preserve existing vegetation and also temporary earth drain from external flow, thereby limiting erosion and sedimentation problem in the area. The erosion and sedimentation problem is contributed by discharge of sediment laden water generated after the sand washing and eroded sediments carried by stormwater runoff.

The contractor shall ensure all erosion and sediment control works are undertaken as required/ instructed in this specification and constructed in accordance with the Urban Stormwater Management Manual for Malaysia 2, 2012, engineering specifications and details. . In order to ensure the planned environmental protection works are effectively implemented, the following budgets have been allocated as summarized in **Table 9** below.

Table 9 : Proposed Bill Of Quantities (BQ) for LD-P2M2

ITEM	DESCRIPTION	UNIT	QTY	RATE (RM)	AMOUNT (RM)
ALL PROVISIONAL BILLS OF QUANTITIES					
1	<u>LDP2M2 IMPLEMENTATIONS</u>				
1.1	Administration of LDP2M2	LS	LS		
	a. Administration and execution of LDP2M2 as part of the Environmental Impact Assessment (EIA) implementation and compliance of the Department of Environment (DOE) requirements.				
	b. To provide a full time Environment Officer (EO) with CESSWI / CISEC qualifications throughout the construction period.				
1.2	Good Engineering Practice				
	a. Phasing and Parcelisation of Development Plots (Planning Exercise)	LS	LS		
	Land disturbing activities shall be carried out in phases, with each parcel fully constructed and implemented with specified LDP2M2 before moving to other parcel.				
1.3	Erosion Control				
	a. Cover Crop				
	Supply and install vegetative cover crop at the bare land area immediately without further delay.				
1.4	Sediment Control (Refer Drawings : KCS/HQ/472-LDP2M2-0319-2653-D002)				
	a. Sediment basin Construction				
	Construct and commission sediment basin complying with LDP2M2 design drawings.	no.	4		
	b. Compacted Earth Bund for Biomass Area				
	Supply, construct and maintain compacted earth bund to provide sediment control from biomass area.	metre run	380		
	c. Silt Fence				
	Supply and install silt fence to provide sediment control which are designed to retain sediment in place where soil is being disturbed by construction processes.	metre run	183		
1.5	Run Off Control (Refer Drawings : KCS/HQ/472-LDP2M2-0319-2653-D002)				
	a. Temporary Earth Drain				
	Construct and maintain earthdrain including all necessary excavation, trimming, excavated sides to slope and to be filled and compacted with suitable earth on completion where accessory all as per LDP2M2 drawing .	metre run	1,125		
	b. Check Dam				
	Supply, construct and maintain check dam as per LDP2M2 drawings, or as directed by EO.	no.	36		
Total :					

Table 9 : Proposed Bill Of Quantities (BQ) for LD-P2M2 (cont')

ITEM	DESCRIPTION	UNIT	QTY	RATE (RM)	AMOUNT (RM)
ALL PROVISIONAL BILLS OF QUANTITIES					
	c. Waterway Crossing (Culvert) Supply, construct and maintain culvert (if necessary) as per LDP2M2 drawings, or as directed by EO.				
1.6	Slope Stabilization (Refer Drawings : KCS/HQ/472-LDP2M2-0319-2653-D003)				
	a. To construct the slope stability such as terracing follow the details drawings.				
2	<u>MAINTENANCE & OPERATION</u>				
2.1	Weekly maintenance of LDP2M2 (periodic)	no.	6		
	a. To carry out maintenance works for the installed BMPs components such as silt fence, earth bund, sediment basin, earth drain, check dam, waterway crossing etc.				
3	<u>ENVIRONMENTAL MONITORING</u>				
3.1	Water Quality Monitoring	no.	6		
	a. To conduct Total Suspended Solids (TSS) level monitoring at sediment basin (primary) discharge points after rainstorm event, or once in a three month.				
3.2	Quarterly TSS Monitoring Report	no.	6		
4	<u>PRESERVATION ITEM (If Applicable)</u>				
	a. River reserved (20m)				
	b. Slope steepness > 35°				
	c. Vertical slope length > 1000m				
	d. R.O.W				
5	<u>OTHER ITEMS</u>				
	a. Nursery				
	b. Portable toilet				
	c. Site Office				
Total :					

5.1 Design of Sediment Basin

A sediment basin is a structure formed by excavation and/or construction of an embankment across a waterway or other suitable location. The purpose of a sediment basin is to collect and store sediment from sites cleared during construction for extended periods of time before re-establishment of permanent vegetation and/ or construction of permanent drainage structures. A sediment basin is designed to trap sediment before it leaves the construction site. It is a temporary structure with a life span of 1 to 2 years. Sediment basin has two categories which are dry sediment basin and wet sediment basin.

5.2 Criteria for Sizing of Sediment Basins

Based on the Sediment Basin Theory (Table 1.3 in MSMA 2, 2012), it requires temporary or permanent BMPs to be designed based on 50 and 40 mm respectively of rainfall applied to the catchments draining to the BMPs. Quality Control Design Criteria is depicted in **Table 10**.

Table 10: Quality Control Design Criteria (Table 1.3 in MSMA 2, 2012)

Variables	Criteria
Water Quality Volume	• Temporary BMPs – 50 mm of rainfall applied to catchments draining to the BMPs • Permanent BMPs – 40 mm of rainfall applied to catchments draining to the BMPs
Primary Outlet Sizing	Based on the peak flow calculated from the 3 month ARI event.
Secondary Outlet (Spillway) Sizing	As per the ARIs recommended in the respective chapters of the individual BMPs

There is a change of approach in MSMA 2 (2012) where temporary or permanent BMPs are designed based on 50 or 40 mm of the rainfall on the catchment, compared to MSMA (2000) where these were based on the 75th or 80th percentile 5 day storm for wet ponds. The comparison between MSMA 1(2000) and 2 (2012) is indicated in **Table 11**.

Table 11: Comparison between MSMA 1 (2000) and 2 (2012) Design Requirements for Sediment Basins

Duration	MSMA 1 (2000)		Duration	MSMA 2 (2012)	
Construction Period	Dry Sedimentation Basin	Wet Sediment Basin	Construction Period	Dry Sedimentation Basin	Wet Sediment Basin
<2 Years	3 Month ARI	75 th Percentile 5 Day Rain	Temporary <18 months	3 Month ARI	50 mm
>2 Years	6 Month ARI	80 th Percentile 5 Day Rain	Temporary >18 months	3 Month ARI	40 mm

Sediment basins are suitable for nearly all types of construction projects. Wherever possible, they should be constructed before land clearing and grading works. The type of basin is to be determined using **Table 12** below.

Table 12: Sediment Basin Types and Design Considerations (Table 12.16 in MSMA 2, 2012)

Category	Soil Description	Hydrological Soil Group	Basin Type	Design Considerations
I	Coarse-grained sand, sandy loam: less than 33% < 0.02mm	A	Dry	Settling velocity, Sediment storage
II	Fine-grained loam, clay: more than 33% < 0.02mm	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

5.3 Design of Dry Sediment Basins

Dry sediment basin sizing guidelines are as shown in **Table 13** (Table 12.18 in MSMA 2, 2012).

Table 13: Dry Sediment Basin Sizing Criteria (Table 12.18 in MSMA 2, 2012)

Parameter	Time of Concentration of Basin Catchment (min)				
	10	20	30	45	60
Surface Area (m ² /ha)	333	250	200	158	121
Total Volume (m ³ /ha)	400	300	240	190	145

5.4 Design of Wet Sediment Basins

Wet sediment basin sizing guidelines are as shown in **Table 14** (Table 12.19 in MSMA 2, 2012). Rainfall depths of 50 and 40 mm are used for temporary and permanent BMPs instead of using the 75th or 80th percentile 5-day rainfall event of the magnitude of design storm.

Table 14: Wet Sediment Basin Sizing Volume (m³/ha) in (Table 12.19 in MSMA 2, 2012)

Parameter	Site Runoff Potential	Magnitude of Design Storm Event in mm				
		20	30	40	50	60
Settling Zone Volume (m ³ /ha)	Moderate-high runoff	70	127	200	290	380
	Very high runoff	100	167	260	340	440
Total Volume (m ³ /ha)	Moderate-high runoff	105	190	300	435	570
	Very high runoff	150	250	390	510	660

5.5 Design of Sediment Basins for this Project

In this proposed Project, design of wet sediment basins will be chosen because it meets the criteria for sizing of sediment basins as follows:-

Based on MSMA 2 (2012),

From Table 12 (Table 12.16), category of predominant soil type (Type B)

Construction time < 2 years

Temporary BMP – 50 mm of Rainfall applied to catchment area.

From Table 12, for the 50 mm storm, with moderate high-runoff,

Required settling zone volume is 290 m³/ha and the required total volume is 435 m³/ha (both interpolated and rounded to nearest whole number)

The water will flow in smooth condition into temporary drain, pass through rock check dam and storage on the Sediment Basin. The basin is enough for storage and outflows are in bigger sizes. Proposed size of the sedimentation pond is as shown in **Table 15**. The details of design calculation for sediment basins are as shown in **Appendix 3**.

A log book is provided to ensure the inspector will check conditions on site and ensure that didn't occur or pollution. Besides that, the contractor must follow all the rules from JKR, JPS, JAS and etc, not only to minimize complain from public but is safe.

Table 15: Proposed Size of the Sediment Basin

Phasing	Sediment Basin No.	Catchment Area (ha.)	Pond Size
Phase 1	SB 1	5.5407	Base level, (Length)=63m, (Width)=29m Top level, (Length)=72 m, (Width)=38 m Total depth= 2.10 m
Phase 2	SB 2a	4.7569	Base level, (Length)=57m, (Width)=27m Top level, (Length)=65 m, (Width)=35 m Total depth= 2.00 m
	SB 2b	3.1886	Base level, (Length)= 48 m, (Width)=21m Top level, (Length)=56 m, (Width)=29 m Total depth= 2.10 m

6.0 POLLUTION PREVENTION AND MITIGATION MEASURES

Pollution Prevention and Mitigation Measures refer to 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.

- i) Construction of earth drain, and earth dykes, drainage and outfall structures and associated works.
- ii) To implement the stockpile soil management
- iii) Vehicle, equipment area, materials storage area.
- iv) To divert all potential natural water sources/ stream to approved discharged area.
- v) Minimum site clearing.
- vi) Integrate project design with site constraints.
- vii) Preserve and stabilize drainage ways.
- viii) Minimize the extent and duration of disturbance.
- ix) Control runoff flows onto, through and from the site in stable drainage structures.
- x) Install perimeter controls.
- xi) Stabilize disturbed areas promptly in a timely manner.
- xii) Use sediment controls to prevent off-site damage.

6.1 Erosion Control Measures

The site egress and ingress shall be converged into a single entry to eliminate multiple access problems by site machineries. Through this measure, the earth path shall have minimum disturbance and hence reduces erosion and sedimentation to the existing drains or surface water body.

However, should additional machinery access be required due to the extent of earthworks, similar approach shall be adopted and subject to the approval by engineers and local authorities. The following methods statements shall be adopted:-

- i) Construction of access road and wash through.
- ii) Preserved 10m existing vegetation as buffer zone along project boundary.
- iii) Construction of sediment basin and temporary earth drains.
- iv) Removal of top soil and stockpiled.

- v) Construction of temporary rubbish/ debris collection center and disposal of the approved dump site.
- vi) Construction of earth retaining structures, if applicable and suit to site conditions
- vii) Checking and monitoring of LD-P2M2.
- viii) Submission of water quality results to Department of Environmental
- ix) Sprinkling of water for dust control. Should water supply is unavailable, soil binders or dust retardants shall be used.

Since the soil erosion impact can be significant for this construction operation, as potential soil erosion, sedimentation and water quality is concerned, it can be very damaging to the environment if it is not handled properly. The following mitigation measures below should be adopted to minimize the environmental disturbance.

- i) Vegetation strips planted in and around the ponds and waterways would act as buffer and filter to decrease the net delivery of silt during runoff flow from the upper hill area to the lower areas and finally into the earth drains and sediment basins before being discharged into adjacent waterways.
- ii) The benches platforms should be constructed with a very slight reverse gradient sloping towards the hillside.
- iii) Water should be directed using a proper drainage system to the Project area and accumulated in the sediment basin before discharge from the site boundary.
- iv) The staging of the activities will help to further reduce potential soil erosion and the resultant sediment pollution.
- v) All filled areas must be firmly consolidated and compacted to reduce the presence of loose soil materials, which are more erodable.
- vi) Water quality monitoring should be carried out regularly at the point of discharge from the Project site to ensure that the water is of an acceptable quality.
- vii) More erosion-prone development activities like site clearing and removal of overburden should be scheduled for the drier period of the year when the rainfall erosivity would be lower. If these activities could be completed and any exposed sites properly prepared and stabilised before the wet season returns, the potential soil loss would be substantially reduced.

6.2 Surface Runoff Control Measures

For construction works, surface runoff as a result of rain demands much attention and can create major problems due to washouts, making provisions of drains and culverts essential. Failure to control storm water can generate

serious erosion on the exposed soil surface, create boggy areas which impede wet weather working and generate pollution problems in sediment-laden runoff leaving the site.

Development of site drainage plan is therefore an essential step that should focus on restricting the amount of extraneous water entering the site, limiting the area disturbed and thus exposed to erosion on the site and managing runoff leaving the site. The control of surface runoff is an important element in reducing the soil erosion hazard. A number of mitigation measures have been devised to reduce and to mitigate the impact of surface runoff. The mitigation measures are as follows:

- i) Provide with appropriate drainage installation to discharge the runoff.
- ii) To maintain bund and drainage in place within the project site to minimize soil erosion on-site as well as runoff and siltation off-site.
- iii) Appropriate drainage system should be installed to lead the runoff from upper slopes without causing too much soil erosion, especially gullying, scouring and mass movement due to slope failure.
- iv) Water should be directed down cut barbers over solid rock, through U-shaped culvert pipes or over riprap installation.
- v) Reduce site runoff by grassing and sealing soil and overburden mound and by progressive restoration of project site areas.
- vi) Surface roads with rock, crushed gravel, asphalt or other approved material to reduce run-off and siltation and pollution of water courses. Remove any material spilled on public roads.

Precaution should be taken to prevent any loss of the overburden materials from the stockpile through water or wind erosion. The material should also be suitably compacted and graded and maintain a suitable angle of repose for the purpose of slope stability. It is also necessary to construct earth drains, sediment basins and other protective works, sufficient to ensure that surface runoff will not erode the surface of the overburden stockpiles placed therein and cause siltation elsewhere within or outside the project area.

6.3 Summary

The potential environmental impacts and their corresponding mitigation measures where required are summarised in **Table 16**. For the purpose of the assessment and proposed mitigation measures as mentioned above, it is assumed that the Project will be planned in orderly manner which will enable the Project to develop efficiently.

Table 16: Summary of Significant Environmental Impacts, Proposed Pollution Prevention and Mitigation Measure (P2M2) and Residual Impact

Potential Impact	Sources of Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Residual Impact	
			Nature of Impact (Adverse, Beneficial or Not Significant)	Significance (Minor, Major, Moderate)
Dust Pollution	Development/ Operation	- Frequent spraying of water on the exposed surface especially during dry seasons. - Regular spraying the entrance and exit points of the site. - Implement all construction vehicles to go through the washing bay after tire washing from the quarry site before exiting the site. - Traffic controls such as speed limits and traffic volume restrictions to reduce dust churned up by vehicles. The recommended speed is not exceeding 30 km/h along the haulage road. - Vehicles transporting earth and construction material should be covered properly with tarpaulin to reduce wind-blown dust. - Transport of earth and materials should be confined to non-peak hours, if possible. - The burning of plant debris and other construction wastes is prohibited. A warning sign board must be erected to send the message across at all time. - Proper maintenance and frequent servicing of vehicles to reduce exhaust fume emissions. - Carry out dust monitoring programme. - Workers should be supplied with respiratory masks.	Not significant	Minor

Table 16: Summary of Significant Environmental Impacts, Proposed Pollution Prevention and Mitigation Measure (P2M2) and Residual Impact (Con't)

Potential Impact	Sources of Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Residual Impact	
			Nature of Impact (Adverse, Beneficial or Not Significant)	Significance (Minor, Major, Moderate)
Noise and Vibration	Development/ Operation	- The machinery used should also be properly checked and maintained at optimum operating conditions. All machinery should be shut down when not in use. - Overall noise level emitted from the transportation of the construction equipment and materials to be controlled by routing all construction vehicles to routes that will cause minimum disturbance. - Any complaints from nearby residents should be immediately attended to and actions taken. Impose and enforce a speed limit on all vehicles moving within the project site. - Regulate the number of external and internal vehicle trips per day. - Maintain natural buffer zones to attenuate the noise impact. - Carry out noise monitoring programme. - Provide workers with earplugs or earmuffs. - Have work shifts for the workers. - Carry out regular audiometric test on the workers. - Adopt proper and safe blasting technique. - Engage qualified personnel to handle blasting and explosive. - Avoid secondary blasting. - Use delay blasting technique and correct stemming. - Carry out quarry face survey. - Monitor blast as feedback for future blast design. - Install effective noise suppression system.	Not significant	Moderate

Table 16: Summary of Significant Environmental Impacts, Proposed Pollution Prevention and Mitigation Measure (P2M2) and Residual Impact (Con't)

Potential Impact	Sources of Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Residual Impact	
			Nature of Impact (Adverse, Beneficial or Not Significant)	Significance (Minor, Major, Moderate)
Water Quality	Development / Operation	• Ensure minimum or no direct water discharge into any of the nearby natural water courses. • The surface runoff from the project area is being channelled into the drainage system and subsequently to the sedimentation pond built in place, before finally discharge. • Adequate sedimentation pond, siltation pond to contain water. • Oil and grease leakages from servicing the construction equipment, is to be drained into a drum for collection and disposed as 'scheduled waste' at the designated skid areas. • Fuel, grease, engine oil storage must be carefully sited to avoid contamination of the surface waters. • Domestic and solid wastes should be collected in covered bins and finally disposed off into an approved dumpsite.	• Not significant	• Moderate
Soil Erosion and sedimentation	Development/ Operation	• Limit the work area to the minimum and expedite work during dry season. • Overburden stockpile cleared regularly and be compacted. • Maintain the sediment pond constructed. • To maintain bund and drainage in place within the project site to minimize soil erosion on-site as well as runoff and siltation off-site.	• Not significant	• Moderate

Table 16: Summary of Significant Environmental Impacts, Proposed Pollution Prevention and Mitigation Measure (P2M2) and Residual Impact (Con't)

Potential Impact	Sources of Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Residual Impact	
			Nature of Impact (Adverse, Beneficial or Not Significant)	Significance (Minor, Major, Moderate)
Waste Generation Health and Safety (Operation)	Development/ Operation	- Proper disposal at approved dump site. - Adequate disposal bin prepared on site.	Not significant	Minor
	Dust Nuisance	- Carry out dust monitoring programme. - Workers should be supplied with respiratory masks.	Beneficial	Minor
	Noise Nuisance	- Carry out noise monitoring programme. - Provide workers with earplugs or earmuffs. - Have work shifts for the workers. - Carry out regular audiometric test on the workers.	Not significant	Minor
	Occupational accidents	Follow the emergency response plan formulated.	Not significant	Minor

7.0 **NARRATIVE**

In this written statement includes five parts which the erosion, sediment and other pollutant control decisions made for the proposed project and the justification for those decisions.

The narrative contains Information concerning Existing Site Conditions, Site Inspection and Maintenance, Monitoring, Construction Method of Sediment Basin, Check Dam, Earth Drain and Drainage Outlet Protection.

7.1 **Site Inspections**

Site inspections shall be conducted to check and to ascertain that all pollution controls and measures specified in the Report and this document have been properly installed and maintained as well as to determine whether any controls that is clearly not operating as intended or any control requires replacement, or additional pollution prevention and mitigation measures 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). The inspection checklist is as attached in **Appendix 4**. Furthermore, inspection on site should be undertaken:

- i) 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.
- ii) All pollution prevention and control measures are installed or applied at the site.
- iii) Installed a new or modified pollution prevention and mitigation measures or additional to make it operational by no later than 7 calendar days from the time of discovery.
- iv) Daily, during hot or dry weather when grass cover is less than 100% on vegetated areas.
- v) 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.
- vi) All areas that have been cleared, graded, or excavated and that have not yet completed stabilization.
- vii) All areas where runoff water typically flows within the site, including drainage ways designed to divert, convey, and/or treat runoff water.
- viii) Inspect construction entrances/exits, roadways, catch drains, earth drains, table drains, slope drains and all points of discharge from the site.
- ix) Inspect material storage areas, spoil area, borrow area, or equipment storage and maintenance areas.

- x) A 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.
- xi) Major observations and incidents of non-compliance shall be recorded in the inspection report, as well as corrective actions and maintenance and shall be recorded in the PM log book.

7.2 Maintenance

Pollution prevention and mitigation measures shall be maintained in accordance with the following requirements:-

- i) Maintenance shall begin as soon as the first pollution control 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.
- 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 $\frac{1}{2}$ full of sediment and/or by replacing them when they are torn or lifted, to retain their functionality.
- v) Stabilized Construction Entrance 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.

7.3 Environmental Performance Monitoring

Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation:-

- i) Environmental Performance Monitoring Committee (EPMC) shall be established to monitor the environmental performance and effectiveness of pollution control and mitigation measures, 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 Project Proponent. 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.
- iii) Performance Monitoring Document (PMD) shall be prepared to describe in detail how EIA approval conditions (COAs) are going to be complied and how performance monitoring of the pollution prevention and mitigation measures will be conducted to ensure the optimal functionality for maintenance. 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 pollution prevention and mitigation measures, discharge compliance, record keeping, etc.
- iv) Environmental performance monitoring (PM) program shall be established and executed to monitor and evaluate the effectiveness, inspect, maintain, take corrective actions to ensure their functionality and effectiveness throughout the entire process of the land disturbing activities.
- v) "Mini laboratory" shall be set up 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) Proper records using a log book (called the Performance Monitoring logbook) that contains among others, Checklist of List Sheet, Installation Sheet, Maintenance Sheet, Site and 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.
- vii) Current copy of the PMD and PM log book shall be kept at the site or at an easily accessible location, so that it can be made available at the time of an on site inspection or upon request by the Department of Environment inspector. This log book shall be maintained or updated by weekly/event-based inspections.

- viii) Performance Monitoring Report (PMR) that discusses the results of the performance monitoring conducted as described in the PMD shall be prepared. Wherever relevant, PMR shall include data interpretation and assessment of the effectiveness 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 pollution prevention and mitigation measures 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.

7.4 Important Notes in Construction Method of Sediment Basin, Check Dam and Earth Drains

Sediment Basin:-

- i) Remove all vegetation and topsoil from under the dam wall and from the storage area.
- ii) Construct a Cut-off Trench 600 mm deep and 1200 mm wide along the centerline of the embankment extending to a point on the gully wall level with the riser crest.
- iii) Maintain the trench free of water and recompact the material to 95% Standard Proctor Density.
- iv) Select fill according to the direction of LD-P2M2 that is free of roots, wood, rock, large stone or foreign material.
- v) Prepare the site under the embankment by ripping at least 100mm deep to help bond compacted fill to existing substrate.
- vi) Spread fills in 100mm to 150 mm layers and compact in Optimum Moisture Content +2%.
- vii) Rehabilitate structure in Accordance with the LD-P2M2.
- viii) Place a "Full of Sediment" marker to show when lesser than Design Capacity occurs and Sediment Removal is required.

Check Dam:-

- i) Trench structure 200 mm into Ground Surface wherever the Structure Contracts the Gully Base. Fill Trenches to 100 mm above Ground Surface to reduce risk of Undercutting.
- ii) Will ensure height of spillway is less than 1 m above the Gully Floor.
- iii) Space Checks so the Toe of the Upstream Dam is level with the Spillway of the next downstream Dam.

Earth Drain:-

- i) All drains must be compacted by Earth Moving Equipment.
- ii) All drains must have positive drainage to an outlet or drain.
- iii) Top width may be wider and side slopes may be flattered if desired to facilitate crossing by construction traffic.
- iv) Field location should be adjusted as needed to utilize a stabilized safe outlet.
- v) Outlets shall function with a minimum of erosion. Runoff shall be conveyed to a sediment trap or basin where either the drain channel or the drainage areas above the drain are not adequately stabilized.
- vi) Periodic inspection and required maintenance must be provided after earth rain event.

7.5 Drainage Outlet Protection

- i) Subgrade fills to be compacted to the density of the surrounding undisturbed material.
- ii) Ensure that concrete or rip-rap used for energy Dissipator or outlet protection conforms to the Grading Limits Specified on the LD-P2M2.
- iii) Ensure that the Geotextile does not Sustain Serious Damage by preparing a smooth, even foundation.
- iv) Repair minor damage to the Geotextile before spreading any aggregate. For repair, patch one piece of fabric over the damage, make sure that all joints and patches overlap more than 300 mm.

8.0 CONCLUSION

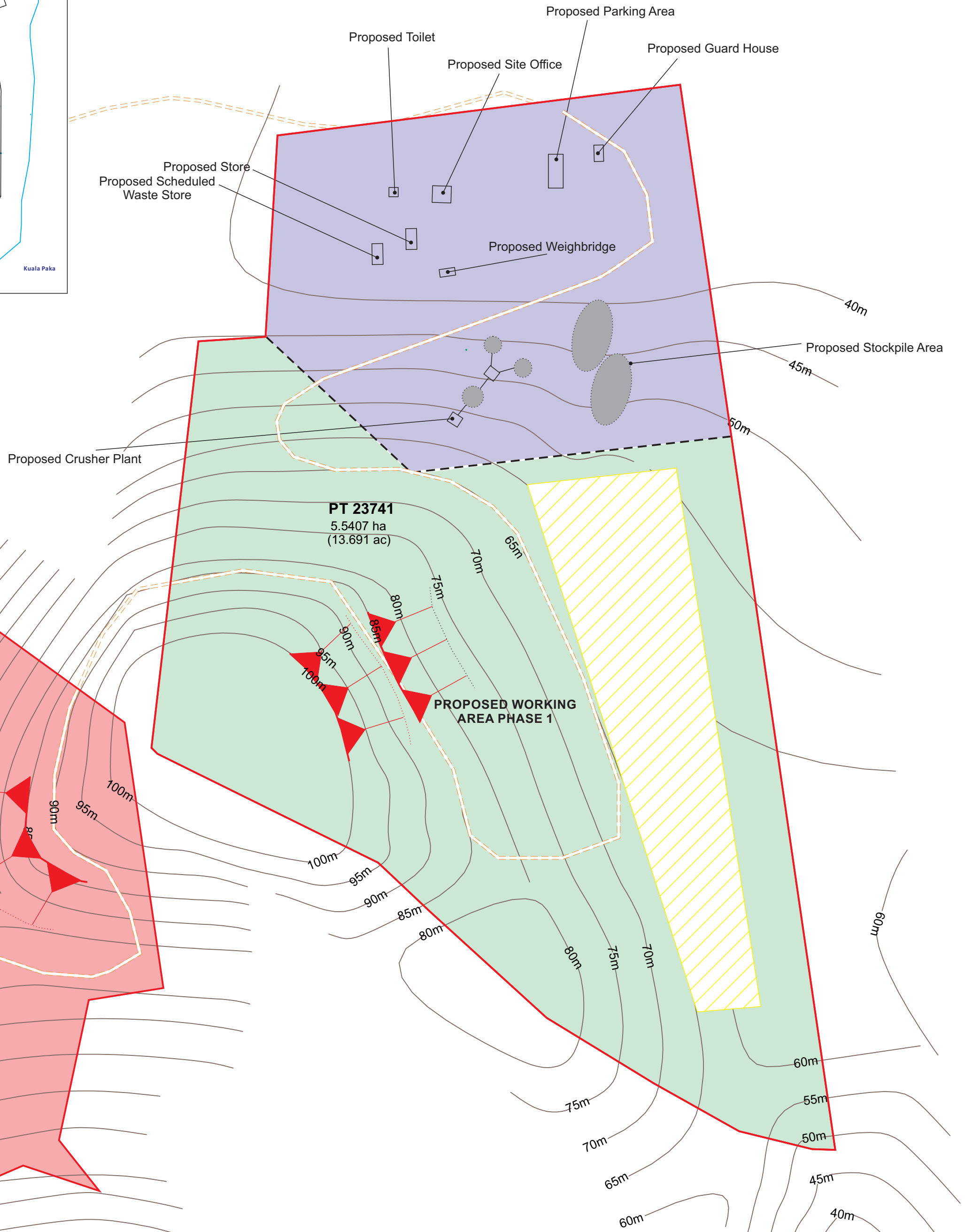
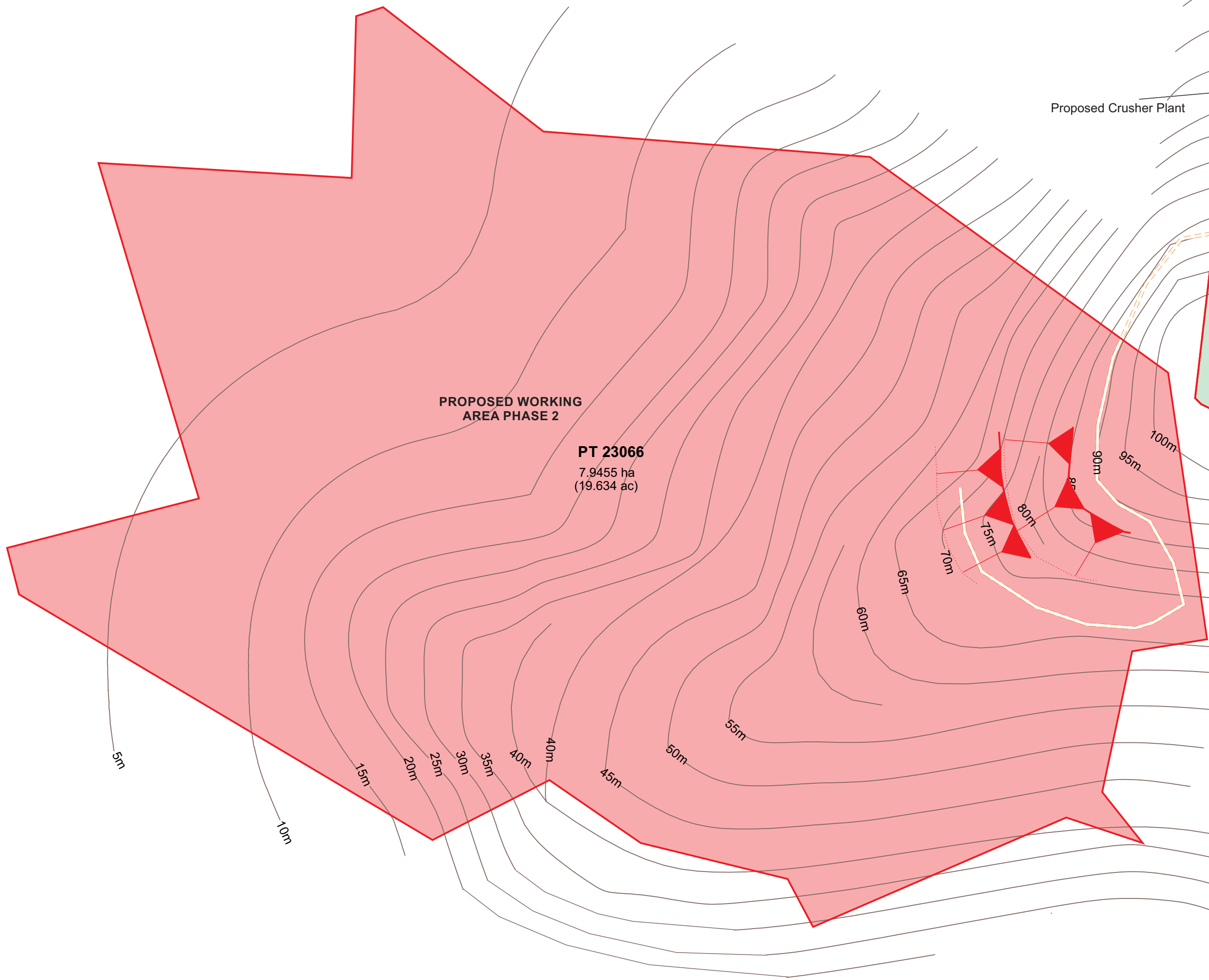
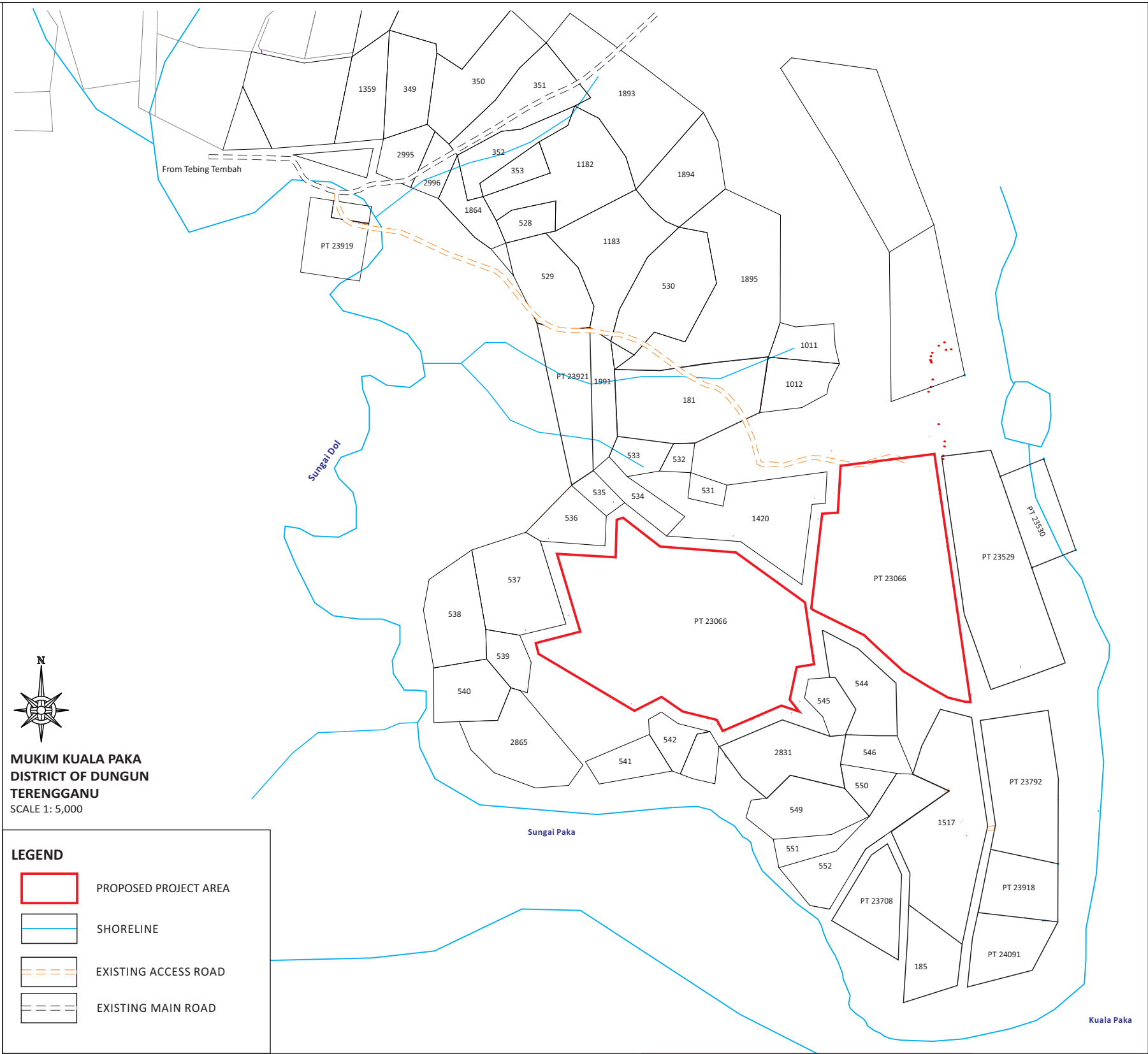
Finally, with proper management and design, ensure no occurrence of any pollutant at site. All erosion and sediment control measure will be kept in good working condition until all earthwork activities are completed and the site stabilized. In particular, attention will be given to:-

- i) Recent works, to ensure that they have not resulted in diversion of sediment-laden water away from them.
- ii) Degradable products, to ensure they are replaced as required.
- iii) Sediment removal, to ensure the design capacity or less remains in the settling zone.

Check Dam and earth bank will be provided at site. Any pollutants removed from the sediment basin are disposed of in areas where further pollution to down slope lands and waterways do not occur too.

The water will flow in smooth condition into earth drain, pass through check dam and storage on sediment basin. The basin is enough for storage and out flows are in bigger sizes.

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



REV.	DATE	DESCRIPTION
000	18.03.2019	EIA
001	24.11.2020	EIA-R1

LEGEND	
	Proposed Quarry Area
	Proposed Access/ Haulage Road
	Proposed Overburden and Biomass Dumping Area
	Proposed Phase 1
	Proposed Phase 2
	Proposed Facilities Area

CONSULTING ENGINEER

PROJECT PROPONENT

PROJECT PROPONENT
HEXATREND QUARRY SDN. BHD.

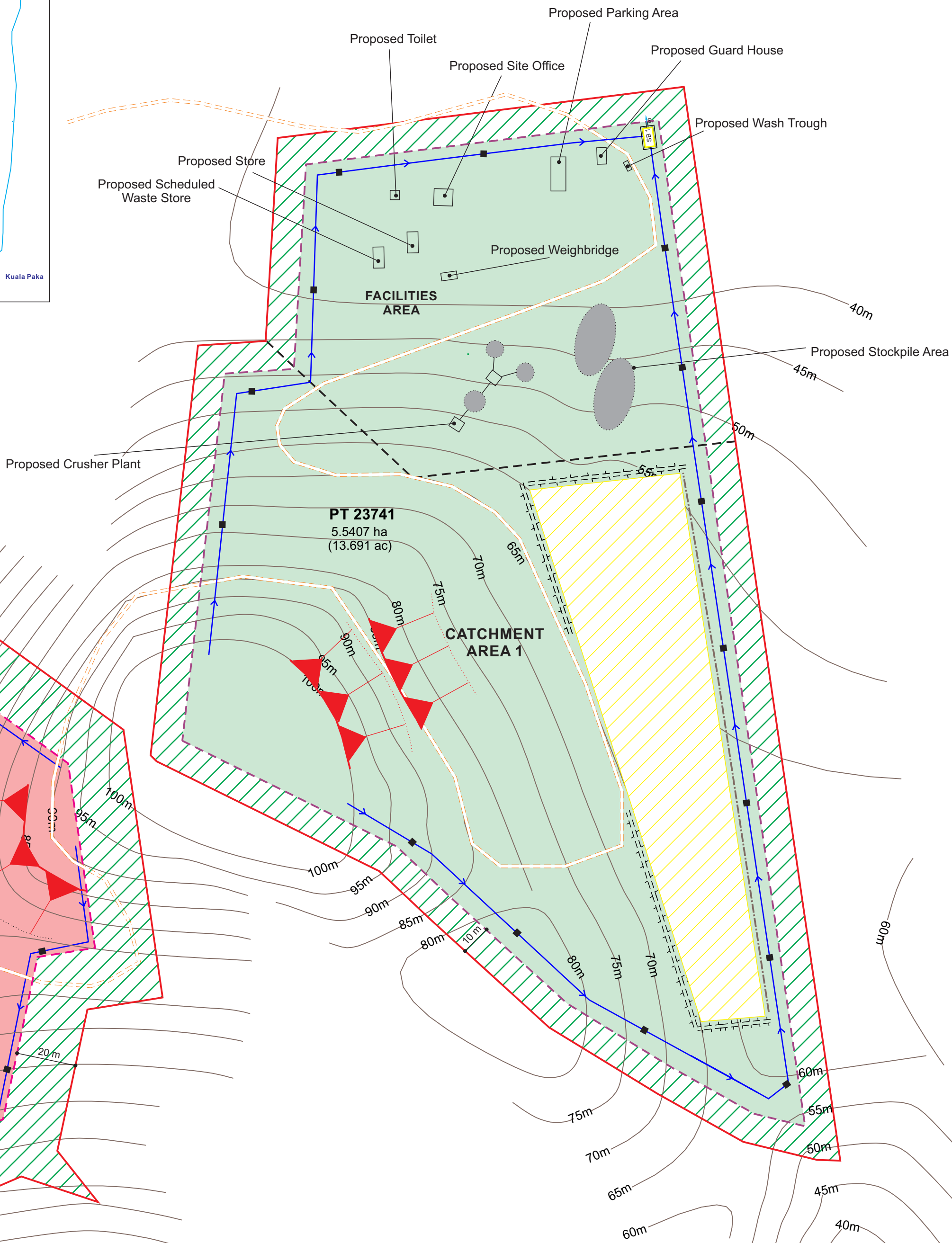
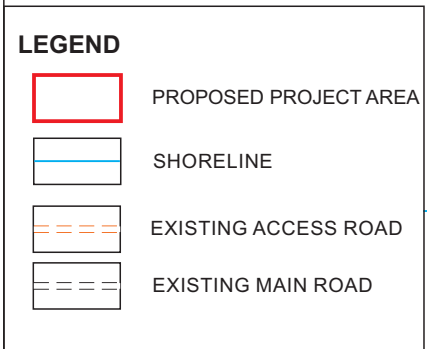
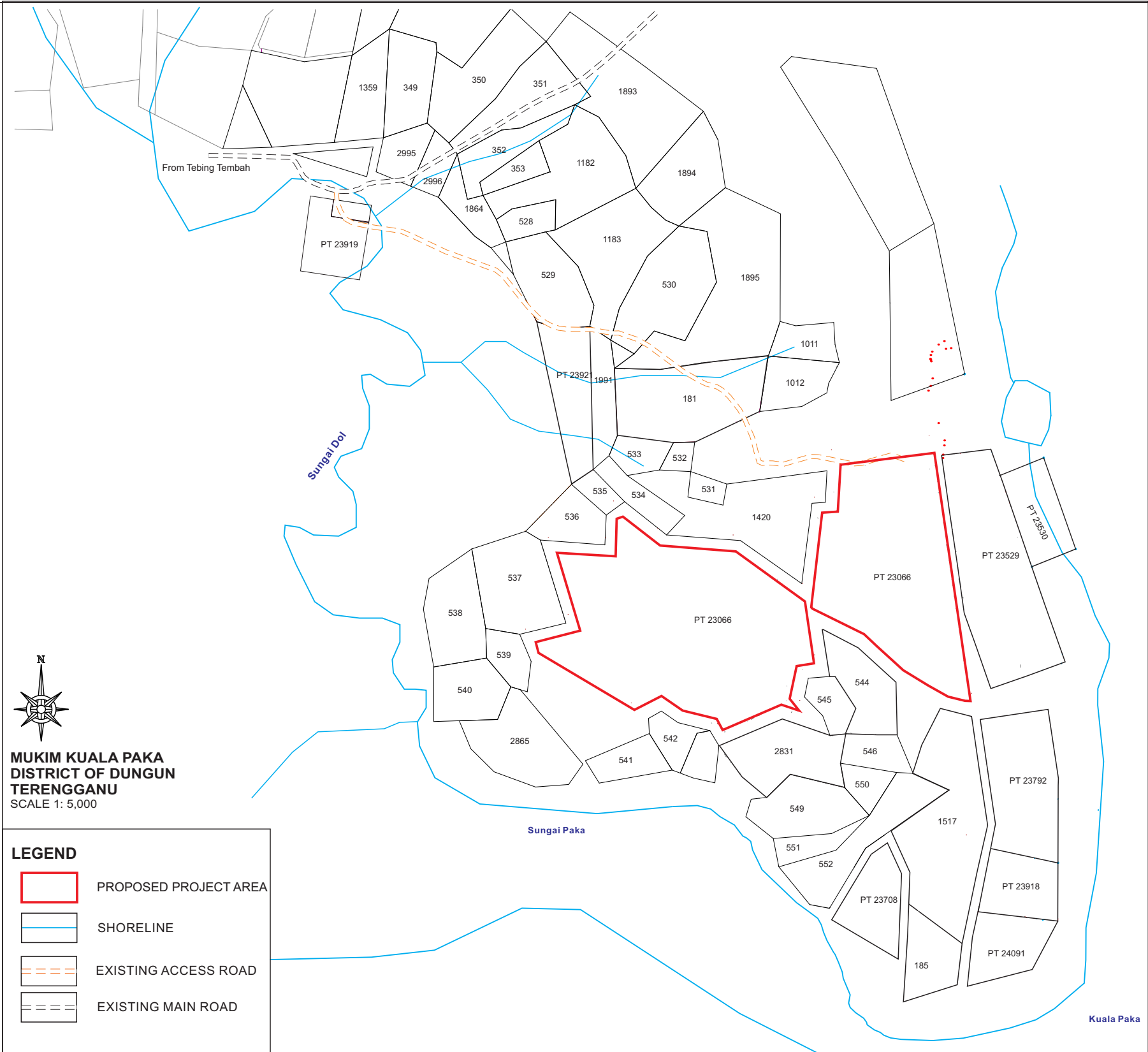
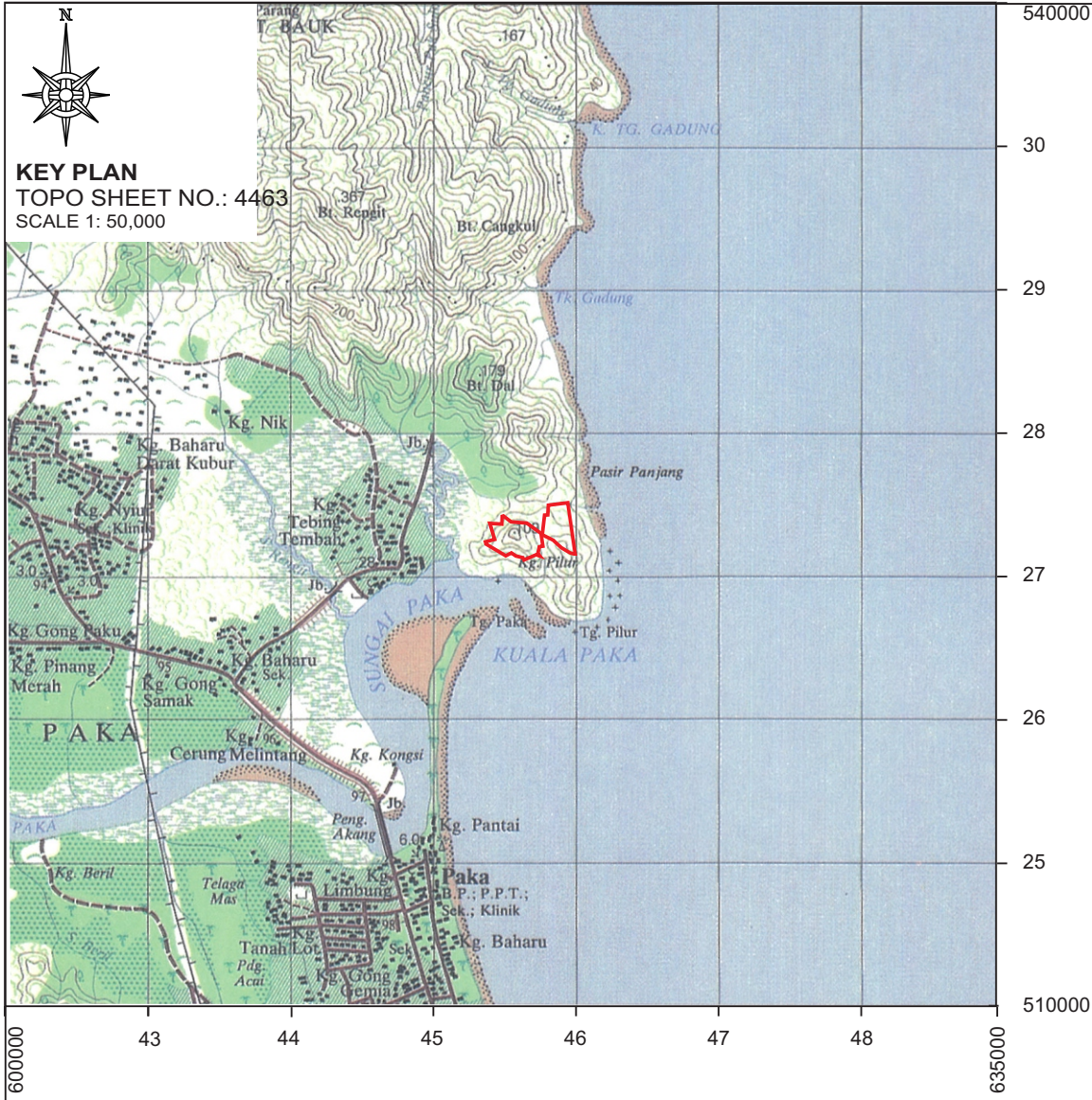
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LAND DISTURBING-POLLUTION PREVENTION AND
MITIGATION MEASURE (LD-P2M2)
-Phasing Plan

Compiled by	Ain
Drawn by	KS Chan
Checked by	Hung
Approved by	Hung
Drawing No.	KCS/HQ/472-LDP2M2-0319-2653-R1-D001
Date	24 November 2020
Scale	1 : 1,200
Paper Size	A1

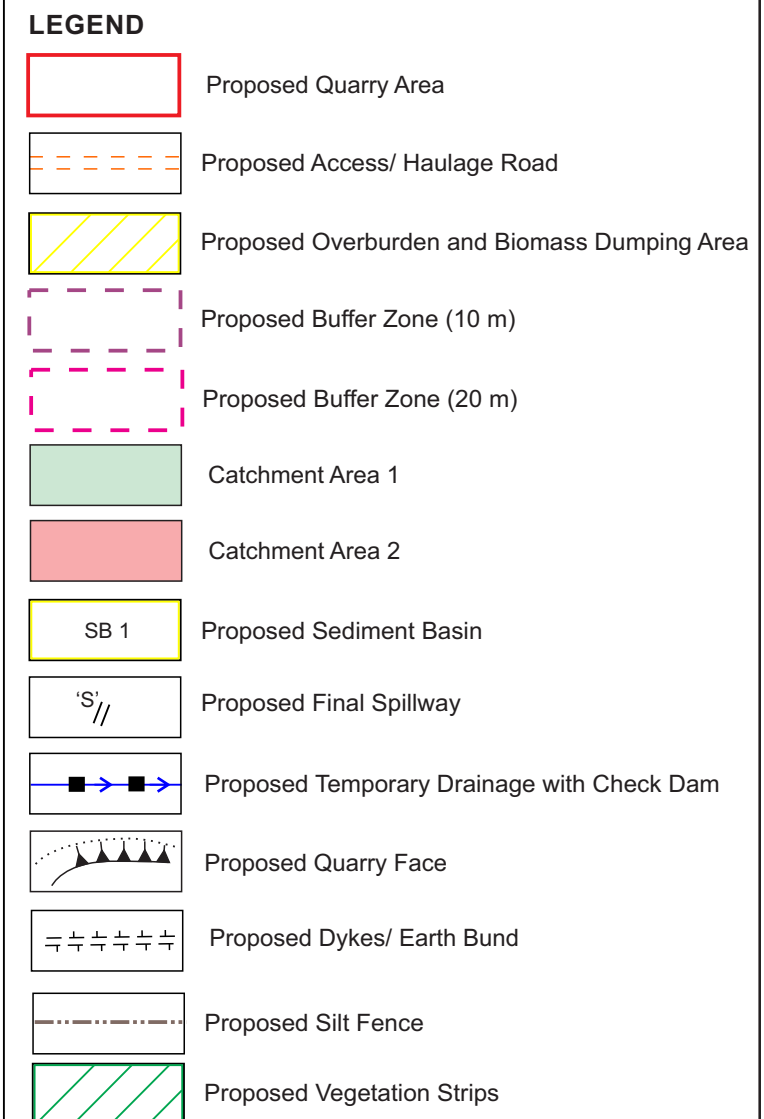
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MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU DARUL IMAN
SCALE 1 : 1,200



REV.	DATE	DESCRIPTION
000	18.03.2019	EIA
001	24.11.2020	EIA-R1



CONSULTING ENGINEER

PROJECT PROPONENT

PROJECT PROPONENT
HEXATREND QUARRY SDN. BHD.

DRAWING TITLE
LAND DISTURBING-POLLUTION PREVENTION AND
MITIGATION MEASURE (LD-P2M2)
-During Construction Phase 1 & 2

Compiled by	Ain
Drawn by	KS Chan
Checked by	Hung
Approved by	Hung
Drawing No.	KCS/HQ/472-LDP2M2-0319-2653-R1-D002
Date	24 November 2020
Scale	1 : 1,200
Paper Size	A1

PREPARED BY

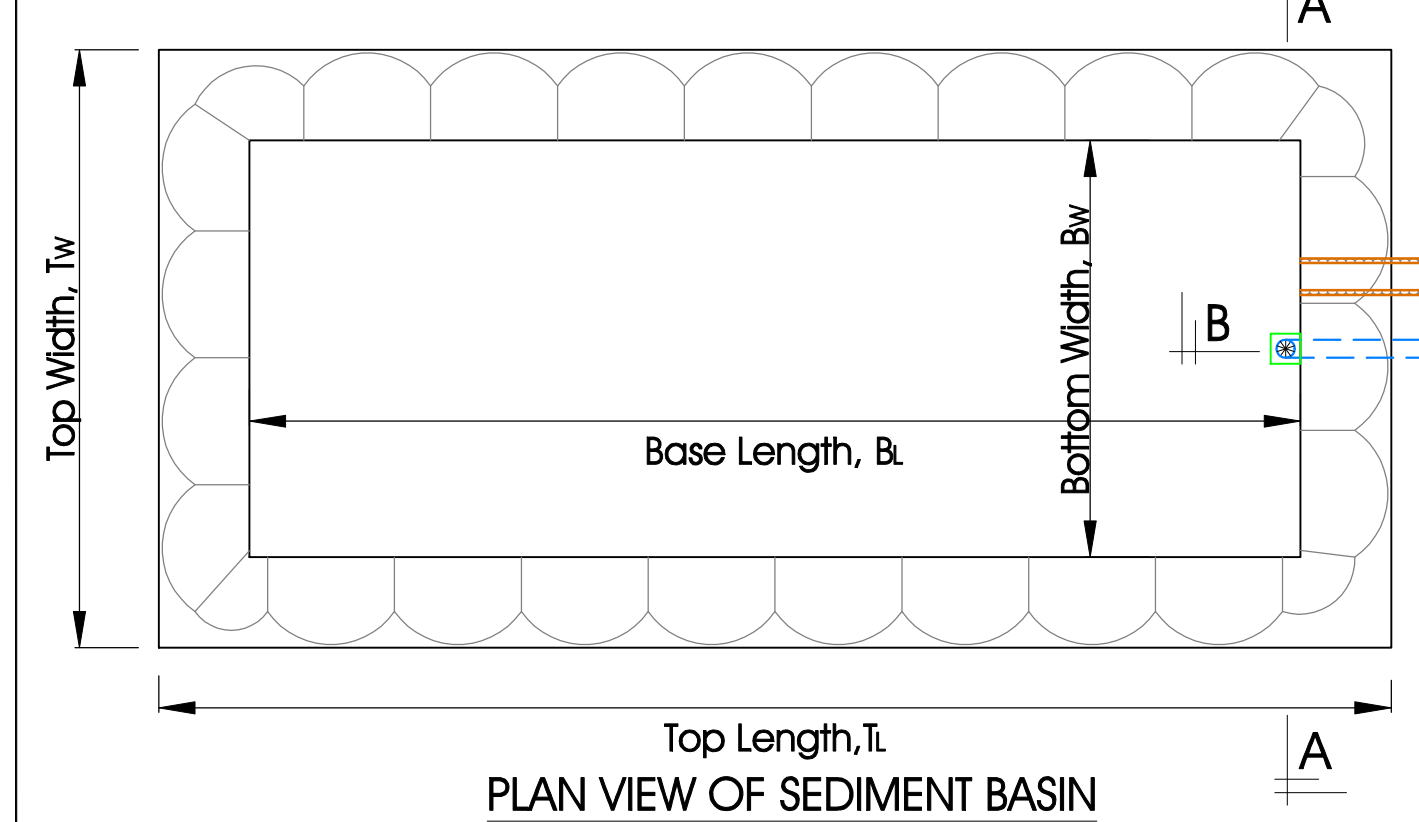
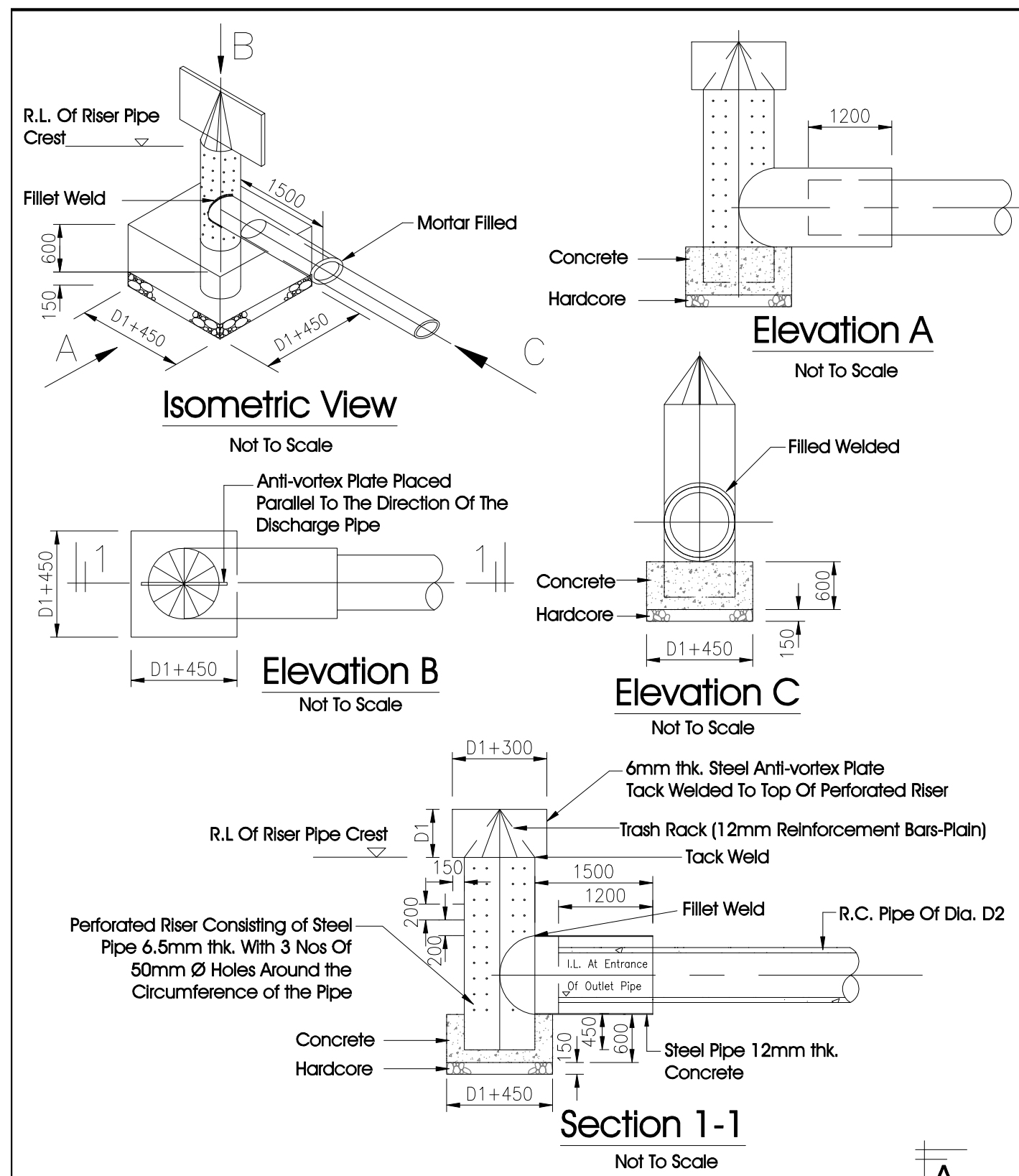
KCS

KenEp Consultancy & Services

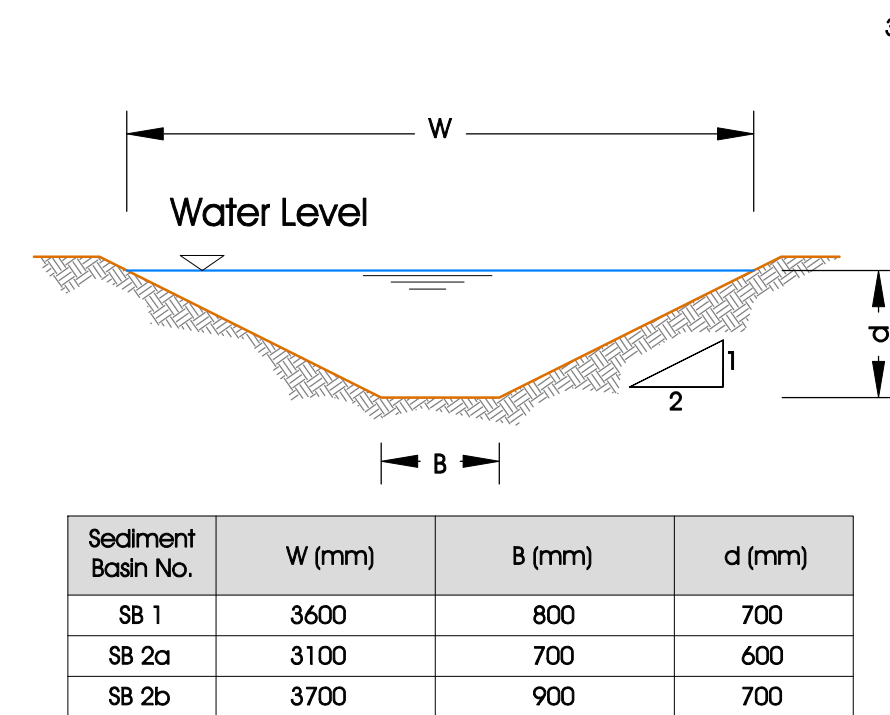
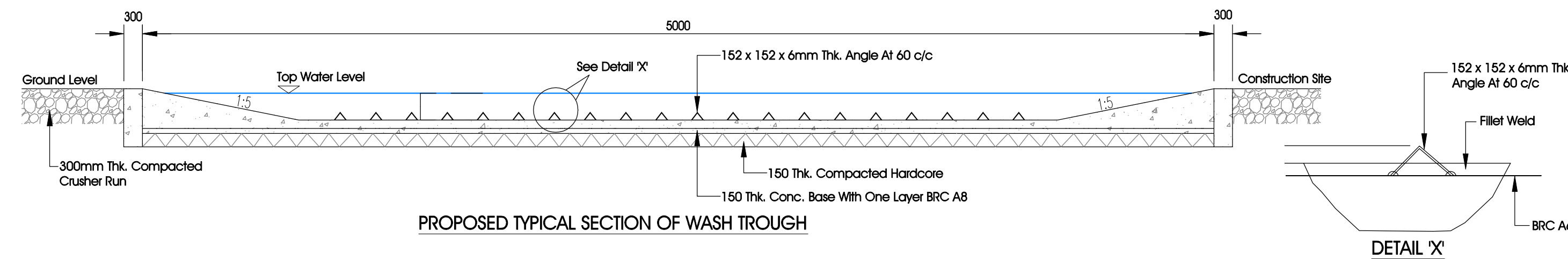
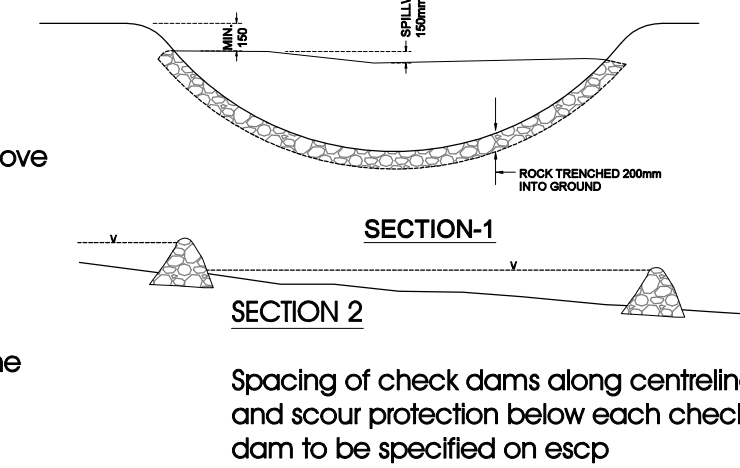
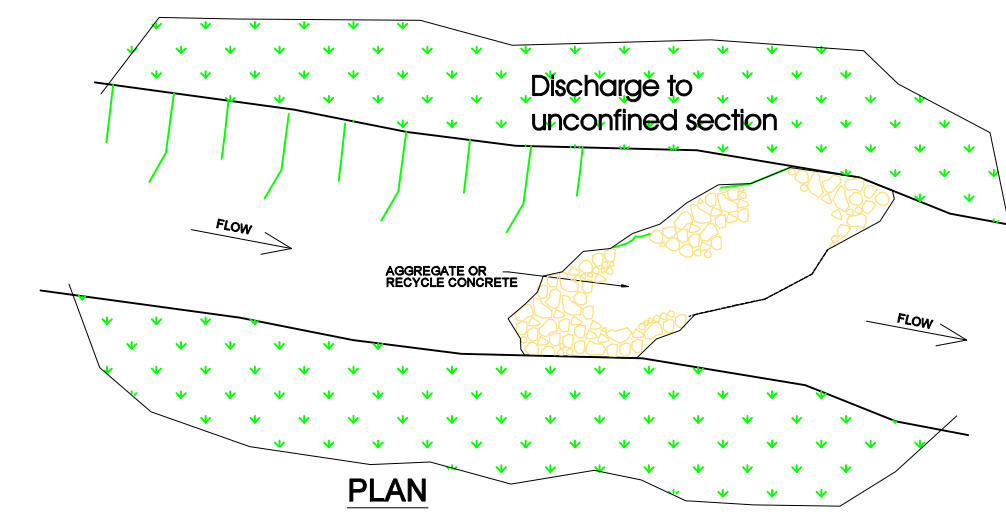
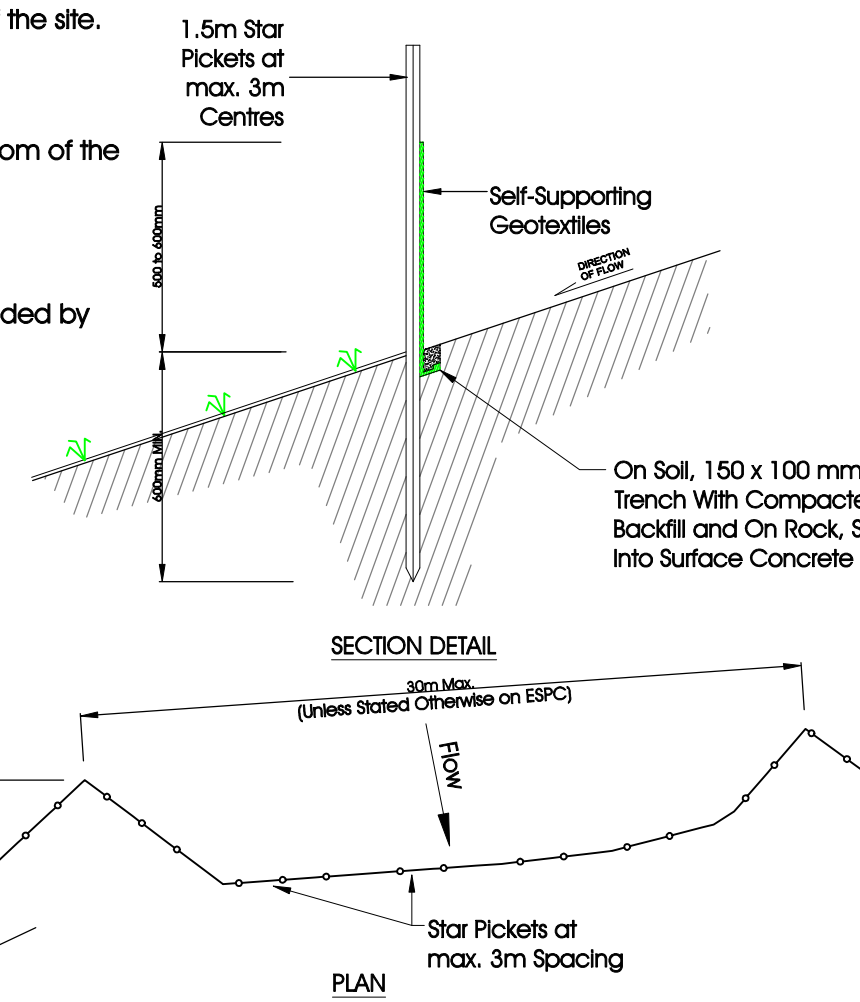
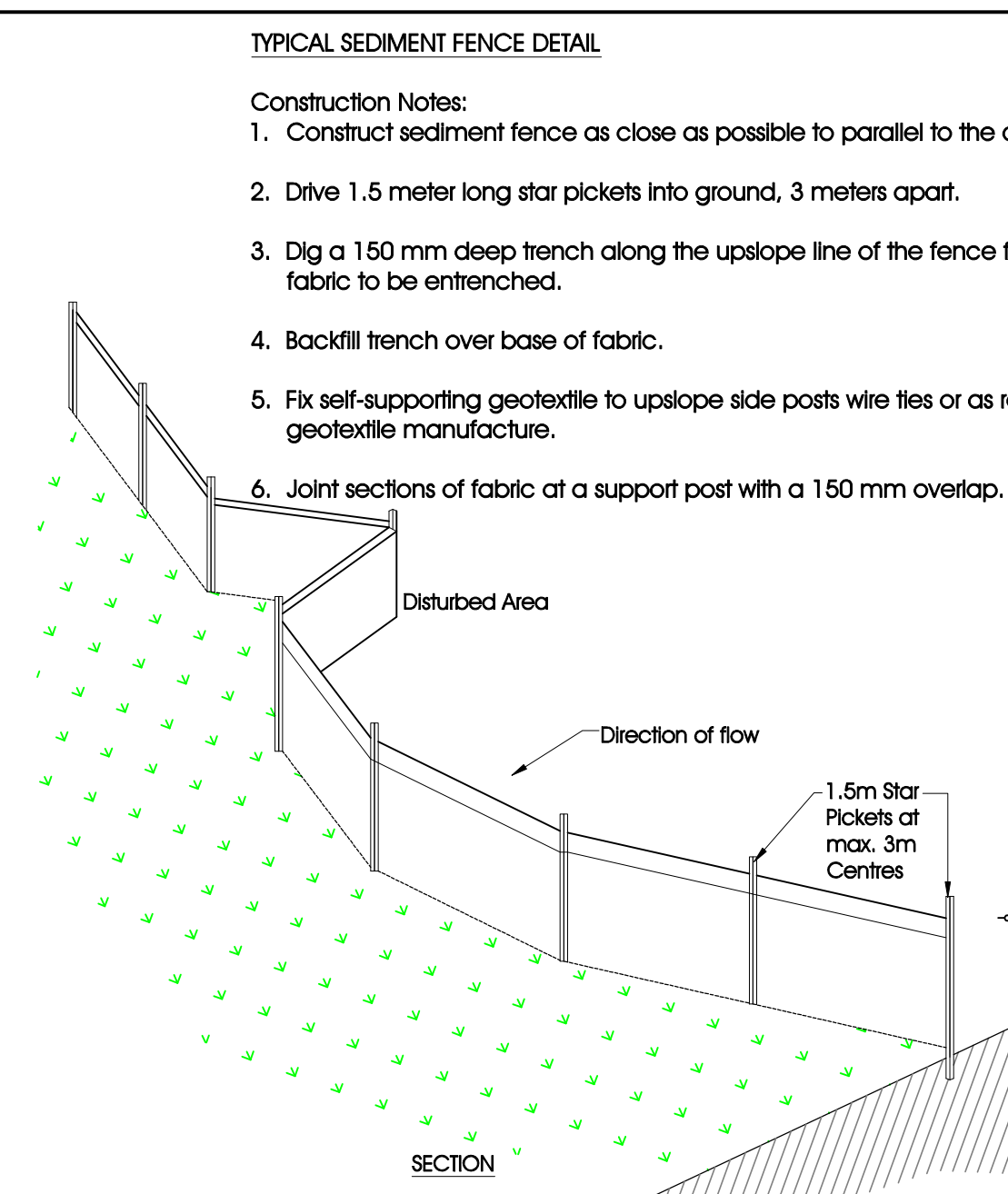
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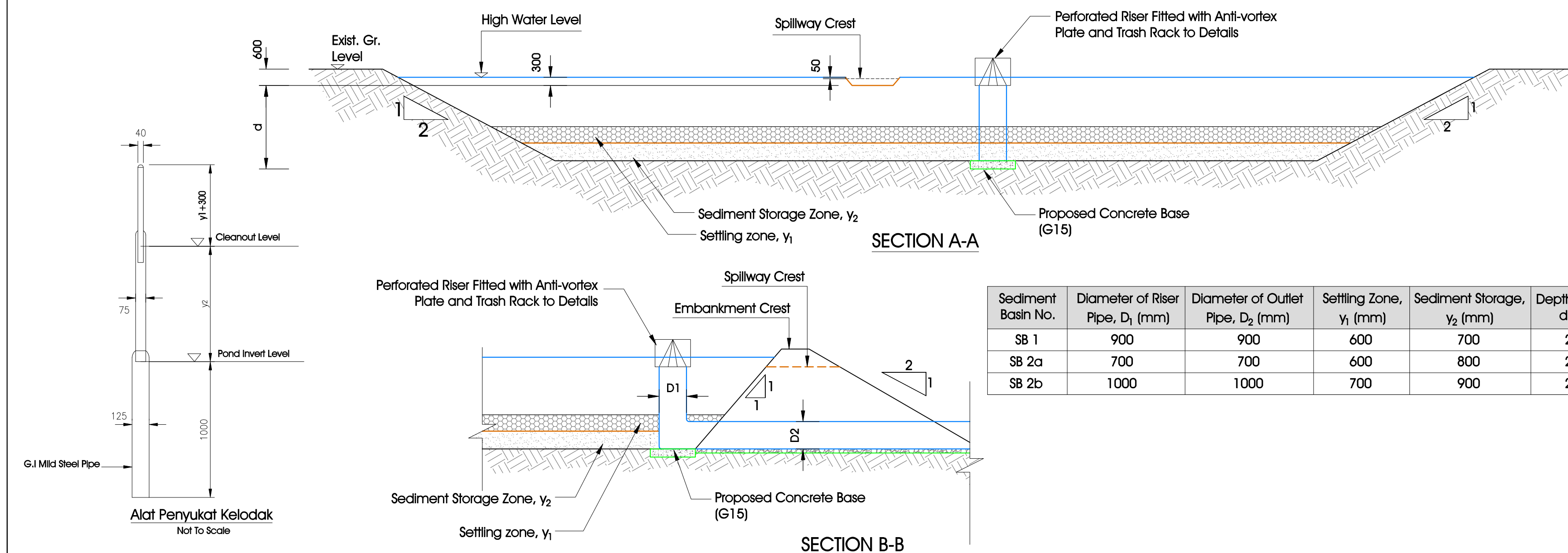
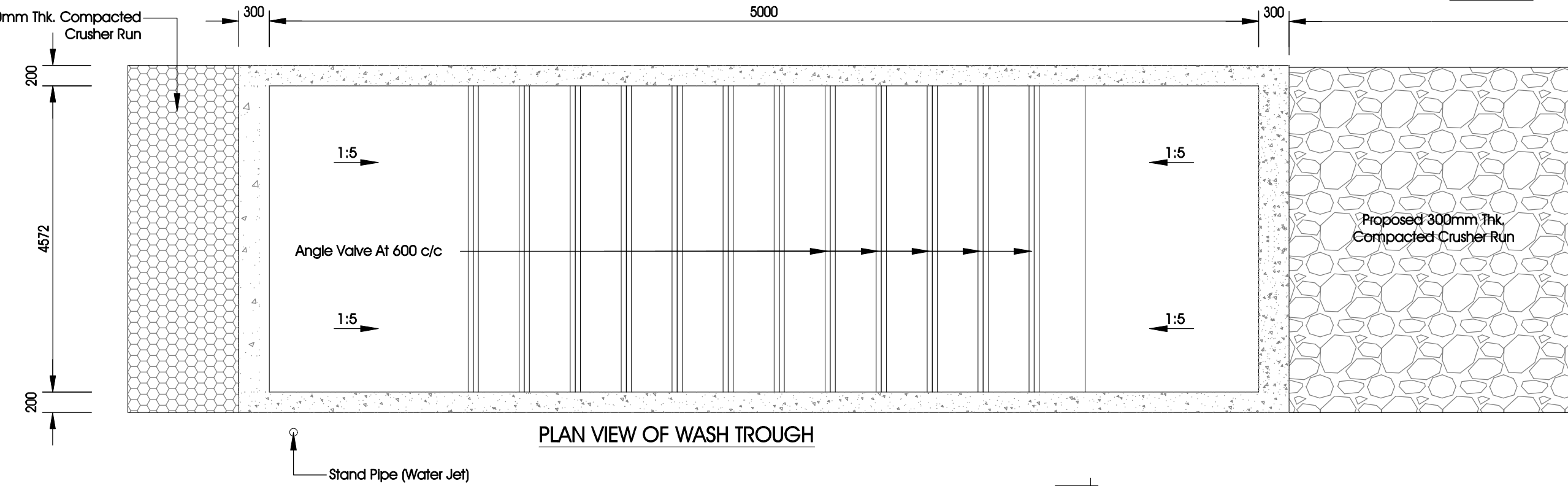




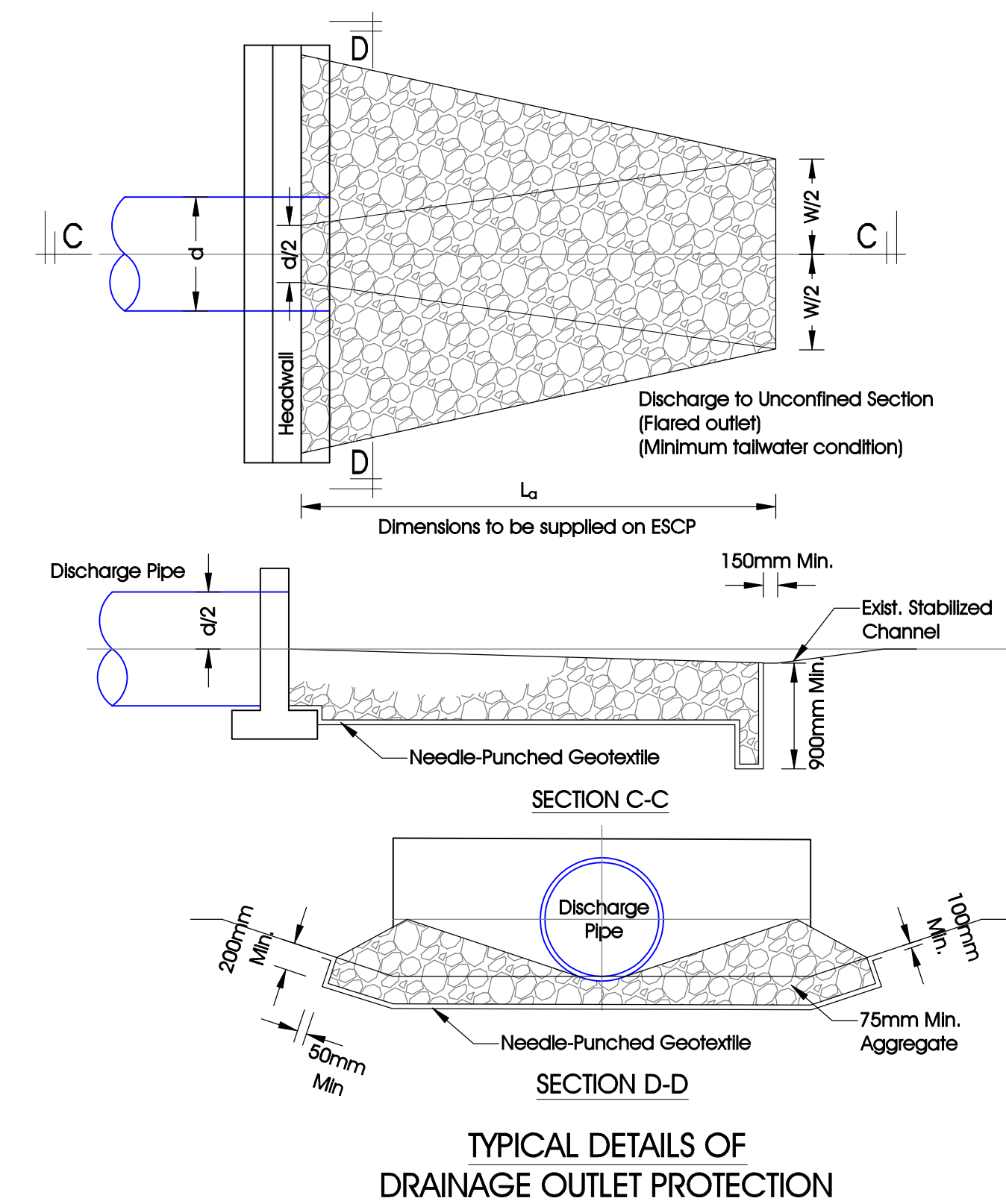
Sediment Basin No.	Top Length, L_t (m)	Top Width, T_w (m)	Base Length, B_t (m)	Base Width, B_b (m)
SB 1	72	38	63	29
SB 2a	53	28	44	19
SB 2b	66	36	56	26



Sediment Basin No.	W (mm)	B (mm)	d (mm)
SB 1	3600	800	700
SB 2a	3100	700	600
SB 2b	3700	900	700



Sediment Basin No.	Diameter of Riser Pipe, D_1 (mm)	Diameter of Outlet Pipe, D_2 (mm)	Settling Zone, y_1 (mm)	Sediment Storage, y_2 (mm)	Depth of Basin, d (mm)
SB 1	900	900	600	700	2300
SB 2a	700	700	600	800	2200
SB 2b	1000	1000	700	900	2600



Rev	Date	Description
000	21.05.2019	EIA
000	25.11.2020	EIA-R1

**METEOROLOGICAL
DATA**

JABATAN METEOROLOGI MALAYSIA
Records of Monthly Rainfall Amount

Station: HOSPITAL DUNGUN

Latitude: 4°45'07"N

Longitude: 103°24'53"E

Elevation: 3 m

Unit: millimetre

Year	Month												ANNUAL
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
2007	474.6	16.0	201.2	160.2	122.0	Def.	274.2	232.6	175.2	269.6	408.6	426.8	2761.0
2008	151.4	71.8	97.4	199.6	34.8	141.6	144.2	189.2	160.4	181.4	541.0	778.0	2690.8
2009	194.0	15.0	462.0	170.4	164.8	84.0	41.6	198.8	213.8	213.8	1645.2	603.0	4006.4
2010	347.4	8.8	88.4	101.4	92.4	36.6	211.2	68.6	112.4	284.0	233.6	928.0	2512.8
2011	367.8	23.4	817.4	47.8	210.6	114.4	199.2	347.6	243.4	490.4	735.6	350.2	3947.8
2012	219.8	70.4	532.4	125.8	145.8	112.2	30.4	152.6	236.0	481.6	234.2	846.6	3187.8
2013	174.0	385.4	36.0	86.0	69.0	57.6	201.8	124.4	137.8	516.2	570.4	970.6	3329.2
2014	137.8	Def.	34.6	5.4	58.4	166.0	134.4	80.2	158.7	146.4	465.4	977.2	2364.5
2015	97.4	79.8	52.4	170.8	38.4	112.6	140.8	224.0	156.8	116.2	326.8	420.0	1936.0
2016	173.8	184.0	17.8	0.0	77.0	125.4	288.4	301.6	202.6	262.6	126.0	881.5	2640.7
2017	Def.	165.8	85.2	148.8	187.0	178.2	101.9	313.2	149.1	403.9	965.2	723.4	3421.7
2018	354.6	10.6	53.6	102.4									

JABATAN METEOROLOGI MALAYSIA**Records of Number of Raindays****Station:** HOSPITAL DUNGUN**Latitude:** 4°45'07"N**Longitude:** 103°24'53"E**Elevation:** 3 m

Year	Month												ANNUAL
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
2007	23	4	12	17	14	Def.	16	15	17	22	21	20	Def.
2008	17	8	13	14	11	17	13	14	17	17	23	25	189
2009	15	5	21	20	15	10	8	18	19	21	25	19	196
2010	21	7	16	9	14	11	19	6	16	21	25	24	189
2011	22	6	25	10	18	12	13	16	15	22	26	24	209
2012	21	9	15	16	14	15	7	15	22	21	23	26	204
2013	16	19	4	9	17	6	13	7	14	28	23	23	179
2014	11	Def.	5	3	10	11	11	11	6	11	22	25	Def.
2015	18	5	11	11	6	5	14	15	11	9	22	21	148
2016	14	18	2	0	14	16	15	20	21	18	14	19	171
2017	Def.	19	10	12	13	13	7	15	12	15	22	25	Def.
2018	27	9	8	12									

**DESIGN
CALCULATION**

1) SEDIMENT BASIN DESIGN FOR SB 1

Reference	Calculation	Output
	The detailed design of the sediment basin is presented in this section.	
Table 12.16	<u>(1) Determination type of soil :</u> For this project, wet sediment basin is chosen. <u>(2) Determine Time of Concentration (minutes) :</u>	
Table 12.18 Table 2.2	Overland flow : $L_o = 27 \text{ m}$ & $S_o = 18.00 \%$ (0.18) $n = 0.0275$ (Bare soil) Eqn 14.1 : $t_o = 107 * n * L^{1/3} / S^{1/5}$ $= 12.44 \text{ minutes}$	
Table 2.3	Drain flow: $L_D = 323 \text{ m}$ $A = 0.490 \text{ m}^2$ $P = 2.749 \text{ m}$ $n = 0.035$ (Grass Drain) $R = 0.178 \text{ m}$ $t_D = n * L / 60 * R^{2/3} * S^{1/2}$ $= 1.40 \text{ minutes}$ Time of concentration, $t_c = t_o + t_D$ $= 13.84 \text{ minutes}$ Adopt, $t_c = 15.00 \text{ minutes}$	$t_c = 15.00 \text{ minutes}$
	<u>(3) Determination of basin dimension :</u> The required surface area is $290 \text{ m}^2/\text{ha}$ and the required total volume is $435 \text{ m}^3/\text{ha}$ (for 15.00 minutes time of concentration of basin catchment). The surface area required for the site $= 290 \times 5.5407 = 1606.803 \text{ m}^2$ (Note : This is the average surface area for the settling zone volume, i.e. at mid-depth) The total basin volume required for the site $= 435 \times 5.5407 = 2410.2045 \text{ m}^3$ (a) Settling zone : The required settling zone, $V_1 = 1205.102 \text{ m}^3$ (half of the total volume) and the selected settling zone depth, $y_1 = 0.60 \text{ m}$ (minimum = 0.60 m) Try a settling zone average width, $W_1 = 31 \text{ m}$ Required settling zone average length, $L_1 = \frac{V_1}{W_1 \times y_1}$ $= \frac{1205.102}{31 \times 0.60}$ $= 64.790 \text{ m, say } 65 \text{ m}$ Average surface area $= 31 \times 65 = 2015 \text{ m}^2$	Required surface area $= 1606.803 \text{ m}^2$ Required volume $= 2410.205 \text{ m}^3$ $= 2015 \text{ m}^2$ $> 1606.803 \text{ m}^2$ OK!

Reference	Calculation	Output
Table 12.17	Check settling zone dimensions $\frac{L_1}{y_1} \text{ ratio} = \frac{65}{0.60}$ $\frac{L_1}{W_1} \text{ ratio} = \frac{65}{31}$ (b) Sediment storage zone : The required sediment storage zone volume is half of the total volume, $V_2 = 1205.102 \text{ m}^3$ For a side slope $Z = 2 (H) : (V) 1$ the dimensions at the top of the sediment storage zone are; $W_2 = W_1 - 2 \times (d_1/2) \times Z = 31 - 2 \times 0.3 \times 2 = 29.8 \text{ m}$ say, 30 m $L_2 = L_1 - 2 \times (d_1/2) \times Z = 65 - 2 \times 0.3 \times 2 = 63.8 \text{ m}$ say, 64 m The required depth for the sediment storage zone, which must be at least 0.30 m, can be calculated from the following relationship, $V_2 = Z^2 y_2^3 - Z y_2^2 (W_2 + L_2) + y_2 (W_2 L_2)$ which gives, $1205.102 = 4 y_2^3 - 2 y_2^2 (30 + 64) + y_2 (1901.24)$ $= 4 y_2^3 - 187.2 y_2^2 + 1901.24 y_2$ Use trial and error to find y_2, For $y_2 = 0.50 \text{ m}$, $V_2 = 904.32 \text{ m}^3$ NOT OK! For $y_2 = 0.60 \text{ m}$, $V_2 = 1074.22 \text{ m}^3$ NOT OK! For $y_2 = 0.70 \text{ m}$, $V_2 = 1240.51 \text{ m}^3$ OK! (c) Overall basin dimensions : Base : $W_B = W_1 - 2 \times Z \times ((y_1 / 2) + y_2) = 29.10 \text{ m}$ $W_B = 29 \text{ m}$ $L_B = L_1 - 2 \times Z \times ((y_1 / 2) + y_2) = 63.10 \text{ m}$ $L_B = 63 \text{ m}$ Depth : Settling zone, $y_1 = 0.60 \text{ m}$ Sediment storage zone, $y_2 = 0.70 \text{ m}$ Side slope, $Z = 2(H) : 1(V)$ (4) Sizing of basin outlet :	$= 108$ < 200 OK! $= 2.10$ < 2 OK! $y_2 > 0.30 \text{ m}$ $V_2 > 1205.102 \text{ m}^3$
Table 12.17	The spillway for this sediment basin must be design for 50 years ARI. The proposed spillway dimension is 2.00 m wide x 0.30 m high.	

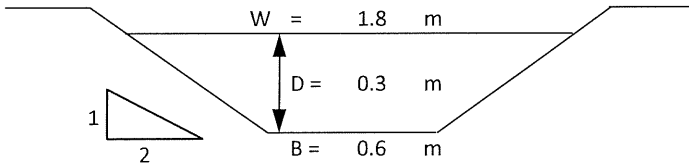
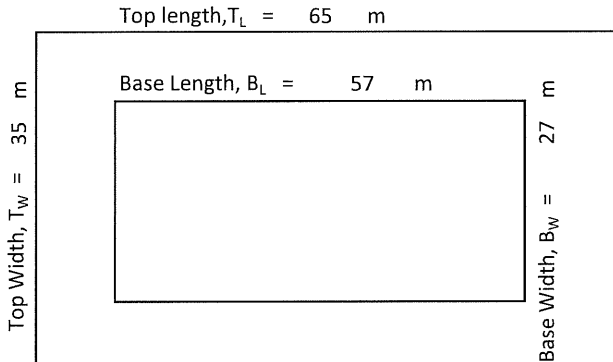
Reference	Calculation	Output																		
	The sill level must be set a minimum 300 mm above the basin top water level. To simplify the calculations, the following assumptions are made : ▪ assume riser pipe flow is orifice flow through the top of the pipe only. ▪ riser pipe head is 300 mm, i.e. the height between the top of the pipe and the spillway crest level $Q_{\text{required}} = Q_{\text{peak}} - Q_{\text{riser}}$ (a) Determination of Q_{peak}																			
Equation 2.2	Using IDF Polynomial Equations for Al Muktafi Billah Shah (4631001) and duration of 15 minutes <table><tr><th rowspan="2">Location & Station ID</th><th rowspan="2">ARI, T (Years)</th><th rowspan="2">Storm Duration, d</th><th colspan="4">Derived Parameters</th></tr><tr><th>λ</th><th>κ</th><th>θ</th><th>η</th></tr><tr><td>Al Muktafi Billah Shah (4631001)</td><td>50</td><td>15 minutes</td><td>66.029</td><td>0.199</td><td>0.165</td><td>0.629</td></tr></table> From Equation 2.2, 50 years ARI rainfall intensity $i = \frac{\lambda T^{\kappa}}{(d + \theta)^{\eta}} = 251.5 \text{ mm/hr}$	Location & Station ID	ARI, T (Years)	Storm Duration, d	Derived Parameters				λ	κ	θ	η	Al Muktafi Billah Shah (4631001)	50	15 minutes	66.029	0.199	0.165	0.629	$i = 251 \text{ mm/hr}$
Location & Station ID	ARI, T (Years)				Storm Duration, d	Derived Parameters														
		λ	κ	θ		η														
Al Muktafi Billah Shah (4631001)	50	15 minutes	66.029	0.199	0.165	0.629														
Section 2.3.1	Rational method,																			
Table 2.5	Coefficient of runoff, C: 0.5 Catchment area, A = 5.5407 ha $Q_{\text{peak}} = \frac{CiA}{360} = \frac{0.5 \times 251 \times 5.5407}{360}$ $= 1.935 \text{ m}^3/\text{s}$	$Q_{\text{peak}} = 1.935 \text{ m}^3/\text{s}$																		
	Try with 1 orifice with diameter 1.05 m at same level. Allow head of 0.3 m from centroid of orifice. (b) Determination of Q_{riser} $Q_{\text{riser}} = C_0 A_0 \sqrt{2gHo}$ $= 0.5 \times \left(\frac{\pi \times 1.1^2}{4} \right) \times \sqrt{2 \times 9.81 \times 0.3}$ $= 1.051 \text{ m}^3/\text{s}$ Therefore, allowing for the riser pipe flow the required spillway capacity is : (c) Sizing spillway : $Q_{\text{required}} = Q_{\text{peak}} - Q_{\text{riser}}$ $= 1.935 - 1.051$ $= 0.885 \text{ m}^3/\text{s}$	$Q_{\text{riser}} = 1.051 \text{ m}^3/\text{s}$ $Q_{\text{required}} = 0.885 \text{ m}^3/\text{s}$																		

2) SEDIMENT BASIN DESIGN FOR SB 2a

Reference	Calculation	Output
	The detailed design of the sediment basin is presented in this section.	
Table 12.16	<u>(1) Determination type of soil :</u> For this project, wet sediment basin is chosen. <u>(2) Determine Time of Concentration (minutes) :</u>	
Table 12.18	Overland flow : $L_o = 27 \text{ m}$ & $S_o = 18.00 \%$ (0.18)	
Table 2.2	$n = 0.0275$ (Bare soil)	
	Eqn 14.1 : $t_o = 107 * n * L^{1/3} / S^{1/5}$	
	$= 12.44 \text{ minutes}$	
Table 2.3	Drain flow: $L_D = 323 \text{ m}$ $A = 0.360 \text{ m}^2$ $P = 2.497 \text{ m}$ $n = 0.035$ (Grass Drain) $R = 0.144 \text{ m}$ $t_D = n * L / 60 * R^{2/3} * S^{1/2}$ $= 1.62 \text{ minutes}$ Time of concentration, $t_c = t_o + t_D$ $= 14.05 \text{ minutes}$ Adopt, $t_c = 15.00 \text{ minutes}$	$t_c = 15.00 \text{ minutes}$
	<u>(3) Determination of basin dimension :</u>	
	The required surface area is $290 \text{ m}^2/\text{ha}$ and the required total volume is $435 \text{ m}^3/\text{ha}$ (for 15.00 minutes time of concentration of basin catchment).	
	The surface area required for the site $= 290 \times 4.7569 = 1379.501 \text{ m}^2$ (Note : This is the average surface area for the settling zone volume, i.e. at mid-depth)	Required surface area $= 1379.501 \text{ m}^2$
	The total basin volume required for the site $= 435 \times 4.7569 = 2069.2515 \text{ m}^3$	Required volume $= 2069.252 \text{ m}^3$
	(a) Settling zone :	
	The required settling zone, $V_1 = 1034.626 \text{ m}^3$ (half of the total volume) and the selected settling zone depth, $y_1 = 0.60 \text{ m}$ (minimum = 0.60 m)	
	Try a settling zone average width, $W_1 = 29 \text{ m}$	
	Required settling zone average length, $L_1 = \frac{V_1}{W_1 \times y_1}$	
	$= \frac{1034.626}{29 \times 0.60}$	
	$= 59.461 \text{ m, say } 59 \text{ m}$	
	Average surface area $= 29 \times 59 = 1711 \text{ m}^2$	$= 1711 \text{ m}^2$ $> 1379.501 \text{ m}^2$ OK!

Reference	Calculation	Output
Table 12.17	Check settling zone dimensions	
	$\frac{L_1}{y_1}$ ratio = $\frac{59}{0.60}$	= 98 < 200 OK!
	$\frac{L_1}{W_1}$ ratio = $\frac{59}{29}$	= 2.03 < 2 OK!
	(b) Sediment storage zone :	
	The required sediment storage zone volume is half of the total volume, $V_2 = 1034.626 \text{ m}^3$	
	For a side slope $Z = 2 \text{ (H) : (V) } 1$ the dimensions at the top of the sediment storage zone are;	
	$W_2 = W_1 - 2 \times (d_1/2) \times Z = 29 - 2 \times 0.3 \times 2 = 27.8 \text{ m}$	say, 28 m
	$L_2 = L_1 - 2 \times (d_1/2) \times Z = 59 - 2 \times 0.3 \times 2 = 57.8 \text{ m}$	say, 58 m
	The required depth for the sediment storage zone, which must be at least 0.30 m, can be calculated from the following relationship,	
	$V_2 = Z^2 y_2^3 - Z y_2^2 (W_2 + L_2) + y_2 (W_2 L_2)$	
	which gives,	
	$1034.626 = 4 y_2^3 - 2 y_2^2 (28 + 58) + y_2 (1606.84)$ $= 4 y_2^3 - 171.2 y_2^2 + 1606.84 y_2$	
	Use trial and error to find y_2 ,	
	For $y_2 = 0.50 \text{ m}$, $V_2 = 761.12 \text{ m}^3$ NOT OK! For $y_2 = 0.60 \text{ m}$, $V_2 = 903.34 \text{ m}^3$ NOT OK! For $y_2 = 0.70 \text{ m}$, $V_2 = 1042.27 \text{ m}^3$ OK!	$y_2 > 0.30 \text{ m}$ $V_2 > 1034.626 \text{ m}^3$
	(c) Overall basin dimensions :	
	Base :	
	$W_B = W_1 - 2 \times Z \times ((y_1 / 2) + y_2) = 27.10 \text{ m}$	$W_B = 27 \text{ m}$
$L_B = L_1 - 2 \times Z \times ((y_1 / 2) + y_2) = 57.10 \text{ m}$	$L_B = 57 \text{ m}$	
Depth :		
Settling zone, $y_1 = 0.60 \text{ m}$	$y_1 = 0.60 \text{ m}$	
Sediment storage zone, $y_2 = 0.70 \text{ m}$	$y_2 = 0.70 \text{ m}$	
Side slope, $Z = 2 \text{ (H) : } 1 \text{ (V)}$	$Z = 2 \text{ (H) : } 1 \text{ (V)}$	
(4) Sizing of basin outlet :		
Table 12.17	The spillway for this sediment basin must be design for 50 years ARI. The proposed spillway dimension is 3.00 m wide x 0.30 m high.	

Reference	Calculation	Output																		
	The sill level must be set a minimum 300 mm above the basin top water level. To simplify the calculations, the following assumptions are made : ▪ assume riser pipe flow is orifice flow through the top of the pipe only. ▪ riser pipe head is 300 mm, i.e. the height between the top of the pipe and the spillway crest level $Q_{\text{required}} = Q_{\text{peak}} - Q_{\text{riser}}$ (a) Determination of Q_{peak} Equation 2.2 Using IDF Polynomial Equations for Al Muktafibilah Shah (4631001) and duration of 15 minutes <table><tr><th rowspan="2">Location & Station ID</th><th rowspan="2">ARI, T (Years)</th><th rowspan="2">Storm Duration, d</th><th colspan="4">Derived Parameters</th></tr><tr><th>λ</th><th>κ</th><th>θ</th><th>η</th></tr><tr><td>Al muktafibilah Shah (4631001)</td><td>50</td><td>15 minutes</td><td>66.029</td><td>0.199</td><td>0.165</td><td>0.629</td></tr></table> From Equation 2.2, 50 years ARI rainfall intensity $i = \frac{\lambda T^{\kappa}}{(d + \theta)^{\eta}} = 251.5 \text{ mm/hr}$	Location & Station ID	ARI, T (Years)	Storm Duration, d	Derived Parameters				λ	κ	θ	η	Al muktafibilah Shah (4631001)	50	15 minutes	66.029	0.199	0.165	0.629	$i = 251 \text{ mm/hr}$
Location & Station ID	ARI, T (Years)				Storm Duration, d	Derived Parameters														
		λ	κ	θ		η														
Al muktafibilah Shah (4631001)	50	15 minutes	66.029	0.199	0.165	0.629														
Section 2.3.1	Rational method, Table 2.5 Coefficient of runoff, C: 0.5 Catchment area, A = 4.7569 ha $Q_{\text{peak}} = \frac{CiA}{360} = \frac{0.5 \times 251 \times 4.7569}{360}$ $= 1.661 \text{ m}^3/\text{s}$	$Q_{\text{peak}} = 1.661 \text{ m}^3/\text{s}$																		
	Try with 1 orifice with diameter 0.95 m at same level. Allow head of 0.3 m from centroid of orifice. (b) Determination of Q_{riser} $Q_{\text{riser}} = C_0 A_0 \sqrt{2gH_0}$ $= 0.5 \times \left(\frac{\pi}{4} \times 1.0^2 \right) \times \sqrt{2 \times 9.81 \times 0.3}$ $= 0.860 \text{ m}^3/\text{s}$ Therefore, allowing for the riser pipe flow the required spillway capacity is : (c) Sizing spillway : $Q_{\text{required}} = Q_{\text{peak}} - Q_{\text{riser}}$ $= 1.661 - 0.860$ $= 0.801 \text{ m}^3/\text{s}$	$Q_{\text{riser}} = 0.860 \text{ m}^3/\text{s}$ $Q_{\text{required}} = 0.801 \text{ m}^3/\text{s}$																		

Reference	Calculation	Output
Table 2.3	Trial dimensions : B = 3.00 m, H _p = 0.40 m & C _{sp} = 1.48	
	$Q_{\text{spillway}} = C_{\text{sp}} B H_p^{1.5}$ $= 1.123 \text{ m}^3/\text{s}$	$Q_{\text{spillway}} = 1.123 \text{ m}^3/\text{s}$ > 0.801 m ³ /s OK!
	Therefore, the total basin depth including the spillway is :	
	0.60 + 0.70 + 0.30 + 0.40 = 2.00 m	
	DESIGN FOR TEMPORARY EARTH DRAIN	
		
	Gradient of slope, Z = 2 (H) : (V) 1 = 2	
	Trapezoidal cross section :-	
	Area, A = 0.5 (B+W)D = 0.36 m ²	
	Wetted Perimeter, P = B+2(D+2D) ^{0.5} = 2.497 m	
Hydraulic Radius, R = A / P = 0.144 m		
Manning Coefficient, n = 0.035 (Short grass)		
Slope, S = 0.180		
$= \frac{1}{n} x \sqrt{S} x (\sqrt[3]{R})^2$		
= 3.333 m/s		
By using Manning's formula :		
$Q_{\text{provided}} = 1.49 \times A \times R^{2/3} \times S^{1/2} / n = 1.788 \text{ m}^3/\text{s} \quad (> Q_{\text{peak}})$	$Q_{\text{provided}} = 1.788 \text{ m}^3/\text{s}$ > 1.661 m ³ /s OK!	
The drain section provided is ADEQUATE!		
		
Size of Sediment Basin	Base level (Length) = 57 m Top level (Length) = 65 m Depth = 2.00 m	Base Width = 27 m Top Width = 35 m

3) SEDIMENT BASIN DESIGN FOR SB 2b

Reference	Calculation	Output
	The detailed design of the sediment basin is presented in this section.	
Table 12.16	<u>(1) Determination type of soil :</u> For this project, wet sediment basin is chosen. <u>(2) Determine Time of Concentration (minutes) :</u>	
Table 12.18 Table 2.2	Overland flow : $L_o = 27 \text{ m}$ & $S_o = 18.00 \% (0.18)$ $n = 0.0275$ (Bare soil) Eqn 14.1 : $t_o = 107 * n * L^{1/3} / S^{1/5}$ $= 12.44 \text{ minutes}$	
Table 2.3	Drain flow: $L_D = 323 \text{ m}$ $A = 0.360 \text{ m}^2$ $P = 2.497 \text{ m}$ $n = 0.035$ (Grass Drain) $R = 0.144 \text{ m}$ $t_D = n * L / 60 * R^{2/3} * S^{1/2}$ $= 1.62 \text{ minutes}$ Time of concentration, $t_c = t_o + t_D$ $= 14.05 \text{ minutes}$ Adopt, $t_c = 15.00 \text{ minutes}$	$t_c = 15.00 \text{ minutes}$
	<u>(3) Determination of basin dimension :</u> The required surface area is $290 \text{ m}^2/\text{ha}$ and the required total volume is $435 \text{ m}^3/\text{ha}$ (for 15.00 minutes time of concentration of basin catchment). The surface area required for the site $= 290 \times 3.1886 = 924.694 \text{ m}^2$ (Note : This is the average surface area for the settling zone volume, i.e. at mid-depth) The total basin volume required for the site $= 435 \times 3.1886 = 1387.041 \text{ m}^3$ (a) Settling zone : The required settling zone, $V_1 = 693.521 \text{ m}^3$ (half of the total volume) and the selected settling zone depth, $y_1 = 0.60 \text{ m}$ (minimum = 0.60 m) Try a settling zone average width, $W_1 = 23 \text{ m}$ Required settling zone average length, $L_1 = \frac{V_1}{W_1 \times y_1}$ $= \frac{693.521}{23 \times 0.60}$ $= 50.255 \text{ m, say } 50 \text{ m}$ Average surface area $= 23 \times 50 = 1150 \text{ m}^2$	Required surface area $= 924.694 \text{ m}^2$ Required volume $= 1387.041 \text{ m}^3$ $= 1150 \text{ m}^2$ $> 924.694 \text{ m}^2$ OK!

Reference	Calculation	Output
Table 12.17	Check settling zone dimensions $\frac{L_1}{y_1} \text{ ratio} = \frac{50}{0.60}$ $\frac{L_1}{W_1} \text{ ratio} = \frac{50}{23}$ (b) Sediment storage zone : The required sediment storage zone volume is half of the total volume, $V_2 = 693.521 \text{ m}^3$ For a side slope $Z = 2 (H) : (V) 1$ the dimensions at the top of the sediment storage zone are; $W_2 = W_1 - 2 \times (d_1/2) \times Z = 23 - 2 \times 0.3 \times 2 = 21.8 \text{ m}$ say, 22 m $L_2 = L_1 - 2 \times (d_1/2) \times Z = 50 - 2 \times 0.3 \times 2 = 48.8 \text{ m}$ say, 49 m The required depth for the sediment storage zone, which must be at least 0.30 m, can be calculated from the following relationship, $V_2 = Z^2 y_2^3 - Z y_2^2 (W_2 + L_2) + y_2 (W_2 L_2)$ which gives, $693.521 = 4 y_2^3 - 2 y_2^2 (22 + 49) + y_2 (1063.84)$ $= 4 y_2^3 - 141.2 y_2^2 + 1063.84 y_2$ Use trial and error to find y_2, For $y_2 = 0.60 \text{ m}$, $V_2 = 588.336 \text{ m}^3$ NOT OK! For $y_2 = 0.70 \text{ m}$, $V_2 = 676.87 \text{ m}^3$ NOT OK! For $y_2 = 0.80 \text{ m}$, $V_2 = 762.75 \text{ m}^3$ OK! (c) Overall basin dimensions : Base : $W_B = W_1 - 2 \times Z \times ((y_1 / 2) + y_2) = 21.00 \text{ m}$ $W_B = 21 \text{ m}$ $L_B = L_1 - 2 \times Z \times ((y_1 / 2) + y_2) = 48.00 \text{ m}$ $L_B = 48 \text{ m}$ Depth : Settling zone, $y_1 = 0.60 \text{ m}$ Sediment storage zone, $y_2 = 0.80 \text{ m}$ Side slope, $Z = 2(H) : 1(V)$ (4) Sizing of basin outlet :	$= 83$ < 200 OK! $= 2.17$ < 2 OK! $y_2 > 0.30 \text{ m}$ $V_2 > 693.521 \text{ m}^3$ $W_B = 21 \text{ m}$ $L_B = 48 \text{ m}$ $y_1 = 0.60 \text{ m}$ $y_2 = 0.80 \text{ m}$ $Z = 2 (H) : 1 (V)$
Table 12.17	The spillway for this sediment basin must be design for 50 years ARI. The proposed spillway dimension is 2.00 m wide x 0.30 m high.	

Reference	Calculation	Output																		
	The sill level must be set a minimum 300 mm above the basin top water level. To simplify the calculations, the following assumptions are made : ▪ assume riser pipe flow is orifice flow through the top of the pipe only. ▪ riser pipe head is 300 mm, i.e. the height between the top of the pipe and the spillway crest level $Q_{\text{required}} = Q_{\text{peak}} - Q_{\text{riser}}$ (a) Determination of Q_{peak}																			
Equation 2.2	Using IDF Polynomial Equations for Al Muktafibilah Shah (4631001) and duration of 15 minutes <table><tr><th rowspan="2">Location & Station ID</th><th rowspan="2">ARI, T (Years)</th><th rowspan="2">Storm Duration, d</th><th colspan="4">Derived Parameters</th></tr><tr><th>λ</th><th>κ</th><th>θ</th><th>η</th></tr><tr><td>Al muktafibilah Shah (4631001)</td><td>50</td><td>15 minutes</td><td>66.029</td><td>0.199</td><td>0.165</td><td>0.629</td></tr></table> From Equation 2.2, 50 years ARI rainfall intensity $i = \frac{\lambda T^{\kappa}}{(d + \theta)^{\eta}} = 251.5 \text{ mm/hr}$	Location & Station ID	ARI, T (Years)	Storm Duration, d	Derived Parameters				λ	κ	θ	η	Al muktafibilah Shah (4631001)	50	15 minutes	66.029	0.199	0.165	0.629	$i = 251 \text{ mm/hr}$
Location & Station ID	ARI, T (Years)				Storm Duration, d	Derived Parameters														
		λ	κ	θ		η														
Al muktafibilah Shah (4631001)	50	15 minutes	66.029	0.199	0.165	0.629														
Section 2.3.1	Rational method,																			
Table 2.5	Coefficient of runoff, C: 0.5 Catchment area, A = 3.1886 ha $Q_{\text{peak}} = \frac{CiA}{360} = \frac{0.5 \times 251 \times 3.1886}{360}$ $= 1.114 \text{ m}^3/\text{s}$	$Q_{\text{peak}} = 1.114 \text{ m}^3/\text{s}$																		
	Try with 1 orifice with diameter 0.80 m at same level. Allow head of 0.3 m from centroid of orifice. (b) Determination of Q_{riser} $Q_{\text{riser}} = C_0 A_0 \sqrt{2gH_0}$ $= 0.5 \times \left(\frac{\pi \times 0.8^2}{4} \right) \times \sqrt{2 \times 9.81 \times 0.3}$ $= 0.610 \text{ m}^3/\text{s}$ Therefore, allowing for the riser pipe flow the required spillway capacity is : (c) Sizing spillway : $Q_{\text{required}} = Q_{\text{peak}} - Q_{\text{riser}}$ $= 1.114 - 0.610$ $= 0.504 \text{ m}^3/\text{s}$	$Q_{\text{riser}} = 0.610 \text{ m}^3/\text{s}$ $Q_{\text{required}} = 0.504 \text{ m}^3/\text{s}$																		

KENEP CONSULTANCY SERVICES
KCS/HQ/472-LDP2M2-0319-2653-R1

**INSPECTION
CHECKLIST**

SITE INSPECTION CHECKLIST

INSPECTION TYPE:

☐

Initial Inspection

☐

Re-Inspection

☐

Final

☐

Special

(Note type of special inspection – e.g., complaint response, corrective action, etc)

PROJECT NAME : PROPOSED GRANITE QUARRY OPERATION ON LOT PT 23066 AND IN
LOT PT 23741 WITH AN AREA OF 13.4862 HECTARES (33.325 ACRES)
MUKIM KUALA PAKA, DISTRICT OF DUNGUN, TERENGGANU DARUL
IMAN

LOCATION : _____

WEATHER : _____ DATE : _____

RAINFALL IN LAST 24 HOURS : _____

RECEIVING WATER / DISCHARGE LOCATION : _____

INSPECTED BY : _____
(print name)

(title)

(signature)

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
PRE-INSPECTION						
1.	Site Management	Approved documents (EIA, COA, LD-P2M2 Document, ESCP, etc.) available on site?				
		Any revision or update of the approved documents (EIA, COA, LD-P2M2 Document, ESCP, etc.)?				
		Contractor's Project Management Plan or Environmental Management Plan based on approved documents (EIA, COA, LD-P2M2 Document, ESCP, etc.)?				
		Working drawings up-to-date and adequately depict erosion and sediment control measures to be implemented at the site?				
		Work programme up-to-date?				
		Work programme tally with status of site work?				
		Project construction scheduling for all major land disturbing activities which include:				
		a) Work zone(s),				
		b) Phasing of construction within the work zone(s),				
		c) Staging and sequencing within the phase of construction that coincides with the installation of P2M2s.				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
1.	Site Ingress/ Engress	Are the wheel wash facility (wash trough) installed correctly?				
		Are the BMP's to minimize vehicle tracking onto road installed correctly?				
		Are construction site entrances and exits properly protected (i.e., using stabilized entrance, tire wash, street sweeping, etc.) to control off-site tracking of sediment and construction related pollutants?				
		Are the following being implemented:				
		a) Graveled, paved, or constructed entrances, exits, and parking areas in-place?				
		b) Unpaved roads on-site are graveled or have other effective measures in-place?				
		c) No dripping from trucks containing saturated soils and/or use of water-tight trucks?				
		d) Controls to prevent discharge of wash water from concrete trucks to surface waters?				
		e) Correct installation and use of all erosion and sediment control measures.				
		f) Procedures in place for prompt maintenance and repair of erosion and sediment control measures?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
2.	Sensitive areas	Width of buffer zones complies with EIA conditions?				
		Soil erosion problem from slope have been managed properly such as:				
		Are construction site entrances and exits properly protected (i.e., using stabilized entrance, tire wash, street sweeping, etc.) to control off-site tracking of sediment and construction related pollutants?				
		a) Provide Tiered terrace/ bench.				
		b) Stabilization for surfaces exposed for more than 14 days after completion of formation level.				
		c) Stabilization / temporary closure for slope cutting works which have not achieved its formation level and which have been suspended / abandoned for more than 21 days.				
		d) Slope compacted.				
		e) Slope fully or properly covered.				
		f) Surface roughening provided to cut slope.				
		g) Berm drains provided at foot				
		h) Upslope drain provided.				
		i) Set-back area adjacent to slope side.				
		Are the natural areas preserved?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
3.	Surface runoff drainage way	Has drainage system been installed and managed properly such as:				
		a) Drainage system connected properly.				
		b) Drainage system connected properly to sediment trap / sediment pond.				
		c) Control outside surface runoff from entering into project site.				
		d) Evidence of runoff discharging from site passing through sediment pond.				
4.	Site Perimeter	Are all storm drain inlets properly protected and well maintained?				
		Does roadway crossing have the appropriate BMP applications?				
		Boundary control such as perimeter drain, drain earth, embankment diversion available on site?				
		Terminal discharge of sediment pond installed properly such as:				
		a) Proper inlet / outlet protection.				
		b) Proper access to sediment pond for sampling and maintenance.				
		c) Discharge via sediment pond outlet.				
		d) Riser /weir function properly.				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
		e) Sediment depth markers available.				
		f) Platform for inspection and maintenance are available.				
		g) Desilting maintenance.				
		h) Embankment provided.				
		i) Size, location and number of ponds in accordance with design / plan.				
		j) Excavated sediment stockpiled at proper place.				
		Construction markers such as fences, signs, tapes, flags provided at:				
		a) Land disturbing from any drainage way or waterway or watercourse within project site				
		b) Areas not to be worked or disturbed				
		c) Buffer area or/and existing vegetation meant for temporary or permanent preservation and for protection				
5.	Material Storage Yard	Are the skid tanks provided with bunds?				
		Are all material handling and storage areas clean and free of spills, leaks, or other deleterious materials?				
		Are all equipment storage and maintenance areas clean and free of spills, leaks, or any other deleterious materials?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
		Are all stockpiles located in designated areas and properly protected (inactive - covered or perimeter controls; active - properly located away from storm drains)?				
		Are construction materials and equipment properly stored in dedicated areas away from storm drain discharge locations with secondary containment where appropriate?				
6.	Phasing of construction schedule	Are BMPs installed as shown on the approved plans?				
		Is the contractor implementing adequate procedures to meet local erosion and sediment and stormwater management requirements?				
		Is the Site Map (including applicable drawing details) up to date and does it adequately depict erosion and sediment control measures being implemented at the site?				
7.	Managing scheduled waste	Is the site generally free of litter and debris and do construction wastes appear to be properly managed?				
	(Used oil, paint, oil filters)	Are hazardous materials and wastes properly stored, including being covered and stored within berms to provide secondary containment?				
		Are the chemical hazards such as pesticides, herbicides and scheduled waste kept safely?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
8.	Cement mixing area (concrete mixer / ready mix)	Are the concrete wastes left exposed without containment?				
9.	Site Planning And Management	Is the BMP's maintenance adequate?				
		Are previous non-compliance issues addressed within seven days of their occurrence?				
		Are other potential sources of pollution being controlled?				
		Are the following being implemented as applicable:				
		a) Clean-up of any significant amounts of sediment within 24 hours of leaving the site?				
		b) No intentional washing of sediment into storm sewers or drainage ways?				
		c) Removal of sediment trapped by silt fences when sediment reaches 1/3 of fence height?				
		d) Cleaning of catch basin filters when capacity is reduced by fifty percent?				
		e) Cleaning of sediment basins when capacity is reduced by fifty percent?				
		f) Install erosion and sediment controls before land disturbance except where controls are in the direct path of work?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
		g) Application of fertilizers per manufacturer's guidelines to minimize nutrients in runoff? h) Site stabilization (vegetation, heavy mulch, temporary, seeding or other method that does not required germination) when construction activities cease 30 days or more?				
		i) Proper storage, application, and disposal of toxic or hazardous materials?				
		j) Management of abandoned hazardous wastes, used oils, contaminated soils, etc. discovered during construction?				
10.	Runoff control	Is runoff control installed properly?				
		a) Earth Bank/ Perimeter Dike				
		b) Diversion				
		c) Lined Waterway (Rock Materials)				
		d) Catch Drain				
		e) Cascading Drain				
		f) Riprap				
		g) Check Dam (CD)				
		h) Temporary Interceptor Dyke				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
		i) Swale				
		j) Temporary and Permanent Pipe Slope Drain				
		k) Rock Outlet Protection				
		l) Sand Bag Barrier				
		m) Storm Drain Inlet Protection				
		Is there evidence of unallowable non-storm water discharges at the site?				
11.	Erosion control	Have all disturbed soil areas not being actively worked been temporarily stabilized to protect against erosion?				
		Are all other erosion prevention measures in-place and functioning in accordance with the LD- P2M2 plan?				
		Is erosion being controlled onsite?				
		Are the following being implemented as required?				
		a) Minimizing areas of exposed soil and scheduling of grading activities to reduce erosion?				
		b) Vegetative control practices (preservation of existing vegetation and vegetative erosion prevention practices)?				
		c) Additional erosion prevention practices (mulching, erosion control blankets, soil tackifiers)?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on-site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
11.	Erosion control	d) Sediment control practices (silt fences, earth dikes, brush barriers, drainage swales, check dams, subsurface drains, pipe slope drains, rock outlet protection, and sediment basins?)				
		e) Stockpile protection?				
		f) Non-storm water controls (Spill prevention and response procedures, employee training, proper disposal procedures, maintenance of vehicles and equipment, covered material and waste storage areas)?				
12.	Sediment control	Is the general construction control provided:				
		a) Construction Fence				
		b) Limits of Construction				
		c) Concrete Washout Area				
		d) Vehicle and Equipment Fueling and maintenance				
		e) Solid Waste Management Area				
		f) Spoil Management Area				
		g) Stabilized Staging Area				
		h) Schedule Waste Management Area				

Check “Yes”, “No” or “N/A” if not applicable. If any answer is “No”, describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
DURING CONSTRUCTION						
		i) Material Storage Control and Stockpile Management				
		j) Sanitary Waste Management				
		k) Spill Prevention and Secondary Containment				
		l) Dust Control & Street Cleaning				
		Are dust control measures being appropriately implemented?				

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	INSPECTION ELEMENT	DESCRIPTION	YES	NO	N/A	COMMENTS
POST INSPECTION						
1.	BMPs maintenance record	Is the site being inspected/monitored by qualified personnel identified in the LD-P2M2 document and in accordance with the required frequency. Are written site inspection records being kept in accordance with EIA requirements and available on-site? Are the copies of the inspection report sent to all required locations/persons? Is there any verification of corrective action? BMP's maintenance logbook been kept? Maintenance record updated? Internal inspections being recorded and available for review? Is the inspection form submitted to DOE? Are the photos, coding, common mistakes and dedicated specification for BMP's provided?				
2.	Form * Check whether the form has been sent to DOE prior to site inspection					
3.	* BMPs *Sample photos, coding, common mistakes and dedicated specification for BMPs					

Check "Yes", "No" or "N/A" if not applicable. If any answer is "No", describe needed correction(s) in the space provided below each question or on an attached sheet. For self-inspections, the contractor should indicate the location of needed correction(s), along with the date corrections are made, on the working Site Map, posted on -site.

NO	DESCRIPTION	YES	NO	N/A	COMMENTS
SAFETY					
1.	Is the necessary personal protection equipment provided on site?				
2.	Are there enough PPE for inspectors?				
3.	Is the site safe from flash flood/ thunderstorm/ lightning and landslide?				
4.	Is there any safe place to take cover in site construction when flash flood/ thunderstorm/ lightning and landslide happen?				
5.	Has the proper workshop on safety provided?				
ETHICS					
1.	Is the inspection and documentation comprehensive and precise?				
2.	Is the Contractor showing integrity?				
3.	Is the Contractor being professional and responsible in handling any conflict?				
4.	Are all relevant persons on site informed on site problems?				

Appendix 6-1

**DOE NATIONAL
WATER QUALITY
STANDARD (NWQS)**

National Water Standards Malaysia

PARAMETER	UNIT	CLASS				
		I	IIA/IIB	III [#]	IV	V
Al	mg/l	↑	-	(0.06)	0.5	↑
As	mg/l		0.05	0.4 (0.05)	0.1	
Ba	mg/l		1	-	-	
Cd	mg/l		0.01	0.01*	0.01	
Cr (IV)	mg/l		0.05	(0.0010)	0.1	
Cr (III)	mg/l		-	1.4 (0.05)	-	
Cu	mg/l		0.02	2.5	-	
Hardness	mg/l		250	-	-	
Ca	mg/l		-	-	-	
Mg	mg/l		-	-	-	
Na	mg/l	N A T U R A L	-	-	3 SAR	L E V E L S A B O V E I V
K	mg/l		-	-	-	
Fe	mg/l		1	-	1(Leaf) 5 (Others)	
Pd	mg/l		0.05	1	5	
Mn	mg/l		0.1	0.02* (0.01)	0.2	
Hg	mg/l		0.001	0.1	0.002	
Ni	mg/l		0.05	0.004	0.2	
Se	mg/l		0.01	(0.0001)	0.02	
Ag	mg/l		0.05	0.9*	-	
Sn	mg/l		-	0.25 (0.04)	-	
U	mg/l	L E V E L S	-	0.0002	-	A B O V E I V
Zn	mg/l		5	0.004	2	
B	mg/l		1	-	0.8	
Cl	mg/l		200	0.4*	80	
Cl ₂	mg/l		-	(3.4)	-	
CN	mg/l		0.02	-	-	
F	mg/l		1.5	(0.02)	1	
NO ₂	mg/l		0.4	0.06 (0.02)	1	
NO ₃	mg/l		7	10	5	
P	mg/l		0.2	0.4	-	
Silica	mg/l	O R G A N I C	50	-	-	↓
SO ₄	mg/l		250	0.1	-	
S	µg/l		0.05	-	-	
CO ₂	µg/l		-	-	-	
Gross-α	mg/l		0.01	(0.001)	-	
Gross-β	mg/l		1	-	-	
Ra-226	Bq/l		< 0.1	-	-	
Sr-90	Bq/l		< 1	-	-	
CCE	Bq/l		500	-	-	
MBAS/BAS	Bq/l		500	-	-	
O&G (Mineral)	µg/l	S E N S I T I V E	40 ; N	-	-	↓
O&G (Emulsified Edible)	µg/l		7000 ; N	5000 (200)	-	
Edible)	µg/l		-	N	-	
PCB	µg/l		0.1	N	-	
				6 (0.05)		

PARAMETER	UNIT	CLASS				
		I	IIA/IIIB	III [#]	IV	V
PCB	µg/l	NATURAL LEVELS OR ABSENT	10	-	-	-
Phenol	µg/l		0.02	0.2 (0.01)	-	-
Aldrin/Dieldrin	µg/l		2	9 (0.1)	-	-
BHC	µg/l		0.08	2 (0.02)	-	-
Chlordane	µg/l		0.1	(1)	-	-
t-DDT	µg/l		10	-	-	-
Endosulfan	µg/l		0.05	0.9 (0.06)	-	-
Heptachlor/Epoxide	µg/l		2	3 (0.4)	-	-
Lindane	µg/l		70	450	-	-
2,4-D	µg/l		10	160	-	-
2,4,5-T	µg/l		4	850	-	-
2,4,5-TP	µg/l		10	1800	-	-
Paraquat						

PARAMETER	UNIT	CLASS					
		I	IIA	IIB	III	IV	V
Ammoniacal Nitrogen	mg/l	0.1	0.3	0.3	0.9	2.7	> 2.7
Biochemical Oxygen Demand	mg/l	1	3	3	6	12	> 12
Chemical Oxygen Demand	mg/l	10	25	25	50	100	> 100
Dissolved Oxygen	mg/l	7	5-7	5-7	3-5	<3	<1
pH	-	6.5-8.5	6-9	6-9	5-9	5-9	-
Colour	TCU	15	150	150	-	-	-
Electrical Conductivity*	µS/cm	1000	1000	-	-	6000	-
Floatables	-	N	N	N	-	-	-
Odour	-	N	N	N	-	-	-
Salinity	%	0.5	1	-	-	2	-
Taste	-	N	N	N	-	-	-
Total Dissolved Solid	mg/l	500	1000	-	-	4000	-
Total Suspended Solid	mg/l	25	50	50	150	300	300
Temperature	°C	-	Normal + 2°C	-	Normal + 2°C	-	-
Turbidity	NTU	5	50	50	-	-	-
Faecal Coliform**	count/100ml	10	100	400	5000(20000)a	5000(20000)a	-
Total Coliform	count/100ml	100	5000	5000	50000	50000	> 50000

Notes:

(SOURCE: DOE, MALAYSIA)

*= At hardness 50 mg/l CaCO₃

#= Maximum (unbracketed) and 24-hour average (bracketed) concentrations

N= Free from visible sheen, discolouration and deposits

DOE Water Quality Index Classification

PARAMETER	UNIT	CLASS				
		I	II	III	IV	V
Ammoniacal Nitrogen	mg/l	< 0.1	0.1 – 0.3	0.3 – 0.9	0.9 – 2.7	> 2.7
Biochemical Oxygen Demand	mg/l	< 1	1 – 3	3 – 6	6 – 12	> 12
Chemical Oxygen Demand	mg/l	< 10	10 – 25	25 – 50	50 – 100	> 100
Dissolved Oxygen	mg/l	> 7	5 – 7	3 – 5	1 – 3	< 1
pH	-	> 7	6 – 7	5 – 6	< 5	> 5
Total Suspended Solid	mg/l	< 25	25 – 50	50 – 150	150 – 300	> 300
Water Quality Index (WQI)		< 92.7	76.5 – 92.7	51.9 – 76.5	31.0 – 51.9	> 31.0

Water Classes and Uses

CLASS	USES
Class I	Conservation of natural environment. Water Supply I – Practically no treatment necessary. Fishery I – Very sensitive aquatic species.
Class IIA	Water supply II – Conventional treatment. Fishery II – Sensitive aquatic species.
Class IIB	Recreational use body contact.
Class III	Water Supply III – Extensive treatment required. Fishery III – Common of economic value and tolerant species; livestock drinking.
Class IV	Irrigation
Class V	None of the above.

DOE Water Quality Classification Based On Water Quality Index

SUB INDEX & WATER QUALITY INDEX	INDEX RANGE		
	CLEAN	SLIGHTLY POLLUTED	POLLUTED
Biochemical Oxygen Demand (BOD)	91 – 100	80 – 90	0 – 79
Ammoniacal Nitrogen (NH ₃ -N)	92 – 100	71 – 91	0 – 70
Suspended Solids (SS)	76 – 100	70 – 75	0 – 69
Water Quality Index (WQI)	81 – 100	60 – 80	0 – 59

Appendix 6-2

**CERTIFICATE OF
LABORATORY
ANALYSIS REPORT**

4.0 ANALYSIS DATA

Table 4.1: Analysis Data for Total Suspended Particulates (TSP)

Point	A1	A2	A3	A4
Monitoring Date	04/07/18- 05/07/18	04/07/18- 05/07/18	04/07/18- 05/07/18	04/07/18- 05/07/18
Sampling Time – Start	3.10 pm	2.30 pm	4.30 pm	4.00 pm
Sampling Time – Stop	3.10 pm	2.30 pm	4.30 pm	4.00 pm
Sampling Duration (min)	1440	1440	1440	1440
Flow rate (m ³ /min)	1.7	1.7	1.7	1.7
Volume of Air Sampled (m ³) corrected to S.T.P.	2718	2718	2718	2718
Filter Paper Final Wt (g)	0.8934	0.8489	0.9233	0.8858
Filter Paper Initial Wt (g)	0.6568	0.6423	0.6823	0.6459
Filter Paper Initial Adjusted Wt (g)	0.6578	0.6433	0.6833	0.6469
Particulate Wt (g)	0.2356	0.2056	0.2400	0.2389
Concentration of TSP (µg/m ³) corrected to S.T.P.	87	76	88	88

Weather Condition During Monitoring:

04/07/18 : Evening: Fine, Night: Fine.

05/07/18 : Midnight: Fine, Morning: Fine & Sunny, Afternoon: Sunny, Evening: Sunny.

Table 4.2: Analysis Data for Particulates Matter (PM₁₀)

Point	A1	A2	A3	A4
Monitoring Date	04/07/18- 05/07/18	04/07/18- 05/07/18	04/07/18- 05/07/18	04/07/18- 05/07/18
Sampling Time – Start	3.10 pm	2.30 pm	4.30 pm	4.00 pm
Sampling Time – Stop	3.10 pm	2.30 pm	4.30 pm	4.00 pm
Sampling Duration (min)	1440	1440	1440	1440
Atmospheric Pressure (on-site), kPa	101.0	101.0	101.0	101.0
Ambient Temperature (on-site), K	305.9	306.0	306.1	306.1
Flow rate (L/min)	5.0	5.0	5.0	5.0
Volume of Air Sampled (m ³) corrected to S.T.P.	7.2	7.2	7.2	7.2
Filter Paper Final Wt (mg)	81.64	82.66	81.60	82.58
Filter Paper Initial Wt (mg)	81.36	82.33	81.26	82.22
Particulate Wt (mg)	0.28	0.33	0.34	0.36
Concentration of PM ₁₀ (µg/m ³) corrected to S.T.P.	39	46	47	50

Weather Condition During Monitoring:

04/07/18 : Evening: Fine, Night: Fine.

05/07/18 : Midnight: Fine, Morning: Fine & Sunny, Afternoon: Sunny, Evening: Sunny

Table 4.3: Analysis Data for Particulates Matter (PM_{2.5})

Point	A1	A2	A3	A4
Monitoring Date	04/07/18- 05/07/18	04/07/18- 05/07/18	04/07/18- 05/07/18	04/07/18- 05/07/18
Sampling Time – Start	3.10 pm	2.30 pm	3.10 pm	4.00 pm
Sampling Time – Stop	3.10 pm	2.30 pm	3.10 pm	4.00 pm
Sampling Duration (min)	1440	1440	1440	1440
Atmospheric Pressure (on-site), kPa	101.0	101.0	101.0	101.0
Ambient Temperature (on-site), K	305.9	306.0	305.9	306.1
Flow rate (L/min)	5.0	5.0	5.0	5.0
Volume of Air Sampled (m ³) corrected to S.T.P.	7.2	7.2	7.2	7.2
Filter Paper Final Wt (mg)	81.09	83.85	81.25	82.29
Filter Paper Initial Wt (mg)	80.93	83.66	81.09	82.11
Particulate Wt (mg)	0.16	0.19	0.16	0.18
Concentration of PM _{2.5} (µg/m ³) corrected to S.T.P.	22	26	22	25

Weather Condition During Monitoring:

04/07/18 : Evening: Fine, Night: Fine.

05/07/18 : Midnight: Fine, Morning: Fine & Sunny, Afternoon: Sunny, Evening: Sunny

Table 4.4: Analysis Data for NO₂, SO₂, CO, and O₃.

Point	A1	A2	A3	A4
Monitoring Date	04/07/18	04/07/18	04/07/18	04/07/18
Sampling Time – Start	3.10 pm	2.30 pm	2.30 pm	4.00 pm
Sampling Time – Stop	4.10 pm	3.30 pm	3.30 pm	5.00 pm
Average Time (min)	60	60	60	60
Average Concentration of NO ₂ (µg/m ³)	ND<0.01	ND<0.01	ND<0.01	ND<0.01
Average Concentration of SO ₂ (µg/m ³)	ND<0.1	35.7	ND<0.1	ND<0.1
Average Concentration of CO (mg/m ³)	2.7	3.2	1.6	3.3
Average Concentration of O ₃ (µg/m ³)	193.0	89.92	76.33	184.81

5.0 SUMMARY OF RESULTS

5.1 Results of the Ambient Air Monitoring at point A1, A2, A3 & A4.

Parameter monitored	Results AM/0718/004				Specification	
	A1	A2	A3	A4	Averaging Time	*Malaysian Guideline
TSP	87	76	88	88	24 hours	260

Note: * means Malaysian Recommended Environmental Air Quality Guideline.

Parameter monitored	Results AM/0718/004				Specification	
	A1	A2	A3	A4	Averaging Time	** IT-2 (2018)
PM₁₀	39	46	47	50	24 hours	120 µg/m ³
PM_{2.5}	22	26	22	25	24 hours	50 µg/m ³
NO₂	ND<0.01	ND<0.01	ND<0.01	ND<0.01	1 hour	300 µg/m ³
SO₂	ND<0.1	35.7	ND<0.1	ND<0.1	1 hour	300 µg/m ³
CO	2.7	3.2	1.6	3.3	1 hour	35 mg/m ³
O₃	193.0	89.92	76.33	184.81	1 hour	200 µg/m ³

Note: ** referred to New Malaysia Ambient Air Quality Standard IT-2 (2018)

ND means Not Detected

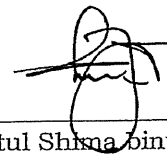
6.0 INFERENCE

The Total Suspended Particulate (T.S.P.) monitored during the 24 hours monitoring at point A1, A2, A3 and A4 were 87 $\mu\text{g}/\text{m}^3$, 76 $\mu\text{g}/\text{m}^3$, 88 $\mu\text{g}/\text{m}^3$ and 88 $\mu\text{g}/\text{m}^3$ which complied with the Malaysian Recommended Environmental Air Quality Guideline limit of 260 $\mu\text{g}/\text{m}^3$.

The Particulate Matter (PM_{10}) monitored during the 24 hours monitoring at point A1, A2, A3 and A4 were 39 $\mu\text{g}/\text{m}^3$, 46 $\mu\text{g}/\text{m}^3$, 47 $\mu\text{g}/\text{m}^3$ and 50 $\mu\text{g}/\text{m}^3$ respectively which complied with the New Malaysia Ambient Air Quality Standard IT-2 (2018) limit of 120 $\mu\text{g}/\text{m}^3$.

The Particulate Matter ($\text{PM}_{2.5}$) monitored during the 24 hours monitoring at point A1, A2, A3 and A4 were 22 $\mu\text{g}/\text{m}^3$, 26 $\mu\text{g}/\text{m}^3$, 22 $\mu\text{g}/\text{m}^3$ and 25 $\mu\text{g}/\text{m}^3$ respectively which complied with the New Malaysia Ambient Air Quality Standard IT-2 (2018) limit of 50 $\mu\text{g}/\text{m}^3$.

The concentration of SO_2 , NO_2 , O_3 and CO monitored at point A1, A2, A3 and A4 complied with the New Malaysia Ambient Air Quality Standard IT-2 (2018) limit.



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5.0 SUMMARY OF RESULTS

Lab Ref No.	Point	Date	L ₁₀ dB(A)	L ₅₀ dB(A)	L ₉₀ dB(A)	Total Leq dB(A)	DOE Guideline Leq, dB(A)
NM/0718/002-N1	N1 (Day)	04/07/18	68.7	50.6	44.2	47.4	65
NM/0718/002-N1	N1 (Night)	04-05/07/18	64.7	54.5	51.3	52.9	55
NM/0718/002-N2	N2 (Day)	04/07/18	64.7	50.0	41.7	45.9	60
NM/0718/002-N2	N2 (Night)	04-05/07/18	53.7	46.2	44.3	45.3	50
NM/0718/002-N3	N3 (Day)	04/07/18	65.0	54.1	47.5	50.8	60
NM/0718/002-N3	N3 (Night)	04-05/07/18	67.4	52.8	46.1	48.5	50
NM/0718/002-N4	N4 (Day)	04/07/18	82.2	57.8	53.1	55.5	60
NM/0718/002-N4	N4 (Night)	04-05/07/18	76.4	56.4	47.4	48.3	50

Note: DOE Guideline means Department Of Environment Recommended

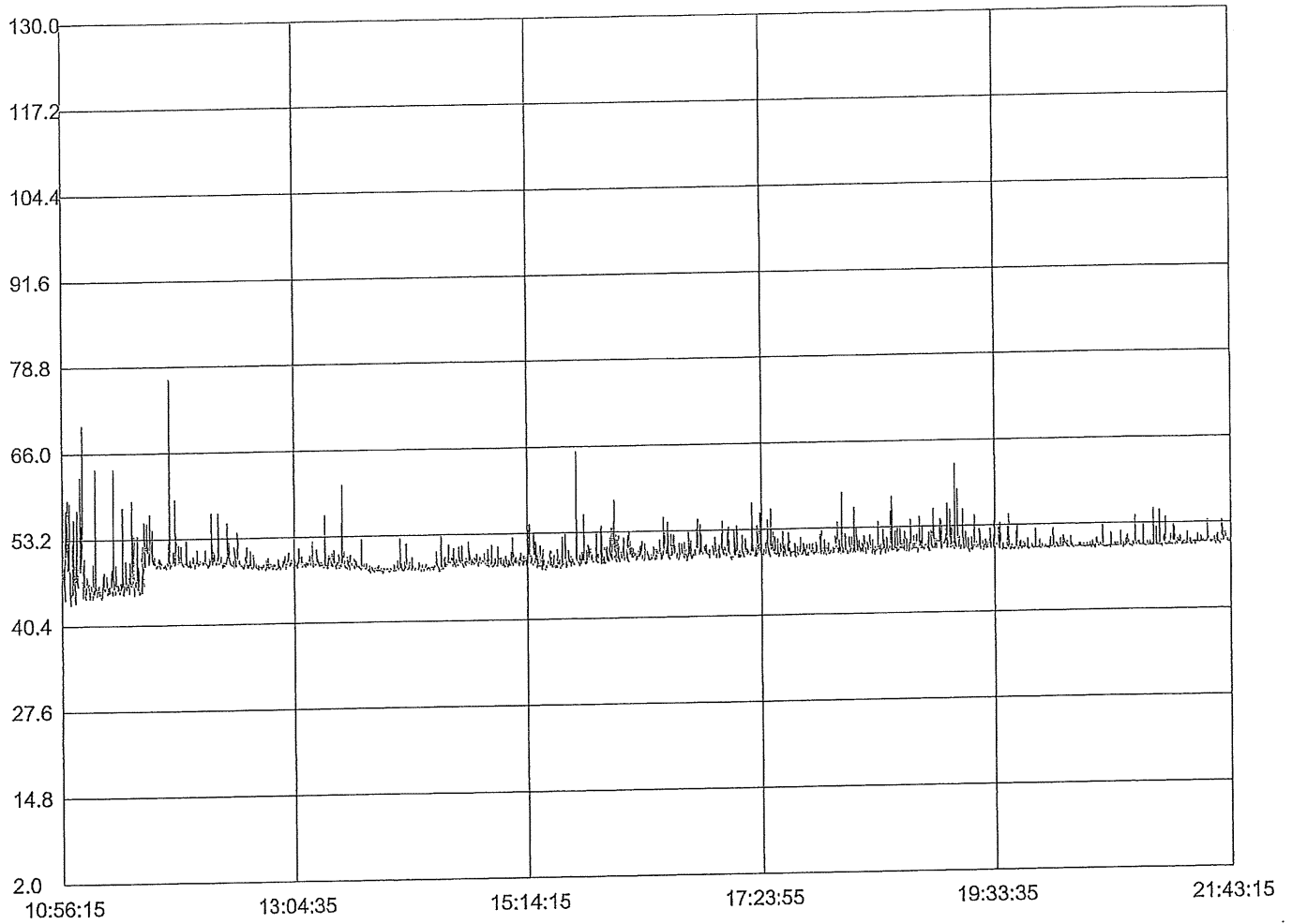
Guideline for Day Time (7 am – 10 pm) – (65 dBA)

And for Night Time (10 pm – 7 am) – (55 dBA)

Guideline for Day Time (7 am – 10 pm) – (60 dBA)

And for Night Time (10 pm – 7 am) – (50 dBA)

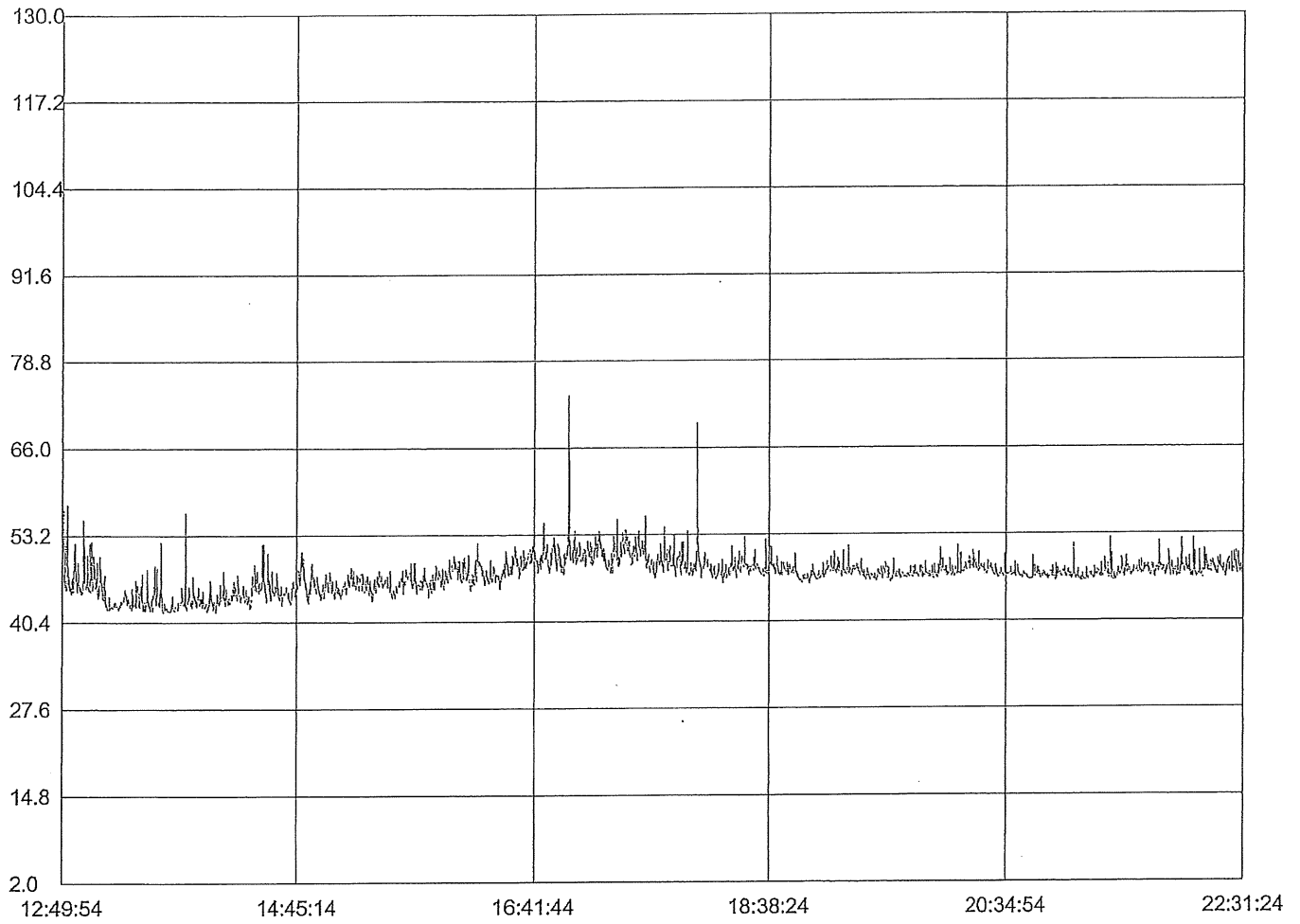
RealTime Graph



Start Time: 04-07-2018,10:56:15
 Maximum: 76.90 04-07-2018,11:55:25
 Minimum: 43.50 04-07-2018,11:01:05
 Sample Rate: 10.00
 Average: 49.70

Sampling Time: 04-07-2018, 1056 to 2143
 L10 dB(A): 68.7
 L50 dB(A): 50.6
 L90 dB(A): 44.2
 Total Leq dB(A): 47.4
 Lab Ref No.: NM/0718/002-N1
 Description: N1 (Day)

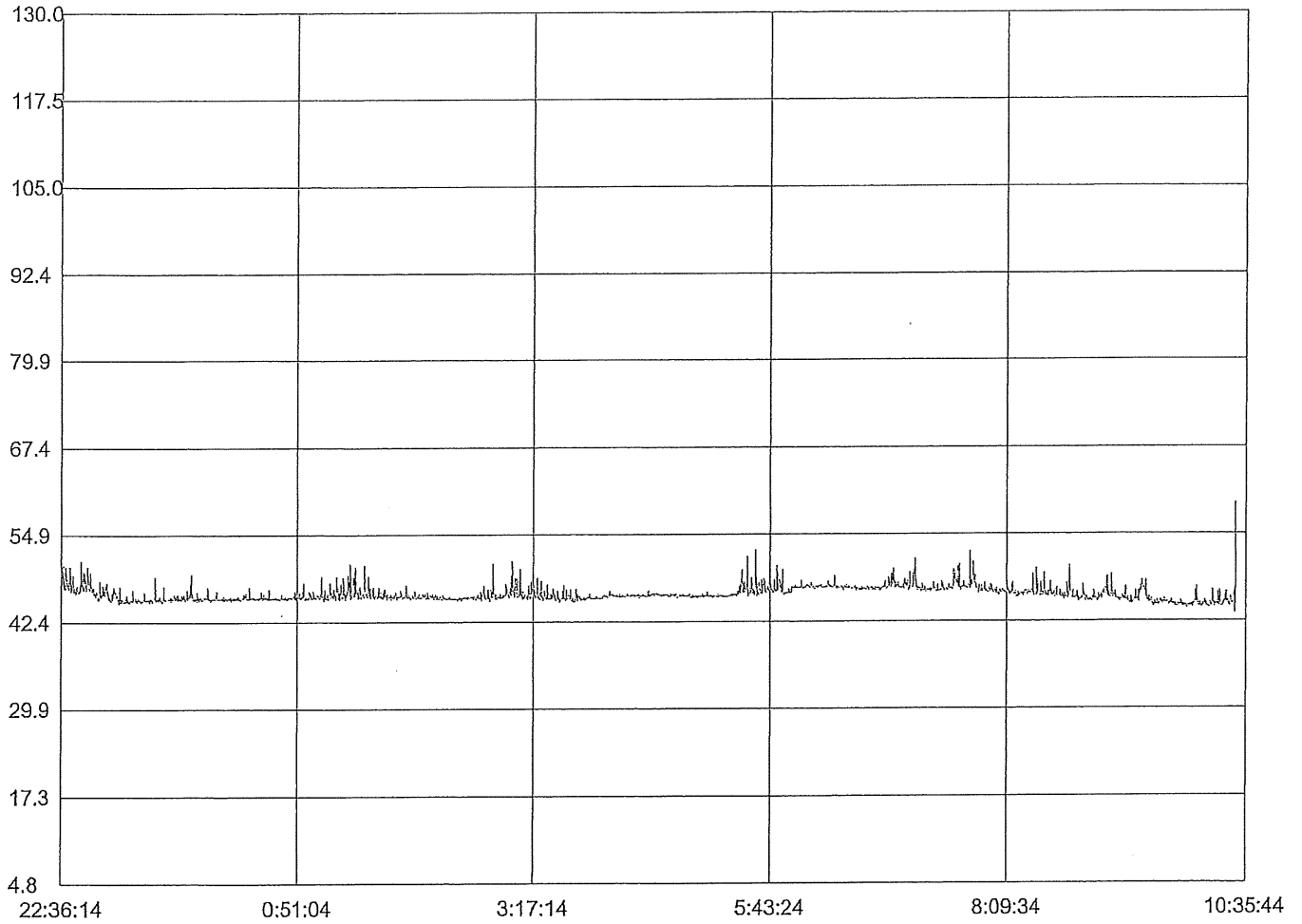
RealTime Graph



Start Time: 04-07-2018,12:49:14
 Maximum: 73.70 04-07-2018,16:58:24
 Minimum: 41.90 04-07-2018,13:39:34
 Sample Rate: 10.00
 Average: 46.30

Sampling Time: 04-07-2018, 1249 to 2231
 L10 dB(A): 64.7
 L50 dB(A): 50.0
 L90 dB(A): 41.7
 Total Leq dB(A): 45.9
 Lab Ref No.: NM/0718/002-N2
 Description: N2 (Day)

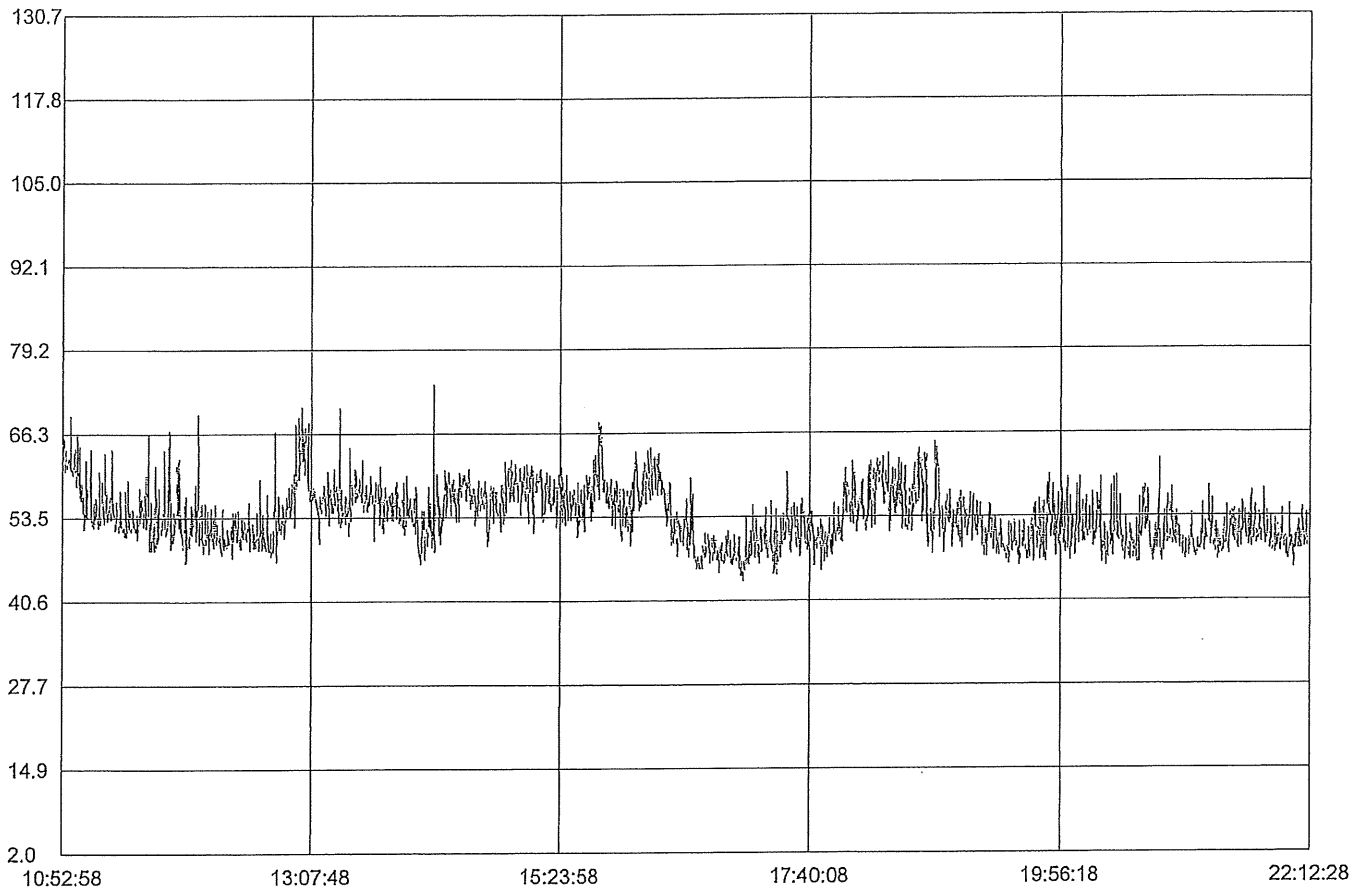
RealTime Graph



Start Time: 04-07-2018, 22:36:14
 Maximum: 57.40 05-07-2018,10:29:14
 Minimum: 43.70 05-07-2018, 9:59:54
 Sample Rate: 10.00
 Average: 46.30

Sampling Time: 04-07-2018, 2236 to 05-07-2018, 1035
 L10 dB(A): 53.7
 L50 dB(A): 46.2
 L90 dB(A): 44.3
 Total Leq dB(A): 45.3
 Lab Ref No.: NM/0718/002-N2
 Description: N2 (Night)

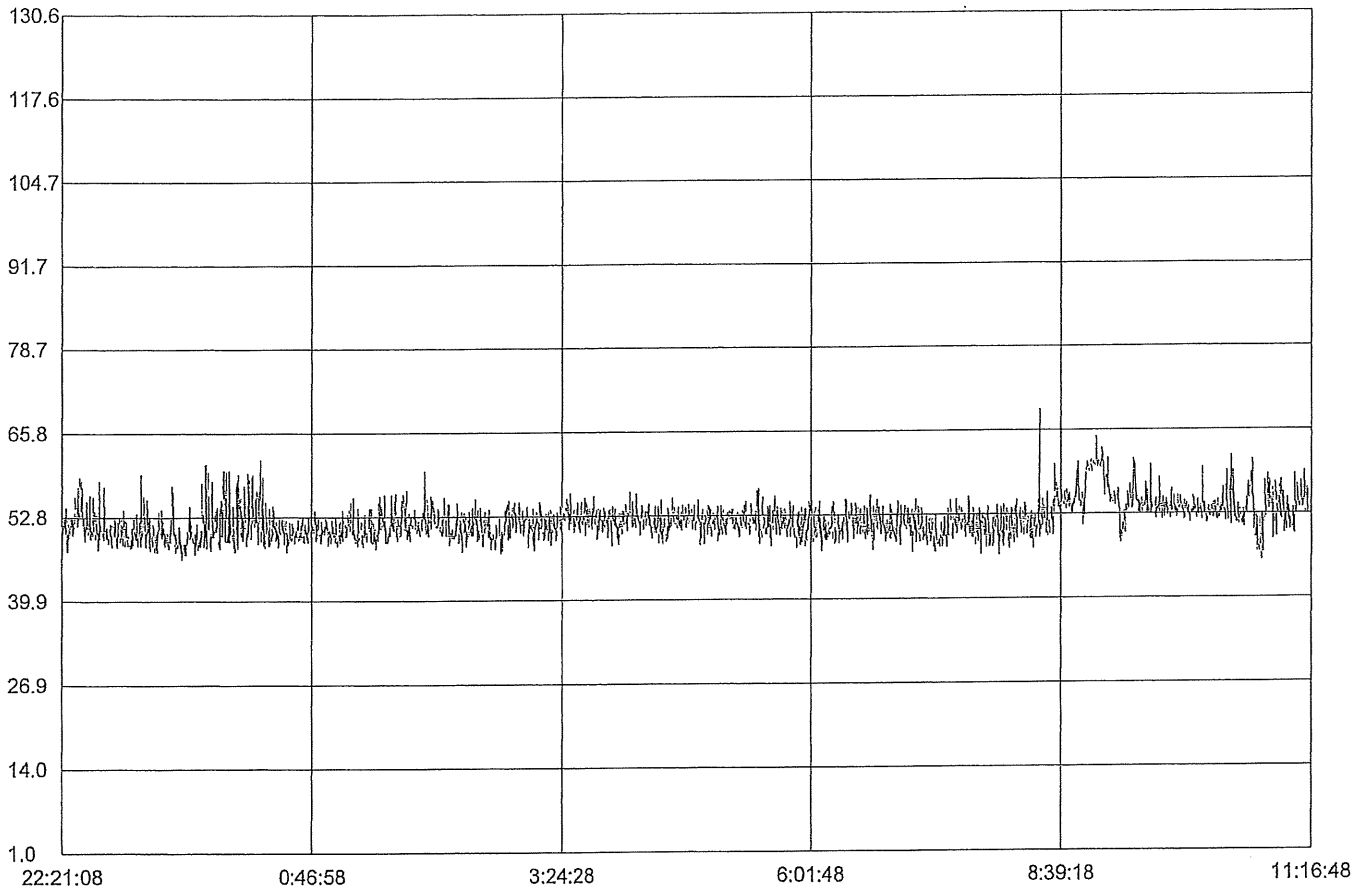
RealTime Graph



Start Time: 04-07-2018,10:52:58
 Maximum: 73.90 04-07-2018,14:14:18
 Minimum: 43.60 04-07-2018,17:03:38
 Sample Rate: 10.00
 Average: 53.62

Sampling Time: 04-07-2018, 1052 to 2212
 L10 dB(A): 65.0
 L50 dB(A): 54.1
 L90 dB(A): 47.5
 Total Leq dB(A): 50.8
 Lab Ref No.: NM/0718/002-N3
 Description: N3 (Day)

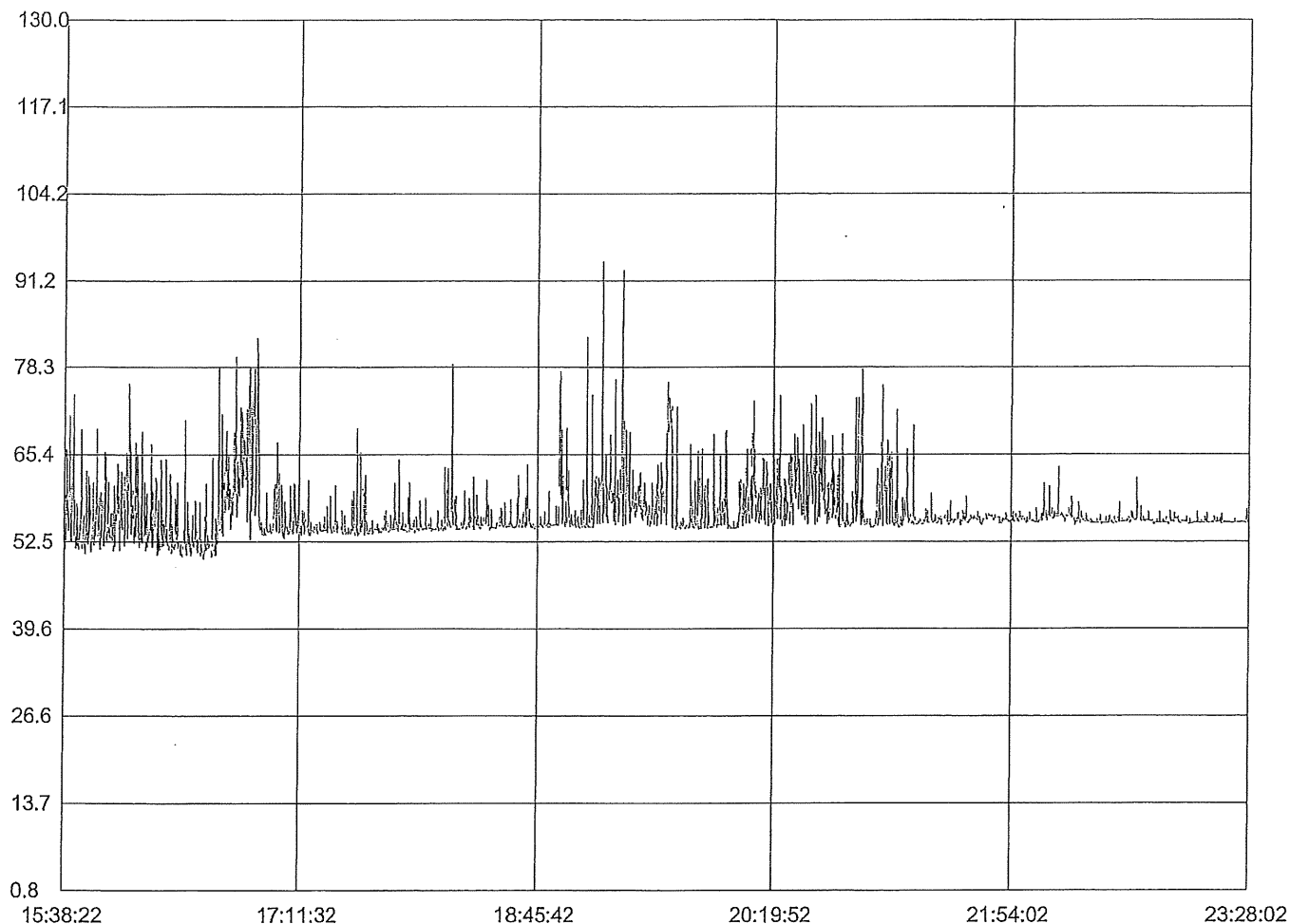
RealTime Graph



Start Time: 04-07-2018, 22:21:08
 Maximum: 69.00 05-07-2018, 8:25:48
 Minimum: 45.70 05-07-2018, 10:45:58
 Sample Rate: 10.00
 Average: 52.23

Sampling Time: 04-07-2018, 2221 to 05-07-2018, 1116
 L10 dB(A): 67.4
 L50 dB(A): 52.8
 L90 dB(A): 46.1
 Total Leq dB(A): 48.5
 Lab Ref No.: NM/0718/002-N3
 Description: N3 (Night)

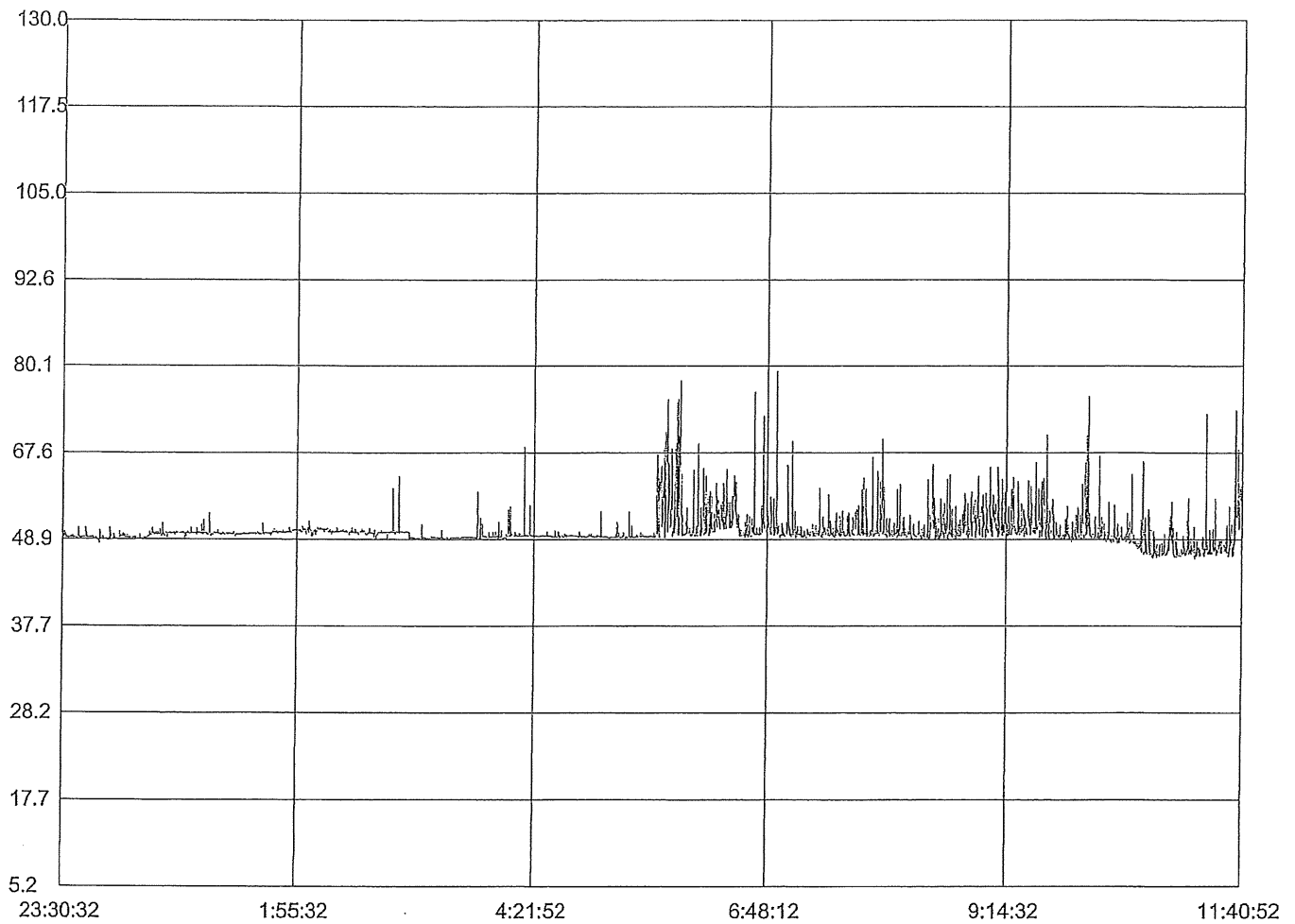
RealTime Graph



Start Time: 04-07-2018,15:38:22
 Maximum: 94.10 04-07-2018,19:11:42
 Minimum: 49.90 04-07-2018,16:33:32
 Sample Rate: 10.00
 Average: 56.80

Sampling Time: 04-07-2018, 1538 to 2328
 L10 dB(A): 82.2
 L50 dB(A): 57.8
 L90 dB(A): 53.1
 Total Leq dB(A): 55.5
 Lab Ref No.: NM/0718/002-N4
 Description: N4 (Day)

RealTime Graph



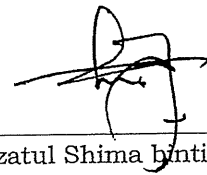
Start Time: 04-07-2018, 23:30:32
Maximum: 79.40 04-07-2018, 6:53:42
Minimum: 47.30 04-07-2018, 10:47:22
Sample Rate: 10.00
Average: 56.50

Sampling Time: 04-07-2018, 2330 to 05-07-2018, 1140
L10 dB(A): 76.4
L50 dB(A): 56.4
L90 dB(A): 47.4
Total Leq dB(A): 48.3
Lab Ref No.: NM/0718/002-N4
Description: N4 (Night)

6.0 INFERENCE

The noise monitoring was conducted on 04th to 05th July 2018 at point N1, N2, N3 and N4. The overall noise level at point N1 for day time were 47.4 dB(A) while for night time were 52.9 dB(A). The noise level monitoring for point N1 complied to its limits under the Department of Environmental Recommended Guideline of 65 dB(A) for day and 55 dB(A) for night.

The overall noise level at point N2, N3, and N4 for day time were 45.9 dB(A), 50.8 dB(A) and 55.5 dB(A) while for night time were 45.3 dB(A), 48.5 dB(A) and 48.3 dB(A). The noise level monitoring for point N2, N3, and N4 complied to its limit under the Department of Environmental Recommended Guideline of 60 dB(A) for day and 50dB(A) for night.



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CERTIFICATE OF ANALYSIS

Lab. Report Ref.: W0718/096

Company	:	KenEp Consultancy & Services Sdn. Bhd.
Sample Date	:	05/07/2018
Sample Received Date	:	09/07/2018
Report Date	:	23/07/2018
Sample Description	:	One (1) no of sample in 1L plastic bottle
Sample Marking	:	W1 – Upstream Tributary of Sg. Dol

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>
pH Value	APHA 4500-H ⁺ B	6.9
Chemical Oxygen Demand, mg/L	In-House Method, KR-LAB-TM02 (based on MN Method 985026 & APHA 5220 D)	85
Biochemical Oxygen Demand* (5 days@ 20°C), mg/L	In-House Method, KR-LAB-TM01 (based on MN Method 985822 & APHA 5210 B)	26
Total Suspended Solid, mg/L	APHA 2540 D	28
*Oil and Grease, mg/L	APHA 5520 B	ND<2
*Dissolved Oxygen, mg/L	MN Method 985822	10.3
Ammoniacal Nitrogen as NH ₄ -N, mg/L	In-House Method, KR-LAB-TM06 (based on MN Method 91805)	0.01

NOTE:

APHA : American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.

MN Method : Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.

STANDARD B : Environmental Quality Act (Industrial Effluent) Regulations 2009, Fifth Schedule.

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: Not SAMM Accredited

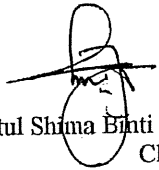
: Sub-contracted and SAMM Accredited

: Sub-contracted but not SAMM Accredited

: the holding time for the analysis was exceeded

: Sample for BOD was preserved at < 4°C and tested on 09/07/2018.

: Sample for Oil & Grease test is subdivided from the original container


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Website: http://www.kenep.com.my


 MS ISO/IEC 17025
TESTING
SAMM NO. 567

CERTIFICATE OF ANALYSIS

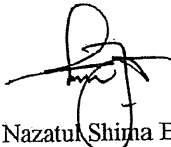
Lab. Report Ref.: W0718/097

Company	:	KenEp Consultancy & Services Sdn. Bhd.
Sample Date	:	05/07/2018
Sample Received Date	:	09/07/2018
Report Date	:	23/07/2018
Sample Description	:	One (1) no of sample in 1L plastic bottle
Sample Marking	:	W2 – Upstream Tributary of Sg. Dol

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>
pH Value	APHA 4500-H ⁺ B	6.2
Chemical Oxygen Demand, mg/L	In-House Method, KR-LAB-TM02 (based on MN Method 985026 & APHA 5220 D)	40
Biochemical Oxygen Demand* (5 days@ 20°C), mg/L	In-House Method, KR-LAB-TM01 (based on MN Method 985822 & APHA 5210 B)	12
Total Suspended Solid, mg/L	APHA 2540 D	82
*Oil and Grease, mg/L	APHA 5520 B	ND<2
+Dissolved Oxygen, mg/L	MN Method 985822	10.0
Ammoniacal Nitrogen as NH ₄ -N, mg/L	In-House Method, KR-LAB-TM06 (based on MN Method 91805)	0.08

NOTE:

APHA	:	American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21 st Edition, 2005.
MN Method	:	Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
STANDARD B	:	Environmental Quality Act (Industrial Effluent) Regulations 2009, Fifth Schedule.
+	:	Not SAMM Accredited
++	:	Sub-contracted and SAMM Accredited
◆	:	Sub-contracted but not SAMM Accredited
#	:	the holding time for the analysis was exceeded
*	:	Sample for BOD was preserved at < 4°C and tested on 09/07/2018.
•	:	Sample for Oil & Grease test is subdivided from the original container


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MS ISO/IEC 17025
TESTING
SAMM NO. 567

CERTIFICATE OF ANALYSIS

Lab. Report Ref.: W0718/098

Company	:	KenEp Consultancy & Services Sdn. Bhd.
Sample Date	:	05/07/2018
Sample Received Date	:	09/07/2018
Report Date	:	23/07/2018
Sample Description	:	One (1) no of sample in 1L plastic bottle
Sample Marking	:	W3 – Midstream Tributary of Sg. Dol

PARAMETER

METHOD

RESULT

pH Value	APHA 4500-H ⁺ B	6.6
Chemical Oxygen Demand, mg/L	In-House Method, KR-LAB-TM02 (based on MN Method 985026 & APHA 5220 D)	41
Biochemical Oxygen Demand* (5 days@ 20°C), mg/L	In-House Method, KR-LAB-TM01 (based on MN Method 985822 & APHA 5210 B)	15
Total Suspended Solid, mg/L	APHA 2540 D	56
*Oil and Grease, mg/L	APHA 5520 B	6
*Dissolved Oxygen, mg/L	MN Method 985822	9.1
Ammoniacal Nitrogen as NH ₄ -N, mg/L	In-House Method, KR-LAB-TM06 (based on MN Method 91805)	0.12

NOTE:

APHA	: American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21 st Edition, 2005.
MN Method	: Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
STANDARD B	: Environmental Quality Act (Industrial Effluent) Regulations 2009, Fifth Schedule.
+	: Not SAMM Accredited
++	: Sub-contracted and SAMM Accredited
◆	: Sub-contracted but not SAMM Accredited
#	: the holding time for the analysis was exceeded
*	: Sample for BOD was preserved at < 4°C and tested on 09/07/2018.
•	: Sample for Oil & Grease test is subdivided from the original container

Puteri Adis Nazatul Shima Binti Azmil
Chemist
IKM No: M/3267/6092/11

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Email: lab@kenep.com.my

Website: http://www.kenep.com.my



CERTIFICATE OF ANALYSIS

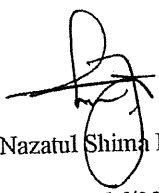
Lab. Report Ref.: W0718/099

Company	:	KenEp Consultancy & Services Sdn. Bhd.
Sample Date	:	05/07/2018
Sample Received Date	:	09/07/2018
Report Date	:	23/07/2018
Sample Description	:	One (1) no of sample in 1L plastic bottle
Sample Marking	:	W4 – Downstream of Sg. Dol

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>
pH Value	APHA 4500-H ⁺ B	7.6
Chemical Oxygen Demand, mg/L	In-House Method, KR-LAB-TM02 (based on MN Method 985026 & APHA 5220 D)	110
Biochemical Oxygen Demand* (5 days@ 20°C), mg/L	In-House Method, KR-LAB-TM01 (based on MN Method 985822 & APHA 5210 B)	36
Total Suspended Solid, mg/L	APHA 2540 D	46
*Oil and Grease, mg/L	APHA 5520 B	ND<2
+Dissolved Oxygen, mg/L	MN Method 985822	7.3
Ammoniacal Nitrogen as NH ₄ -N, mg/L	In-House Method, KR-LAB-TM06 (based on MN Method 91805)	0.27

NOTE:

APHA	: American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21 st Edition, 2005.
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STANDARD B	: Environmental Quality Act (Industrial Effluent) Regulations 2009, Fifth Schedule.
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++	: Sub-contracted and SAMM Accredited
◆	: Sub-contracted but not SAMM Accredited
#	: the holding time for the analysis was exceeded
*	: Sample for BOD was preserved at < 4°C and tested on 09/07/2018.
•	: Sample for Oil & Grease test is subdivided from the original container


 Puteri Adis Nazatul Shima Binti Azmil
 Chemist
 IKM No: M/3267/6092/11



No. 5 & 5A, Jalan Jelapang Bayu 1, Puncak Jelapang Bayu,
 30020 Ipoh, Perak, Malaysia.
 Tel: +605-525 0336 Fax: +605-525 2908
 Email: lab@kenep.com.my
 Website: http://www.kenep.com.my



CERTIFICATE OF ANALYSIS

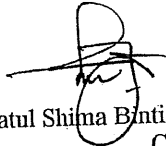
Lab. Report Ref.: W0718/100

Company	:	KenEp Consultancy & Services Sdn. Bhd.
Sample Date	:	05/07/2018
Sample Received Date	:	09/07/2018
Report Date	:	23/07/2018
Sample Description	:	One (1) no of sample in 1L plastic bottle
Sample Marking	:	W5 – Downstream of Sg. Paka

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>
pH Value	APHA 4500-H ⁺ B	7.3
Chemical Oxygen Demand, mg/L	In-House Method, KR-LAB-TM02 (based on MN Method 985026 & APHA 5220 D)	160
Biochemical Oxygen Demand* (5 days@ 20°C), mg/L	In-House Method, KR-LAB-TM01 (based on MN Method 985822 & APHA 5210 B)	45
Total Suspended Solid, mg/L	APHA 2540 D	40
*Oil and Grease, mg/L	APHA 5520 B	ND<2
+Dissolved Oxygen, mg/L	MN Method 985822	9.3
Ammoniacal Nitrogen as NH ₄ -N, mg/L	In-House Method, KR-LAB-TM06 (based on MN Method 91805)	0.21

NOTE:

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MN Method	: Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
STANDARD B	: Environmental Quality Act (Industrial Effluent) Regulations 2009, Fifth Schedule.
+	: Not SAMM Accredited
++	: Sub-contracted and SAMM Accredited
◆	: Sub-contracted but not SAMM Accredited
#	: the holding time for the analysis was exceeded
*	: Sample for BOD was preserved at < 4°C and tested on 09/07/2018.
•	: Sample for Oil & Grease test is subdivided from the original container


 Puteri Adis Nazatul Shima Binti Azmil
 Chemist
 IKM No: M/3267/6092/11



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CERTIFICATE OF ANALYSIS

Lab. Report Ref.: W0718/101

Company	:	KenEp Consultancy & Services Sdn. Bhd.
Sample Date	:	05/07/2018
Sample Received Date	:	09/07/2018
Report Date	:	23/07/2018
Sample Description	:	One (1) no of sample in 1L plastic bottle
Sample Marking	:	W6 – Downstream of Sg. Paka

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>
pH Value	APHA 4500-H ⁺ B	8.2
Chemical Oxygen Demand, mg/L	In-House Method, KR-LAB-TM02 (based on MN Method 985026 & APHA 5220 D)	180
Biochemical Oxygen Demand* (5 days@ 20°C), mg/L	In-House Method, KR-LAB-TM01 (based on MN Method 985822 & APHA 5210 B)	49
Total Suspended Solid, mg/L	APHA 2540 D	38
*Oil and Grease, mg/L	APHA 5520 B	ND<2
*Dissolved Oxygen, mg/L	MN Method 985822	8.9
Ammoniacal Nitrogen as NH ₄ -N, mg/L	In-House Method, KR-LAB-TM06 (based on MN Method 91805)	0.25

NOTE:

APHA	: American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21 st Edition, 2005.
MN Method	: Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
STANDARD B	: Environmental Quality Act (Industrial Effluent) Regulations 2009, Fifth Schedule.
+	: Not SAMM Accredited
++	: Sub-contracted and SAMM Accredited
◆	: Sub-contracted but not SAMM Accredited
#	: the holding time for the analysis was exceeded
*	: Sample for BOD was preserved at < 4°C and tested on 09/07/2018.
•	: Sample for Oil & Grease test is subdivided from the original container

Puteri Adis Nazatul Shima Binti Azmil
Chemist

IKM No: M/3267/6092/11

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Tel: +605-525 0336 Fax: +605-525 2908
Email: lab@kenep.com.my
Website: http://www.kenep.com.my



CERTIFICATE OF ANALYSIS

Lab. Report Ref.: W0718/402

Company : KenEp Consultancy & Services Sdn. Bhd.
Sample Date : 27/07/2018
Sample Received Date : 31/07/2018
Sample Report Date : 25/08/2018
Sample Description : One (1) no of samples in 1.5L plastic bottle
Sample Marking : M1

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>	<u>STANDARD</u>
Temperature, °C	APHA 2550 B	24.8	≤2
Total Suspended Solids, mg/L	APHA 2540-D	140	100
Oil & Grease, mg/L	APHA 5520-B	ND<2	5
Mercury as Hg, µg/L	USEPA 200.7	2	50
Cadmium as Cd, µg/L	APHA 3120 B	3	10
Hexa-Chromium, µg/L	APHA 3500-Cr B	1	48
Arsenic as As, µg/L	APHA 3120 B	16	50
*Cyanide as CN, µg/L	In-House Method, KR-LAB-TM10 (based on MN Method 91830)	2	20
Lead as Pb, µg/L	APHA 3120 B	ND<2	50
Copper as Cu, µg/L	APHA 3120 B	ND<4	10
Zinc as Zn, µg/L	APHA 3120 B	ND<4	100
Phenol, µg/L	APHA 5530-B,D	8	100
*Nitrate Nitrogen as NO ₃ -N, µg/L	MN Method 91865	120	1000
*Dissolved Oxygen, mg/L	MN 985822	5.8	3
*Phosphate as PO ₄ -P, µg/L	MN Method 91877	400	75
**Fecal Coliform, MPN/100mL	APHA 9222 D	ND<1.8	200 faecal coliform 100mL-1
**Ammonia (unionized), µg/L	APHA NH ₃ -B,C	ND<70	320
**Nitrite as NO ₂ -N, µg/L	APHA 4500 NO ₂ B	920	1000
*Salinity, psu	APHA 2520 B	54	-

NOTE:

APHA : American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.
MN Method : Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
USEPA : United States Environmental Protection Agency
STANDARD : Class 3 Malaysia Marine Water Quality Criteria and Standards (MWQCS)
ND : Not Detected (result below Method Detection Limits).
+ : Not SAMM Accredited
++ : Sub-contracted and SAMM Accredited
♦ : Sub-contracted but not SAMM Accredited
: the holding time for the analysis was exceeded

Puteri Adis Nazatul Shima Binti Azmil
Chemist
IKM No.: M/3267/6092/11



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Tel: +605-525 0336 Fax: +605-525 2908

Email: lab@kenep.com.my

Website: http://www.kenep.com.my



MS ISO/IEC 17025
TESTING
SAMM NO. 567

CERTIFICATE OF ANALYSIS

Lab. Report Ref.: W0718/403

Company : KenEp Consultancy & Services Sdn. Bhd.
Sample Date : 27/07/2018
Sample Received Date : 31/07/2018
Sample Report Date : 25/08/2018
Sample Description : One (1) no of samples in 1.5L plastic bottle
Sample Marking : M2

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>	<u>STANDARD</u>
Temperature, °C	APHA 2550 B	24.6	≤2
Total Suspended Solids, mg/L	APHA 2540-D	95	100
Oil & Grease, mg/L	APHA 5520-B	ND<2	5
Mercury as Hg, µg/L	USEPA 200.7	2	50
Cadmium as Cd, µg/L	APHA 3120 B	3	10
Hexa-Chromium, µg/L	APHA 3500-Cr B	1	48
Arsenic as As, µg/L	APHA 3120 B	14	50
*Cyanide as CN, µg/L	In-House Method, KR-LAB-TM10 (based on MN Method 91830)	1	20
Lead as Pb, µg/L	APHA 3120 B	ND<2	50
Copper as Cu, µg/L	APHA 3120 B	ND<4	10
Zinc as Zn, µg/L	APHA 3120 B	ND<4	100
Phenol, µg/L	APHA 5530-B,D	ND<1	100
*Nitrate Nitrogen as NO ₃ -N, µg/L	MN Method 91865	ND<100	1000
*Dissolved Oxygen, mg/L	MN 985822	5.2	3
*Phosphate as PO ₄ -P, µg/L	MN Method 91877	800	75
**Fecal Coliform, MPN/100mL	APHA 9222 D	ND<1.8	200 faecal coliform 100mL-1
**Ammonia (unionized), µg/L	APHA NH ₃ -B,C	ND<70	320
**Nitrite as NO ₂ -N, µg/L	APHA 4500 NO ₂ B	1,070	1000
*Salinity, psu	APHA 2520 B	48	-

NOTE:

APHA : American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 21st Edition, 2005.
MN Method : Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
USEPA : United States Environmental Protection Agency
STANDARD : Class 3 Malaysia Marine Water Quality Criteria and Standards (MWQCS)
ND : Not Detected (result below Method Detection Limits).
+ : Not SAMM Accredited
++ : Sub-contracted and SAMM Accredited
♦ : Sub-contracted but not SAMM Accredited
: the holding time for the analysis was exceeded

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Email: lab@kenep.com.my

Website: http://www.kenep.com.my



MS ISO/IEC 17025
TESTING
SAMM NO. 567

CERTIFICATE OF ANALYSIS

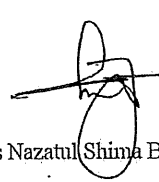
Lab. Report Ref.: W0718/404

Company : KenEp Consultancy & Services Sdn. Bhd.
Sample Date : 27/07/2018
Sample Received Date : 31/07/2018
Sample Report Date : 25/08/2018
Sample Description : One (1) no of samples in 1.5L plastic bottle
Sample Marking : M3

<u>PARAMETER</u>	<u>METHOD</u>	<u>RESULT</u>	<u>STANDARD</u>
Temperature, °C	APHA 2550 B	25.1	≤2
Total Suspended Solids, mg/L	APHA 2540-D	160	100
Oil & Grease, mg/L	APHA 5520-B	ND<2	5
Mercury as Hg, µg/L	USEPA 200.7	2	50
Cadmium as Cd, µg/L	APHA 3120 B	3	10
Hexa-Chromium, µg/L	APHA 3500-Cr B	1	48
Arsenic as As, µg/L	APHA 3120 B	16	50
*Cyanide as CN, µg/L	In-House Method, KR-LAB-TM10 (based on MN Method 91830)	ND<1	20
Lead as Pb, µg/L	APHA 3120 B	ND<2	50
Copper as Cu, µg/L	APHA 3120 B	ND<4	10
Zinc as Zn, µg/L	APHA 3120 B	ND<4	100
Phenol, µg/L	APHA 5530-B,D	ND<1	100
*Nitrate Nitrogen as NO ₃ -N, µg/L	MN Method 91865	ND<100	1000
*Dissolved Oxygen, mg/L	MN 985822	5.4	3
*Phosphate as PO ₄ -P, µg/L	MN Method 91877	700	75
**Fecal Coliform, MPN/100mL	APHA 9222 D	ND<1.8	200 faecal coliform 100mL-1
++Ammonia (unionized), µg/L	APHA NH ₃ -B,C	ND<70	320
**Nitrite as NO ₂ -N, µg/L	APHA 4500 NO ₂ B	500	1000
*Salinity, psu	APHA 2520 B	34	-

NOTE:

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MN Method : Testing Method of Macherey-Nagel (MN) for the Examination of Water and Wastewater.
USEPA : United States Environmental Protection Agency
STANDARD : Class 3 Malaysia Marine Water Quality Criteria and Standards (MWQCS)
ND : Not Detected (result below Method Detection Limits).
+ : Not SAMM Accredited
++ : Sub-contracted and SAMM Accredited
♦ : Sub-contracted but not SAMM Accredited
: the holding time for the analysis was exceeded


Puteri Adis Nazatul Shima Binti Azmil
Chemist

IKM No.: M/3267/6092/11

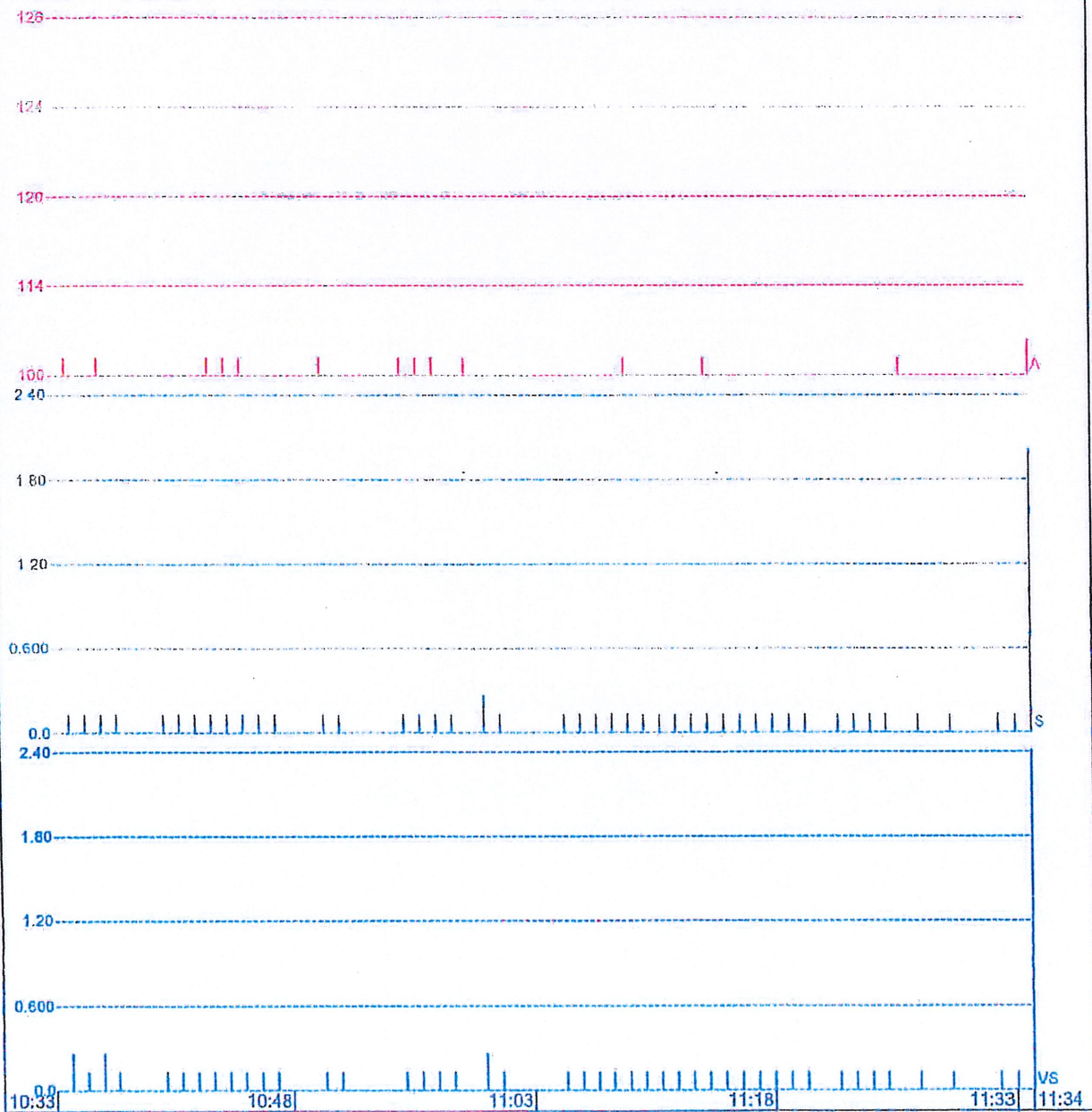
Page 1 of 1

Client: Hexatrend Quarry Sdn. Bhd.
Monitored By: Muhamad Fizrie
Monitoring Consultants: KenEp Consultancy & Services
Location: Project Boundary

File Name: 522201807051033001.bar
Number: 001
Range: 05/7/2018 10:33 AM-05/7/2018 11:34:00 AM
Acoustic: 106 dBL (05/7/2018 11:34:00 AM)
Seismic: 1.91 mm/sec (05/7/2018 11:34:00 AM)
Vector Sum: 2.29 mm/sec (05/7/2018 11:34:00 AM)
Serial Number: 5222
Seismic Range: 63.5 in/s
Acoustic Range: 142 dBL
Sample Interval: 1 Minute
Samples: 61
Gain: 2.0x
Voltage Range: 6.6-6.5

Amplitudes
Acoustic: 106dBL (05/7/2018 11:34:00 AM)
Seismic: 1.91 mm/sec (05/7/2018 11:34:00 AM)
Vector Sum: 2.29 mm/sec (05/7/2018 11:34:00 AM)

Graph Information
Data Range: 05/7/2018 10:33:00 AM-05/7/2018 11:34:00 AM
Sample: 61
Acoustic Scale: 126 dBL
Seismic Scale: 2.40 mm/sec (0.600 mm/sec/div)
Time Intervals: 15 Minutes
Show Peak Every: 1 Sample

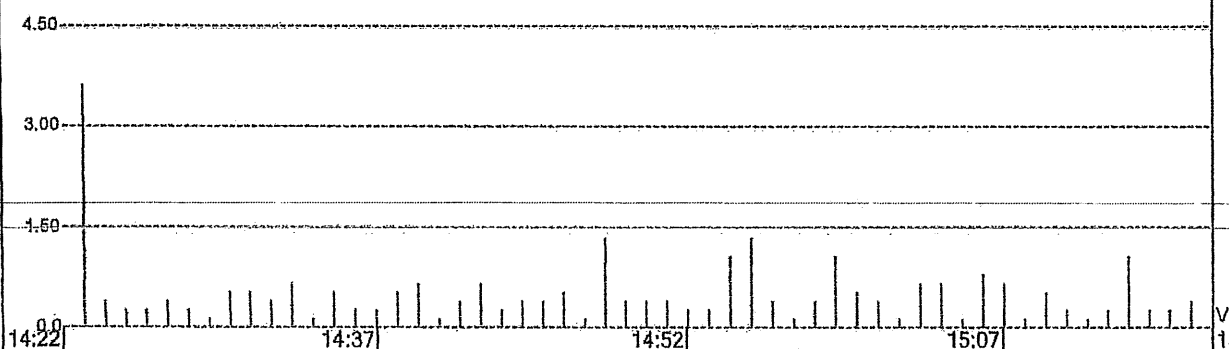
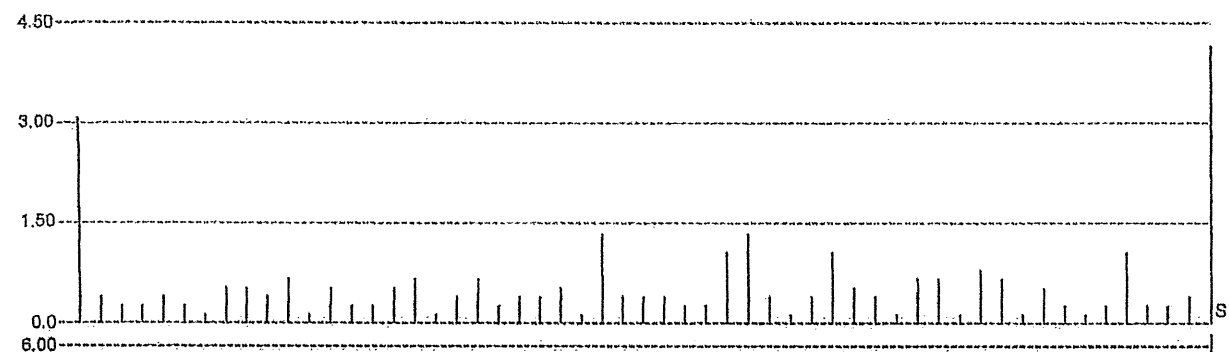
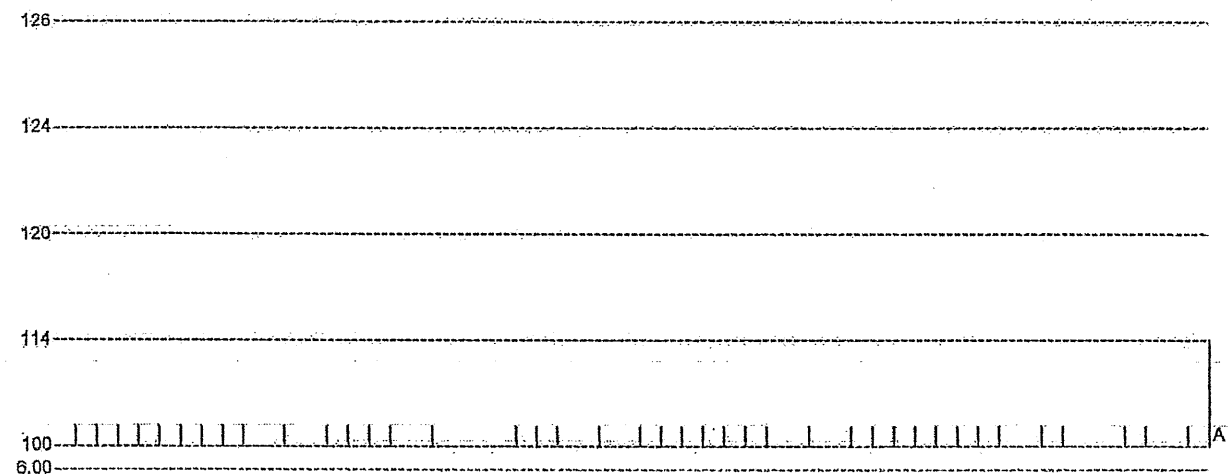


Client: Hexatrend Quarry Sdn. Bhd.
Monitored By: Muhamad Fizrie
Monitoring Consultants: KenEp Consultancy & Services
Location: Kg. Tebing Tembah

File Name: 522201807051422002.bar
Number: 002
Range: 05/7/2018 2:22:00 PM-05/7/2018 3:17:00 PM
Acoustic: 114 dBL (05/7/2018 3:17:00 PM)
Seismic: 1.35 mm/sec (05/7/2018 3:17:00 PM)
Vector Sum: 0.98 mm/sec (05/7/2018 3:17:00 PM)
Serial Number: 5222
Seismic Range: 63.5 in/s
Acoustic Range: 142 dBL
Sample Interval: 1 Minute
Samples: 55
Gain: 2.0x
Voltage Range: 6.6-6.5

Amplitudes
Acoustic: 114dBL (05/7/2018 3:17:00 PM)
Seismic: 1.35 mm/sec (05/7/2018 3:17:00 PM)
Vector Sum: 0.98 mm/sec (05/7/2018 3:17:00 PM)

Graph Information
Data Range: 05/7/2018 2:22:00 PM-05/7/2018 3:17:00 PM)
Sample: 55
Acoustic Scale: 126 dBL
Seismic Scale: 6.00 mm/sec (1.500 mm/sec/div)
Time Intervals: 15 Minutes
Show Peak Every: 1 Sample

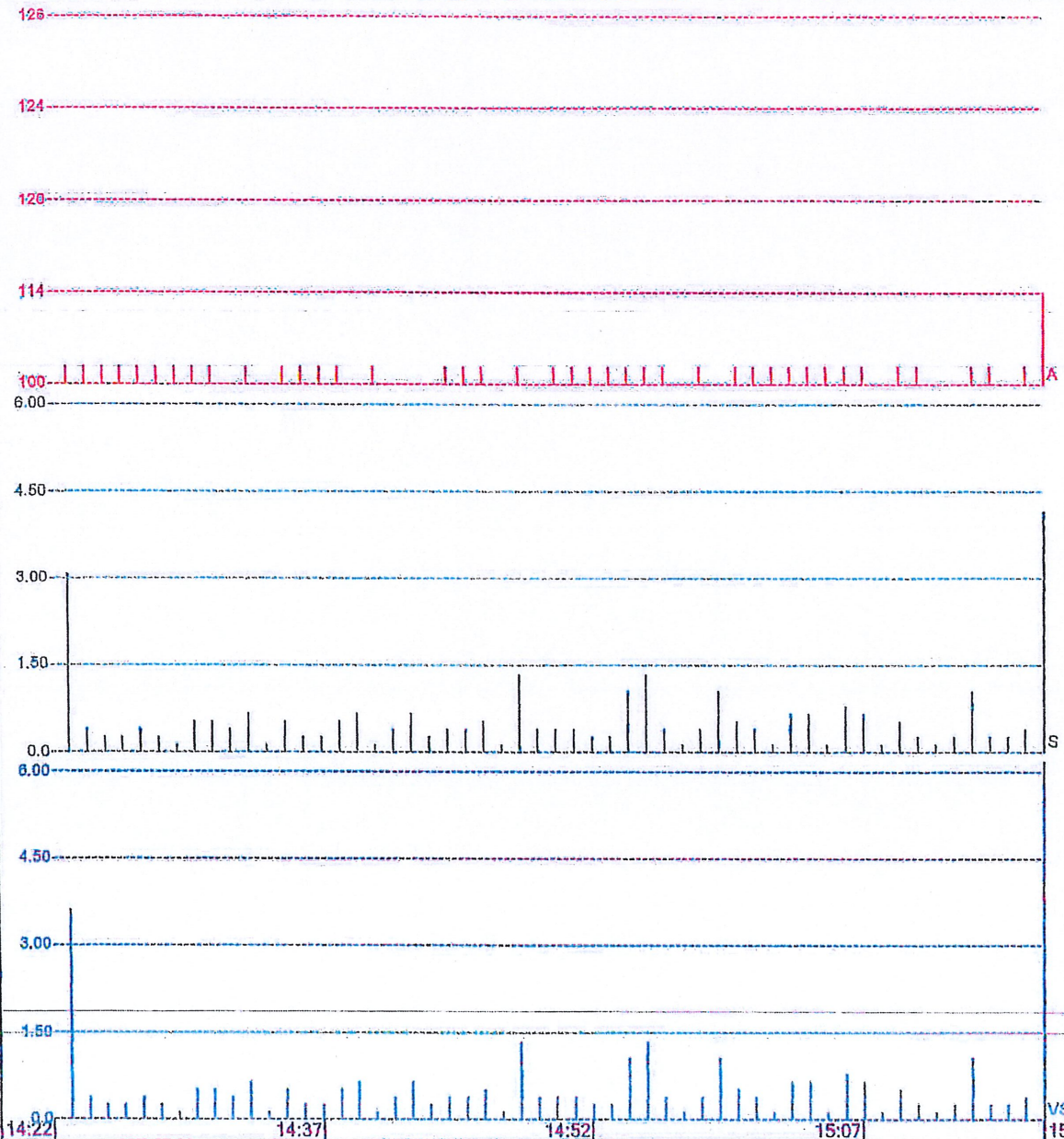


Client: Hexatrend Quarry Sdn. Bhd.
Monitored By: Muhamad Fizrie
Monitoring Consultants: KenEp Consultancy & Services
Location: Kg. Tebing Tembah

File Name: 5222201807051422002.bar
Number: 002
Range: 05/7/2018 2:22:00 PM-05/7/2018 3:17:00 PM
Acoustic: 114 dBL (05/7/2018 3:17:00 PM)
Seismic: 1.35 mm/sec (05/7/2018 3:17:00 PM)
Vector Sum: 0.98 mm/sec (05/7/2018 3:17:00 PM)
Serial Number: 5222
Seismic Range: 63.5 in/s
Acoustic Range: 142 dBL
Sample Interval: 1 Minute
Samples: 55
Gain: 2.0x
Voltage Range: 6.6-6.5

Amplitudes
Acoustic: 114dBL (05/7/2018 3:17:00 PM)
Seismic: 1.35 mm/sec (05/7/2018 3:17:00 PM)
Vector Sum: 0.98 mm/sec (05/7/2018 3:17:00 PM)

Graph Information
Data Range: 05/7/2018 2:22:00 PM-05/7/2018 3:17:00 PM)
Sample: 55
Acoustic Scale: 126 dBL
Seismic Scale: 6.00 mm/sec (1.500 mm/sec/div)
Time Intervals: 15 Minutes
Show Peak Every: 1 Sample

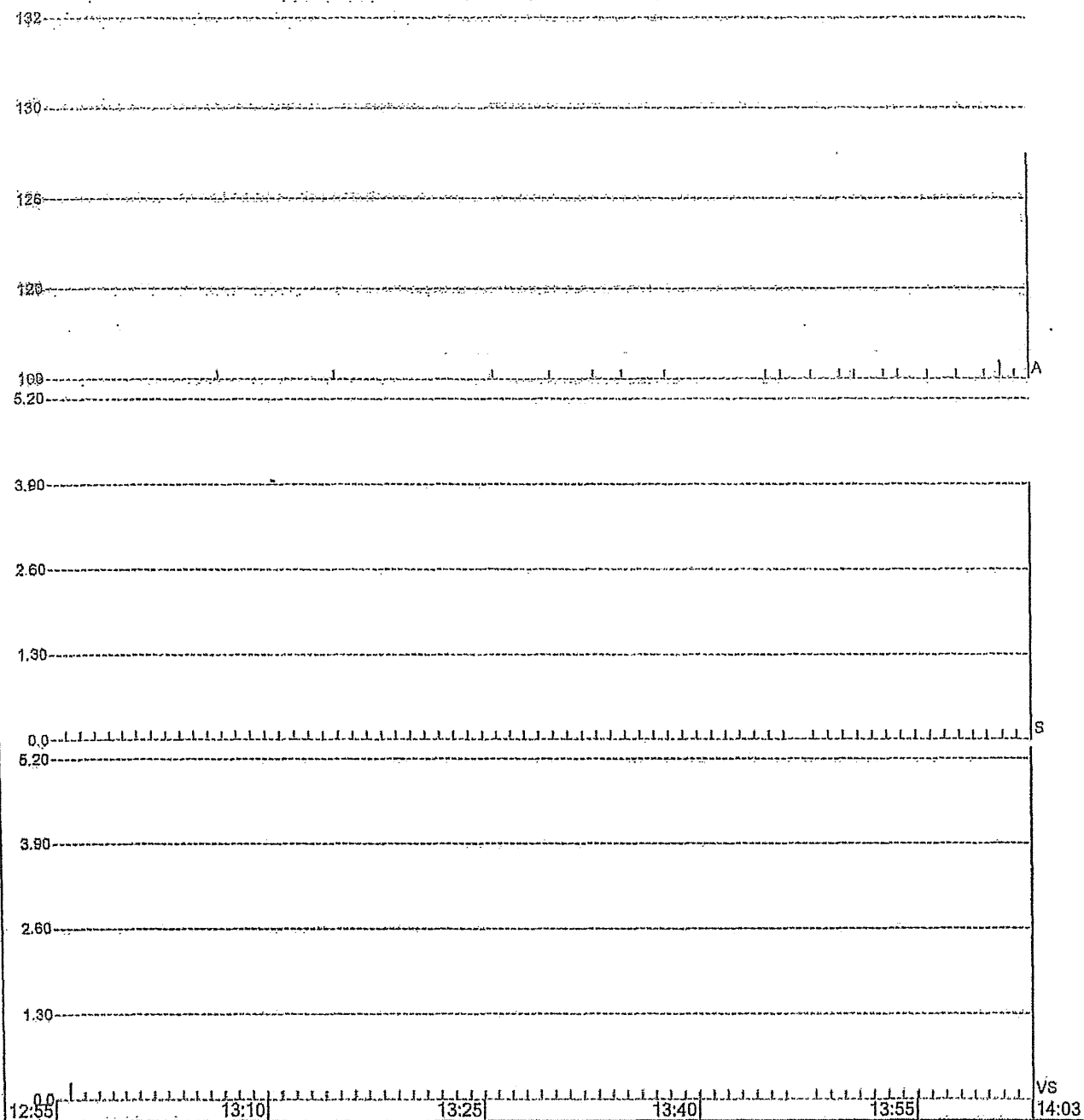


Client: Hexatrend Quarry Sdn. Bhd.
Monitored By: Muhamad Fizrie
Monitoring Consultants: KenEp Consultancy & Services
Location: Kg. Kongs

File Name: 522201807051255003.bar
Number: 003
Range: 05/7/2018 12:55 PM-05/7/2018 2:03:00 PM
Acoustic: 128 dBL (05/7/2018 2:03:00 PM)
Seismic: 3.68 mm/sec (05/7/2018 2:03:00 PM)
Vector Sum: 5.08 mm/sec (05/7/2018 2:03:00 PM)
Serial Number: 5222
Seismic Range: 63.5 in/s
Acoustic Range: 142 dBL
Sample Interval: 1 Minute
Samples: 68
Gain: 2.0x
Voltage Range: 6.6-6.5

Amplitudes
Acoustic: 128dBL (05/7/2018 2:03:00 PM)
Seismic: 0.68 mm/sec (05/7/2018 2:03:00 PM)
Vector Sum: 2.08 mm/sec (05/7/2018 2:03:00 PM)

Graph Information
Data Range: 05/7/2018 12:55:00 PM-05/7/2018 2:03:00 PM)
Sample: 68
Acoustic Scale: 132 dBL
Seismic Scale: 5.20 mm/sec (1.300 mm/sec/div)
Time Intervals: 15 Minutes
Show Peak Every: 1 Sample



Appendix 6-3

**DOE MARINE
WATER QUALITY
STANDARD (MWQS)**

Marine Water Quality Criteria and Standards

Parameter	Class A	Class B	Class C	Class E
Uses	Preservation, Marine Protected Areas, Marine Parks	Marine Life, Fisheries, Coral Reefs, Recreational and Mariculture	Ports, Oil & Gas Fields	Mangrove Estuarine & River-mouth Water
Temperature (°C)	≤2 °C increase over maximum ambient	≤2 °C increase over maximum ambient	≤2 °C increase over maximum ambient	≤2 °C increase over maximum ambient
Dissolved oxygen (mg/L)	> 80%saturation	5	3	5
Total Suspended Solid (mg/L)	25 mg/L or ≤10 % increase in seasonal average, whichever is lower	50 mg/L or ≤10 % increase in seasonal average, whichever is lower	100 mg/L or ≤10 % increase in seasonal average, whichever is lower	100 mg/L or ≤30 % increase in seasonal average, whichever is lower
Oil and grease(mg/L)	0.01	0.14	5	0.14
Mercury* (µg/L)	0.04	0.16(0.04)	50	0.5
Cadmium (µg/L)	0.5	2(3)	10	2
Chromium (µg/L)	5	10	48	10
Copper (VI) (µg/L)	1.3	2.9	10	2.9
Arsenic (III)* (µg/L)	3	20(3)	50	20(3)
Lead (µg/L)	4.4	8.5	50	8.5
Zinc (µg/L)	15	50	100	50
Cynade (µg/L)	2	7	20	7
Ammonia(unionized) (µg/L)	35	70	320	70
Nitrite (µg/L)	10	55	1,000	55
Nitrate (µg/L)	10	60	1,000	60
Phosphate (µg/L)	5	75	670	75

Marine Water Quality Criteria and Standards (Con't)

Parameter	Class A	Class B	Class C	Class E
Phenol (µg/L)	1	10	100	10
Tributyltin (TBT) (µg/L)	0.001	0.01	0.05	0.01
Faecal coliform (Human health protection for seafood consumption) – most Probable Number (MPN)	70 faecal coliform 100mL-1	100 faecal coliform 100mL-1 & (70 faecal coliform 100mL-1)	200 faecal coliform 100mL-1	100 faecal coliform 100mL-1 & (70 faecal coliform 100mL-1)
Polycyclic Aromatic Hydrocarbon (PAHs) ng/g	100	200	1,000	1,000

Note: *MWQCS in parentheses are for coastal and marine water areas where seafood for human consumption is applicable.

Source: EQR 2006

Appendix 6-4

**MALAYSIAN
AMBIENT AIR
QUALITY
GUIDELINE, 2013**

AMBIENT AIR MONITORING GUIDELINE

New Malaysian Ambient Air Quality Standards, 2013

Particulate matter with size less than 10 micron (PM₁₀)

Average Time	Unit	Existing Guideline	IT-1 (Interim target 1) by 2015	IT-2 (Interim target 2) by 2018	Standard (2020)
1 Year	µg/m ³	50	50	45	40
24 Hours	µg/m ³	150	150	120	100

Particulate matter with size less than 2.5 micron (PM_{2.5})

Average Time	Unit	Existing Guideline	IT-1 (Interim target 1) by 2015	IT-2 (Interim target 2) by 2018	Standard (2020)
1 Year	µg/m ³	-	35	25	15
24 Hours	µg/m ³	-	75	50	35

Sulphur Dioxide (SO₂)

Average Time	Unit	Existing Guideline	IT-1 (Interim target 1) by 2015	IT-2 (Interim target 2) by 2018	Standard (2020)
1 Hour	µg/m ³	350	350	300	250
24 Hours	µg/m ³	105	105	90	80

Carbon Monoxide (CO)

Average Time	Unit	Existing Guideline	IT-1 (Interim target 1) by 2015	IT-2 (Interim target 2) by 2018	Standard (2020)
1 Hour	mg/m ³	35	35	35	30
8 Hours	mg/m ³	10	10	10	10

Nitrogen Dioxide (NO₂)

Average Time	Unit	Existing Guideline	IT-1 (Interim target 1) by 2015	IT-2 (Interim target 2) by 2018	Standard (2020)
1 Hour	µg/m ³	320	320	300	280
24 Hours	µg/m ³	75	75	75	70

Ground Level Ozone (O₃)

Average Time	Unit	Existing Guideline	IT-1 (Interim target 1) by 2015	IT-2 (Interim target 2) by 2018	Standard (2020)
1 Hour	µg/m ³	200	200	200	180
8 Hours	µg/m ³	120	120	120	100

Appendix 6-5

**GUIDELINES FOR
ENVIRONMENTAL
NOISE LIMIT AND
CONTROL, THIRD
EDITION, 2019**

Schedule of Permissible Sound Levels

First Schedule Recommended Permissible Sound Level (L_{AEQ}) By Receiving Land Use for New Development

Receiving Land Use Category	Daytime 7.00 am – 10.00 pm	Night-time 10.00 pm – 7.00 am
Low Density Residential, Noise sensitive Receptors, Institutional (School, Hospital, Worship)	55 dB(A)	50 dB(A)
Suburban Residential (Medium Density), Recreational	60 dB(A)	55 dB(A)
Urban Residential (High Density), Mixed Development	65 dB(A)	60 dB(A)
Commercial Business Zones	65 dB(A)	60 dB(A)
Industrial Zones	70 dB(A)	65 dB(A)

(Source: Guidelines for Environmental Noise Limit and Control, Third Edition, 2019)

Appendix 6-6

**SOCIAL ECONOMIC
STUDY**

SOCIO-ECONOMIC REPORT



CERTIFIED TO ISO 9001: 2015
CERT. NO.: QMS 03181



CERTIFIED TO ISO 9001: 2015
CERT. NO.: QMS 03181



CERTIFIED TO ISO 9001: 2015
CERT. NO.: QMS 03181



***Proposed Granite Quarry Operation On PT 23066 And PT 23741
With An Area Of 13.4862 Hectare (33.325 Acre)
In Mukim Kuala Paka,
District Of Dungun,
Terengganu Darul Iman***

Prepared By:
KenEp Consultancy & Services
(Company number: IP 0436751-T)

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30020 Ipoh,
Perak Darul Ridzuan.

Tel: 05-525 0336
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Email: kcs@kenep.com.my
Ref: KCS/HQ/472-EIA-0119-2505-R1

Project Proponent:
Hexatrend Quarry Sdn. Bhd.
(Company number: 1178486-T)

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SOCIAL IMPACT ASSESSMENT

1.1 INTRODUCTION

This socio-economic study was conducted in order to develop a baseline characterization of the human environment within the project's zone of influence, which is an area circumscribed by the radius of 0.5 m and 5 km from the proposed project site (see **Figure 1-1(a)** and **Figure 1-1(b)**). The aspects to be assessed include the manner in which people go about their life from the perspectives of economics, social system and cultural values. For this purpose, a list of criteria has been developed to ensure that the necessary social parameters are documented in the study such as the demographic and population effects, housing and economic status and public utilities.

The main objectives of this Socio-Economic Assessment can be summarized as follow:

- To study the existing socio-economic environment of the inhabitants living within the project's zone of influence (see **Figure 1-1(a)** and **Figure 1-1(b)**),
- To assess the perceptions and opinion of the inhabitants living within the said zone on the potential impacts of the project development before, during and after its operation on the socio-economic environment of the affected region,
- To make the assessments of the impacts on the inhabitants and socio-economic environment as a result of the operation of the proposed project, and
- To suggest the mitigating measures that could be adopted to minimize the negative impacts during and after the completion of the proposed project.

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MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU DARUL IMAN
SCALE 1: 8,000

LEGEND

	PROPOSED PROJECT AREA
	EXISTING ACCESS ROAD
	EXISTING MAIN ROAD

No.	Location
①	Hardy Builder Sdn Bhd
②	Kampung Tebing Tembah
③	Paka Kuari Sdn Bhd

PROJECT PROPONENT
HEXATREND QUARRY SDN. BHD.

DRAWING TITLE
Figure 1(a)
500M RADIUS PLAN OF THE PROPOSED
PROJECT AREA

Compiled by	PW Lin
Drawn by	PW Lin
Checked by	Ooi
Approved by	YK Wong
Report Ref.	KCS/HQ/472-EIA-0119-2505-R1
Date	20 November 2020
Scale	1 : 8,000
Paper Size	A3

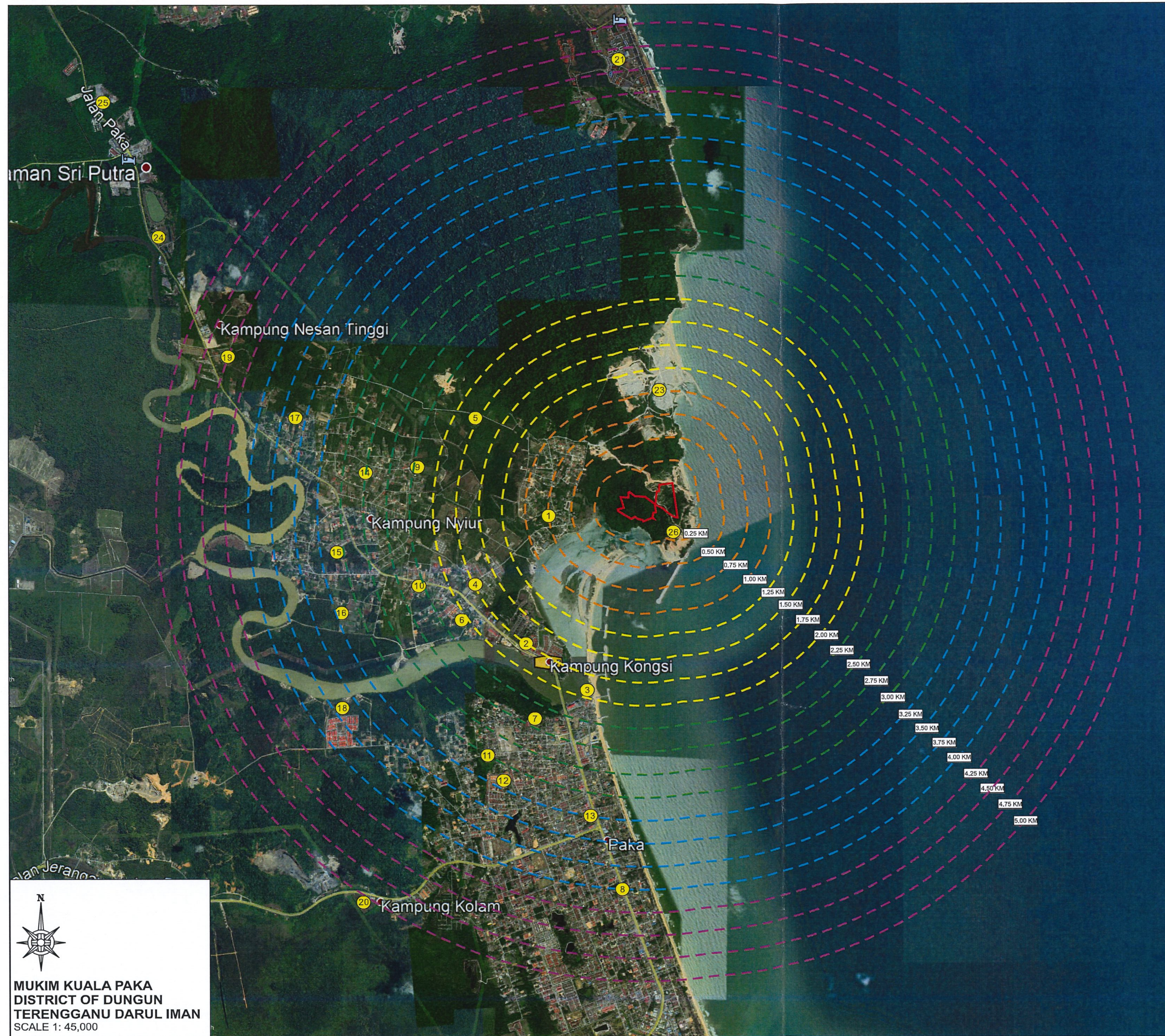
PREPARED BY



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LEGEND

PROPOSED PROJECT AREA

No.	Location
1	Kampung Tebing Tembah
2	Kampung Kongsil
3	Kampung Pantai
4	Kampung Baharu
5	Kampung Nik
6	Kampung Cerung Melintang
7	Kampung Limbung
8	Kampung Baharu
9	Kampung Baharu Darat Kubur
10	Kampung Gong Samak
11	Kampung Lot Tanah
12	Kampung Gong Gemia
13	Kampung Cacar
14	Kampung Nyiur
15	Kampung Gong Paku
16	Kampung Pinang Merah
17	Kampung Gong Gemuruh
18	Kampung Beril
19	Kampung Nesan Tinggi
20	Kampung Kolam
21	Institut Teknologi Mara
22	Kampung Dusun Besar
23	Hardy Builder Sdn. Bhd.
24	Loji Air Bukit Bauk (Jabatan Bekalan Air Dungun)
25	ECRL Terowong Dungun
26	Paka Kuari Sdn Bhd

PROJECT PROPONENT

HEXATREND QUARRY SDN. BHD.

DRAWING TITLE

Figure 1(b)
5 KM RADIUS GOOGLE PLAN OF THE
PROPOSED PROJECT AREA

Compiled by	PW Lin
Drawn by	PW Lin
Checked by	Ooi
Approved by	YK Wong
Report Ref.	KCS/HQ/472-EIA-0119-2505-R1
Date	20 November 2020
Scale	1 : 45,000
Paper Size	A3

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MUKIM KUALA PAKA
DISTRICT OF DUNGUN
TERENGGANU DARUL IMAN
SCALE 1: 45,000

1.2 SCOPE OF STUDY

This study will encompass various aspects of the socio-economic environment of the affected region, covering both the local residence and non-residence. It includes the present and projected population; existing and proposed land use; planned development activities; housing needs and supplies; community structure; economic base/employment; distribution of income; goods and services; utilities; recreation; public health and safety; cultural peculiarities, aspirations and attitudes will be explored.

An assessment of public perception of the proposed development will also be conducted. This assessment may vary with community structure and may take multiple forms such as meeting or sample survey as deemed most appropriate. An assessment will be done on the socio-economic activities of the community and the people's perception of the project development.

1.3 PROJECT SITE

The proposed Project area is located within forestry area. The proposed quarry site is covered hilly area with elevations ranging from 5 m above Mean Sea Level (MSL) to the highest of 100 m. No resident located within 500m radius. The nearest receptors are Kampung Tebing Tembah which situated about 750m western. Meanwhile, Kampung Baharu and Kampung Kongsu which are situated about 1.75km southwest from the proposed Project site respectively. The existing quarries located adjacent to the proposed project area which are Paka Kuari Sdn. Bhd. and about 1.0km northern from the proposed project area which is Hardy Builder Sdn. Bhd.. The quarries are currently operating.

1.4 EXISTING SOCIO-ECONOMICS

This section provides a brief summary on the existing socio-economic background of the District of Dungun where the project site is located whilst focusing on areas surrounding the proposed project site.

District of Dungun consists of eleven (11) mukims. The project site is located at the one of the mukim, which is Mukim Kuala Paka. The settlements found nearby the proposed Project site which are Kampung Tebing Tembah and Kampung Baharu which situated about 750m western and 1.75km southwest from the proposed Project site respectively. Only these two villages were located along the transportation route of the lorry to deliver the products from the quarry site. A social economic study has been carried out on 26th November until 27th November 2020 with the local community of these two settlements. The settlements where located within 5 km radius of the project site are summarized in **Table 1-1**.

Table 1-1: Settlements within 5km Radius of the Project Site

Settlement	Distance from Project Site (km)
Kampung Tebing Tembah	0.75km
Kampung Baharu	1.75km

According to *Rancangan Tempatan Daerah Dungun 2035*, a total population of 180,530 was recorded at District of Dungun in 2020. It is estimated to have a population of 264,490 in the year of 2035. Main occupation of the population in these residences are village work, though there are some housewives, small industries, and government offices.

1.5 METHODOLOGY

The survey works were conducted in the month of 26th November until 27th November 2020 targeting the local community. The local communities were those inhabitants who live at the areas along the transportation route of the lorry to deliver the products from the quarry site.

DATA SOURCES

Both the primary and secondary data were utilised in the assessment of the socio-economic environment of the affected region.

Primary Data

Various methods were applied for the collection of primary data. These methods included random sampling method, survey method, questionnaire method, observation method and interview method.

Primary data was collected via a sample survey to be conducted on the inhabitants of the affected region using the face-to-face interviewing technique. Where possible the respondents were identified according to where they live so as to ensure that as many villages as possible are covered in the study. The interviews were normally done at the place of residence of the respondents. Both, the quantitative and qualitative data were collected. To achieve this objective a specially constructed questionnaire, which followed the basic statistical guidelines, will be used. The photos taken during social survey were enclosed in **Appendix 1**.

Secondary Data

Meanwhile, secondary data were collected mainly as a result of meeting with the representatives. Data collected encompass the socio-economic aspects of the said mukim where the project site is located.

SAMPLE SIZE

The determination of sample size was made purposively whilst taking into consideration various factors such the objective of the study, time frame for the fieldwork and the cost involved etc. Hence, during the survey a total of 63 inhabitants of the affected region were interviewed and that the figure is more than sufficient to provide the necessary information to meet the objective of the study.

Table 1-2 shows the distribution of the respondents by villages. **Figure 1-2** shows the pie chart of distribution of sample by villages.

Table 1-2: Distribution of Sample by Villages

Villages	Sample Size
Kampung Tebing Tembah	39
Kampung Baharu	24
Total	63

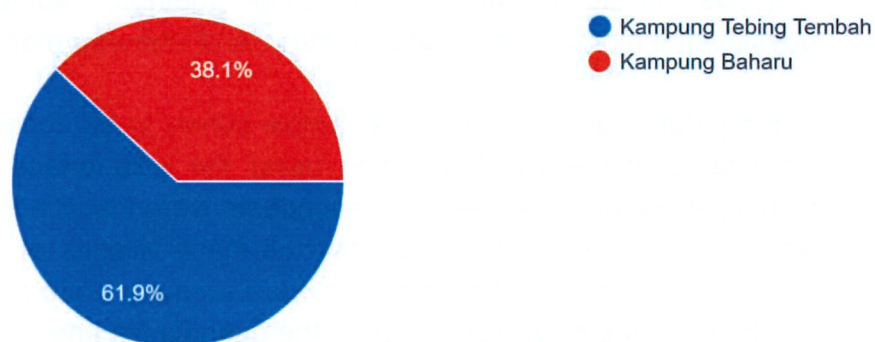


Figure 1-2: Distribution of Sample by Villages

DATA ANALYSIS

Data analysis of the survey is attached in **Appendix 2**. The copy CD of the respondent's response to survey in soft copy is attached in **Appendix 3**. The assessment covers the potential impact on the social, demographic, economic and cultural aspects of the community.

1.6 RESULT ANALYSIS

This section presents the results of local community's demography and socio-economy who inhabit in areas along the transportation route of the lorry to deliver the products from the quarry site which including Kampung Tebing Tembah and Kampung Baharu. It is very useful for understanding social and economic problems and identifying potential solutions.

1.6.1 SOCIAL ASPECTS

Ethnicity, Gender and Marital Status

The ethnic groups covered were the Malays who accounted for of the respondents. Of the total of 63 respondents interviewed 33 were male and 30 were female; 52 were married, 6 were single and 5 were widower.

Age Structure

Overall, the age distribution of the respondents varies between 21 and 70 years and the mean age was 25 years. **Figure 1-3** shows the graph of age distribution of the respondents. This distribution reflects well on the information gathered indicating that the age group belongs to a wide range of the affected inhabitants.

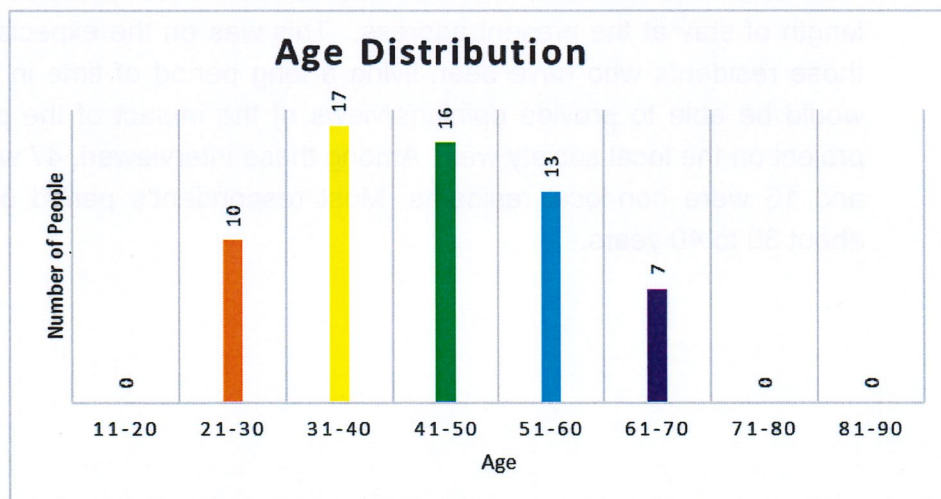


Figure 1-3: Graph of Age Distribution of the Respondents

Family Size

The family sizes ranged from 1 to 11 persons per household with the majority of the households have 5 members. Mean per household is 5 members. **Table 1-3** shows the family size living near the project site.

Table 1-3: Family Size of the Respondents

Family Size	No. of Respondents
1	1
2	3
3	10
4	14
5	16
6	9
7	5
8	2
9	2
10	1
Total	63

Length of Stay in the Area

To determine the level of reliability of the information obtained, in particular with regard to the representativeness of the opinions and perceptions of those who will be directly or indirectly affected by the operation of the proposed project, the respondents were asked to state their status as resident, whether local or non-local residents and the length of stay at the present address. This was on the expectation that those residents who have been living a long period of time in the area would be able to provide opinions/views of the impact of the proposed project on the local society well. Among those interviewed, 47 were local and 16 were non-local residents. Most respondent's period of stay is about 30 to 40 years.

Education Level Attained

When interpreting the data on educational background of the respondents, we need to be aware that the affected region is mainly urban in character. Hence, there will be some population with higher education, although large majority population is who do not have the higher university education. Even if there are, they would have moved to other parts of the country looking for better jobs. For this reason, the bulk of those interviewed had SPM/SPMV/MCE. (Table 1-4).

Table 1-4: Levels of Education Achieved

Educational Levels	No. Respondents
Uneducated	1
PMR and below	15
SPM/SPMV/MCE	40
College/university	7
Unspecified	-
Total	63

Health Profile

In this study information pertaining to hygiene and health profile of the respondents was also collected. These include information pertaining to the number of smokers, the types of diseases commonly afflicting the residents of the villages over the past one-year period, availability of electric supply and the source of water supply.

Both the piped water and electricity are available in all households. 48 of those interviewed admitted that they do not smoke. Two types of non-vector-borne diseases most prevalent are high blood pressure suffered by 9 of the respondents followed by diabetics 7 of the respondents.

1.6.2 ECONOMIC ASPECT

Occupation

The occupational groups of the respondents are varied, the largest number being those who work in housewives. This is followed by those private. (Table 1-5).

Table 1-5: Occupational Groups by Sectors

Sectors	No. of Respondents
Government	3
Private	22
Own business	12
Unemployed/retired	1
Housewives	18
Village work	3
Others – Fisherman	4
Total	63

Types of Dwelling and Ownership

The types and ownership of dwellings the respondents live in are expected to reflect their socio-economic status within the community. 93.7% of the respondents self-owned the house and 6.3% of the respondents rent the house.

Property Ownership

Table 1-6 shows the various types of amenities owned by the individual households and these ownerships reflect the generally high standard of living enjoyed by the inhabitants of the impacted areas.

Table 1-6: Amenities Available by the Households

Amenities	No. of Households
Car	59
Motorcycle	62
Fixed/mobile phone	62
ASTRO	54
Microwave oven	17
Computer	8
Washing machine	63
Refrigerator	62
Kitchen	63
Dining table	63
Others	-

1.6.3 PERCEPTIONS TOWARDS PROPOSED HYDROPOWER PLANT OPERATION

Distance of House from The Project Site

In order to ensure that those opinions and perceptions come from the actual concern of the respondents, they were also asked to state the distance of their place of residence and the project site. Data collected show that all locations are varies from 0.6 km to 2.0 km from the project site based on the distance of their villages (**Table 1-7**).

Table 1-7: Distance of Villages from the Project Site

Distance (km)	Sample Size
0.6 – 1.0	39
1.6 – 2.0	24
Total	63

Project Awareness

One of the questions asked during the interview concerned the project awareness and the year the respondents knew about the project implementation. With the total of 63 people interviewed, all of them respondents do not aware of this project.

Respond Towards Project

There were 42 of the respondents 'Agreeable' with the proposed project implementation while the remaining respondents were 'not agreeable' (See **Table 1-8**).

Table 1-8: Attitude towards Project

Attitude towards Project	Frequency
Strongly agreeable	0
Agreeable	42
Not agreeable	19
Strongly not agreeable	2
Total	63

Among those who agreed, main reason given was the fact that the project when completed will be able to '*Increase local economic growth*' (See **Table 1-9**).

Table 1-9: Reasons for Agreeing

Reasons for Agreeing	No. of Respondents
Increase in job opportunities	31
Increase property	3
Create business opportunities	5
Change into more comfortable lifestyle	0
Increase local economic growth	40
Increase income level	2
Others	0

On the other hand, 21 from 63 of those who disagreed stated traffic jam, air and noise pollution as the main reason not to agree with the project (See **Table 1-10**).

Table 1-10: Reasons for Disagreeing

Impacts	No. of Respondents
Traffic jam	18
Noise pollution	16
Air pollution	18
Increase of cost of living	1
Pose a social problem	0
Others	1

1.7 SOCIO-ECONOMIC IMPACT

In determining the significance of the impacts of the project on the human environment, one of the important variables used is the community's attitude and perception towards the proposed project. This is because the type of attitude and perception formed among the communities would influence the shape of the position that they will take when the project is implemented, whether during the period under or after construction.

1.7.1 THE METHODOLOGY USED

The methodology to assess the impacts of the project on the community, not captured in the survey sampling process was through meetings and discussions with relevant individual and personal observations by the researcher on the existing conditions and human environment of the region of influence.

This section thus summarizes the results obtained from the said efforts which include information pertaining to the public awareness, perception and the opinions regarding the potential impacts the project will have on the affected population.

Perceived Positive Impacts

Generally, the people met during the investigation were very much in support for the proposed project (see **Table 1-9** and **1-10**). They believe this the project will generate economic growth to the area.

Perceived Negative Impacts

Despite the fact that the project is very important to them they were some respondents also wary about the negative impacts that may be brought along during its operation such as:

- health and safety problem,
- air pollution such as dust and particles,
- noise pollution, and

- water pollution and so forth.
- Traffic jam

1.7.2 PROGNOSIS OF POTENTIAL IMPACTS AND CHANGE

The ultimate impact of a project development, directly or indirectly, on the environment is reflected in the potential change on the socio-economic factors that can be identified within the region of influence being assessed. A list of factors and the prediction of their potential changes that may result subsequent to the implementation of the proposed project are summarized below. The basis of the prediction on the potential change was the information collected during the conduct of on-site investigation and as reported in the earlier sections of this report.

Demographic Impacts

Whether inward or outward migrations of the local inhabitants are concerned, the possibility of it occurring is fairly negligible. Hence, the demographic pattern of the local population is not expected to change.

Social System and Organization

On immediate or short-term basis the community may not expect to experience any new change in their feelings toward stability or identity. There is also no likelihood of change in community attitudes and lifestyles since there is little possibility of change in demographic pattern of the population.

Economic Impacts

There will be some economic impacts assuming that the proposed project may be able to contribute towards the increase in the collection of taxes for the benefits of the district and hence the local population.

Retail Market Impacts

The net effect of the migration is not expected to significantly affect the retail market since the economic impact on the population may not be significant enough to change the existing socio-economic environment of the population and income pattern.

Distinct Settlement

On immediate or short-term basis it is not expected to create dislocation of the locals as no acquisition of lands will be made since the site of the proposed project is situated on hilly terrain.

Health and Securities

Currently, the available public health and security services are sufficient to meet the demand of the local community. However, the demand in the future would most probably increase, in levels and types, in tandem with the increase in immigration level, population size and economic development. **Table 1-11** below summarizes the predicted change, whether increase, decrease or no change to the factors highlighted above.

Table 1-11: The Summary of the Prediction of Change in the Environment

Socio-economic Factors	Impacts of Project Implementation
Demographic change	No change
Social System and Organization	No change
Economic impacts	Possibly change
Retail market impacts	Possibly some
Distinct settlement	No change
Public health and securities	Possible change

1.8 SOCIAL IMPACTS

This section presents the potential social impacts to the inhabitants of the affected region. The summary given encompasses impact on the local community.

The contractor should be required to prepare and confirm to environmental protection guidelines which identify procedures to minimise ecological, water quality, and other environmental impacts within the standard prescribed by "Environmental Act 1965". The guidelines need to be incorporated into the construction plans and development be carried out according to specification.

During Operation Period

Direct adverse impact on the local people can be alleviated if sufficient mitigation measures are taken. These include:

1. Prevent and minimize any water pollution to their water source,
2. Give job priority at the project site to the local people,
3. Provide suitable accommodations for the migrant workforce where their daily needs and other facilities can be made available at the workers campsites which are located away from the local population,
4. Consider ways and means to reduce chances of accidents at road, for example by putting a signboard at the road junction of the project site, and
5. Conduct public relation exercise to inform and to educate by detailing out the work schedule to the local people.
6. Traffic controls such as speed limits and traffic volume restrictions to reduce dust churned up by vehicles. The recommended speed is not exceeding 30 km/h along the existing access road.
7. Implementation of Corporate Social Responsibilities (CSR) Practices toward the local community.

After Completion

1. Where the surrounding areas of the project site have been destroyed, the project developer needs to undertake programs to rehabilitate such areas.

Project Abandonment

The project development needs to take actions to ensure that any incomplete structure be remove or made safe for the local people such as:

1. All unused building materials should be cleared so as to mar the existing areas and also to prevent from becoming breeding grounds for mosquitoes and rodents and hence preventing the vector-borne diseases from occurring,
2. Foreign and out of state workers whose work have since completed, either need to be resettled elsewhere or be given proper employment at the project site or be taken away so that they do not become nuisance to the local residents.

1.10 CONCLUSION

Considering that the project is to be carried out, therefore, it can be safely said that there is a remote chance that the impact on the local population will be severe enough so as to feel unsafe. However, and more importantly, if certain suggested measures are undertaken in line with the sensitivity of the local people, then the negative impacts can at least be mitigated so as to absorb any hostile feeling and animosity of the public towards the project implementation.

Soalan 5: Tahap Pendidikan Tertinggi Dicapai

No.	Tahap Pendidikan Tertinggi Dicapai	Bilangan Responden
1.	Tidak Bersekolah	1
2.	PMR dan ke bawah	15
3.	SPM/SPMV/MCE	40
4.	Kolej/university	7
5.	Lain-lain	0
Jumlah		63

Soalan 6: Sektor Perkerjaan

No.	Sektor Perkerjaan	Bilangan Responden
1.	Kerajaan	3
2.	Syarikat Swasta	22
3.	Berniaga	12
4.	Tiada perkerjaan / Bersara	1
5.	Suri Rumah	18
6.	Kerja Kampung	3
7.	Lain-lain (Nelayan)	4
Jumlah		63

Soalan 7. Asal usul Responden

No.	Asal usul Responden	Bilangan Responden
1.	Orang tempatan	47
2.	Bukan Orang Tempatan	16
3.	Lain-lain	0
Jumlah		63

Soalan 8. Berapa lamakah anda telah menetap di sini?

No.	Tahun	Bilangan Responden
1.	1-10	4
2.	11-20	6
3.	21-30	15
4.	31-40	12
5.	41-50	11
6.	51-60	8
7.	61-70	7
Jumlah		63

Soalan 9. Nyatakan jenis tempat kediaman/rumah anda

No.	Jenis Tempat Kediaman/Rumah	Bilangan Responden
1.	Rumah kampung	58
2.	Separa kayu separa batu	0
3.	Teres satu tingkat	1
4.	Teres dua tingkat	0
5.	Banglo/ Semi-D	1
6.	Rumah kedai	0
7.	Lain-lain	3
Jumlah		63

Soalan 10. Taraf pemilikan tempat kediaman/ rumah anda:

No.	Taraf Pemilikan Tempat Kediaman/ Rumah	Bilangan Responden
1.	Kepunyaan Sendiri	59
2.	Sewa Nilai sewaan sebulan	4
3.	Lain-lain	0
Jumlah		63

Soalan 12: Nyatakan jumlah ahli keluarga anda (termasuk anda)

No.	No. ahli keluarga	Bilangan Responden
1.	1	1
2.	2	3
3.	3	10
4.	4	14
5.	5	16
6.	6	9
7.	7	5
8.	8	2
9.	9	2
10.	10	1
Jumlah		63

Soalan 13: Nyatakan tahap kepuasan anda terhadap kemudahan social di kawasan ini.

No.	Kemudahan Sosial	Sangat Puas Hati	Puas Hati	Tidak Puas Hati	Sangat Tidak Puas Hati	Tiada Komen	Jumlah
1.	Kesihatan	14	47	2	0	0	63
2.	Keselamatan (Polis)	0	59	4	0	0	63
3.	Pengangkutan jalan	0	0	9	51	3	63
4.	Pusat membeli-belah	1	59	1	0	2	63
5.	Sistem pemungutan sampah	0	1	0	1	61	63
6.	Persekolahan/ pendidikan	15	48	0	0	0	63
7.	Rekreasi	1	5	49	6	2	63

Soalan 14: Apakah yang anda rasa penting untuk kualiti hidup? *(Nombor mengikut yang terpenting dahulu, beri kod 1, diikuti dengan kedua penting, beri kod 2 dan seterusnya)*

No.	Impak	1	2	3	4	5	Jumlah
1.	Air dan udara bersih	54	7	2	0	0	63
2.	Pekerjaan yang baik	6	5	44	8	0	63
3.	Seni dan tradisi	0	0	0	6	57	63
4.	Keselamatan dan kesejahteraan	2	44	14	3	0	63
5.	Hubungan baik antara jiran	0	8	3	46	6	63

Soalan 15: Adakah rumah anda dilengkapi dengan alatan berikut? *(boleh pilih lebih daripada satu)*

No.	Jenis Alatan	Bilangan Responden
1.	Kereta	59
2.	Motosikal	62
3.	Telefon rumah/ bimbit	62
4.	ASTRO	54
5.	Oven (Ketuhar)	17
6.	Komputer	8
7.	Mesin basuh	63
8.	Peti sejuk	62
9.	Dapur gas	63
10.	Meja makan	63
11.	Lain-lain	0

BAHAGIAN B: PROFIL KESIHATAN

Soalan 16: Adakah anda merokok?

Merokok	Bilangan Responden
Ya	48
Tidak	15

Soalan 17: Apakah sumber utama bekalan air minum anda?

Sumber Bekalan Air	Bilangan Responden
Hujan	0
Perigi terbuka	0
Perigi pam terbuka	0
Paip air sendiri	63
Paip umum JBA	0
Sungai	0
Lain-lain	0
Sungai dan lain-lain	0
Jumlah	63

Soalan 18: Nyatakan jenis tandas yang digunakan di tempat kediaman/ rumah anda.

Jenis Tandas	Bilangan Responden
Lubang	0
Tandas angkut	0
Tandas curah	19
Tandas Tarik	44
Menggunakan parit/sungai sebagai tandas	0
Jumlah	63

Soalan 19: Adakah rumah anda dibekalkan dengan bekalan elektrik?

Belakan Elektrik	Bilangan Responden
Ya	63
Tidak	0

Soalan 20: Dalam tempoh satu (1) tahun yang lepas, adakah anda atau mana-mana ahli keluarga anda telah dikenalpasti oleh doctor sebagai pengidap penyakit berikut?

No.	Jenis Penyakit	Bilangan Responden
1.	Lelah	3
2.	Bronkitis kronik	0
3.	Radang paru-paru	0
4.	Batuk kering	0
5.	Barah paru-paru	0
6.	Penyakit pernafasan lain	0
7.	Darah tinggi	9
8.	Angin ahmar	0
9.	Lemah jantung	3
10.	Kencing manis	7
11.	Denggi	0
12.	Demam kepialu	0
13.	Malaria	0
14.	Lain-lain	3

BAHAGIAN C: KUNJUNGI KE BUKIT TAPAK PROJEK

Soalan 21: dalam sebulan berapa kerap anda ke Bukit Tapak Projek?

No.	Kerapan	Bilangan Responden
1.	0	0
2.	1	0
3.	2	0
4.	3	0
5.	4	0
6.	5	0
7.	Lebih daripada 5 kali	0
Jumlah		0

Soalan 22: Apakah tujuan anda ke sana?

No.	Tujuan	Bilangan Responden
1.	Bekerja	0
2.	Menghabiskan masa lapang	0
3.	Bersiar-siar/ ambil angin	0
4.	Berkelah	0
5.	Lain-lain	0
6.	Menghabiskan masa lapang dan lain-lain	0

Soalan 23: Kebiasannya apakah jenis kenderaan yang anda gunakan untuk ke sana?

No.	Jenis Kenderaan	Bilangan Responden
1.	Kereta	0
2.	Motorsikal/ basikal	0
3.	Berjalan kaki	0
4.	Lain-lain	0

Soalan 24: Bilakah waktu anda kerap ke sana?

No.	Waktu	Bilangan Responden
1.	Pagi	0
2.	Petang	0
3.	Tengahari	0
4.	Malam	0

Soalan 25: Pada kebiasaannya, dengan siapa anda ke sana?

No.	Siapa	Bilangan Responden
1.	Seorang diri	0
2.	Bersama kawan/teman	0
3.	Bersama keluarga	0
4.	Lain-lain	0

Soalan 26: Apakah pendapat anda tentang persekitaran bukit tersebut dari segi:

No.	Pendapat	Sangat memuaskan	Memuaskan	Tidak memuaskan	Sangat tidak memuaskan	Tiada komen
1.	Kebersihan	0	0	0	0	0
2.	Jalan	0	0	0	0	0
3.	Kemudahan rekreasi	0	0	0	0	0

BAHAGIAN D: PERSEPSI TERHADAP PROJEK

Soalan 27: Sebelum hari ini adakah anda tahu tentang projek pengkuarian ini?

Tahu Tentang Projek	Bilangan Responden
Ya	0
Tidak	63

Soalan 28: Jika 'Ya' nyatakan tahun anda mengetahuinya

Tahun	Bilangan Responden
2015	0
2016	0
2017	0
2018	0
2019	0

Soalan 29: Apakah sumber maklumat tersebut?

No.	Sumber Maklumat	Bilangan Responden
1.	Pejabat kerajaan	0
2.	Surat khabar/ tv/ radio	0
3.	Kawan/ saudara	0
4.	Risalah	0
5.	Lain-lain	0

Soalan 30: Apakah pendapat anda tentang projek ini?

No.	Pendapat	Bilangan Responden
1.	Sangat setuju	0
2.	Setuju	42
3.	Tidak setuju	19
4.	Sangat tidak setuju	2
Jumlah		63

Soalan 31: Sekiranya jawapan anda pada **soalan 29** adalah '**sangat setuju**' atau '**setuju**', jawab soalan berikut: **Adakah projek ini akan:- (boleh jawab lebih daripada satu)**

No.	Projek akan	Bilangan Responden
1.	Menambah peluang pekerjaan untuk anda	31
2.	Meningkatkan hartanah	3
3.	Memberi peluang perniagaan kepada anda	5
4.	Mengubah cara hidup kepada lebih selesa	0
5.	Meningkatkan pertumbuhan ekonomi tempatan	40
6.	Meningkatkan pendapatan anda	2
7.	Lain-lain	0

Soalan 32: Sekiranya jawapan anda pada **soalan 29** adalah '**sangat tidak setuju**' atau '**tidak setuju**', jawab soalan berikut: **Adakah projek ini akan:-**
(*boleh jawab lebih daripada satu*)

No.	Projek akan	Bilangan Responden
1.	Meningkatkan kesesakan dan kesibukan lalu lintas	18
2.	Menimbulkan masalah pencemaran bunyi (bising)	16
3.	Menimbulkan masalah pencemaran udara (habuk)	18
4.	Meningkatkan kos sara hidup (sewa rumah)	1
5.	Menimbulkan masalah social (jenayah, kecurian, dadah dll)	0
6.	Lain-lain	1

Soalan 33: Nyatakan jarak antara tempat kediaman/ rumah anda dengan tapak projek:

No.	Jarak (km)	Bilangan Responden
1.	≥0.5	0
2.	0.6 – 1.0	39
3.	1.1 – 1.5	0
4.	1.6 – 2.0	34
5.	2.1 – 2.5	0
6.	2.6 – 3.0	0
7.	3.1 – 3.5	0
8.	3.6 – 4.0	0
9.	4.1 – 4.5	0
10.	4.6 – 5.0	0
Jumlah		63

Appendix 3

**QUESTIONNAIRE IN
SOFTCOPY**

Appendix 7-1

**AIR QUALITY
ASSESSMENT**

Proposed Granite Quarry Operation on PT 23066 and PT 23741 with an Area of 13.4862Ha (33.325ac), Mukim Kuala Paka, District of Dungun, Terengganu Darul Iman

AIR QUALITY IMPACT ASSESSMENT

1.0 POLLUTION SOURCES IDENTIFICATION

Air pollutants, particularly in dust form can be generated during the proposed quarry project. However, the magnitude, duration and frequency of pollutant generation will vary according to the type of activity, the efficiency of the natural atmospheric dispersion and the effectiveness of preventive measures.

The mining operations involves a primary jaw crusher, secondary and tertiary cone crushers with screening. Dust is expected to originate from these operations. Particulate matter PM10 is the only primary and significant pollutant being emitted from the quarrying and rock crushing operation.

In this modelling assessment, emission rate of air pollutant from the four identified sources, the primary, secondary and tertiary crushers and fugitive dust from screening, conveying and handling were computed. The generally accepted percentage of dust as PM10 emitted by a typical crushing and screening plant **without any control measures** (JICA, 1993) are shown in **Table 1**.

Table 1 – Typical Dust Emission Factor for Crushing and Screening Plant without Control Measures

Source	Percentage
Primary Crusher	0.025
Secondary Crusher	0.075
Tertiary Crusher	0.300
Conveying and handling	0.100

The proposed quarry will produce 80,000 tons/mth of granite. Based on 12 hours/day and 28 days/mth, the hourly production rate would be 238.1 tons/hr. With the emission factor of 0.025% for the primary crusher, the potential amount of dust emitted from the primary crusher without any control measures is $238.1 \text{ tons/hr} \times 0.025\% = 59.5 \text{ kg/hr}$ or 16.534 g/s.

With stringent control measures, emissions from the sources can be reduced significantly. Among the control measures proposed that are reasonable and viable are:-

- i) Covered conveyor
- ii) Covered hopper and crushers with water sprinkler installed
- iii) Enclosed screen and transfer points with water sprinkler installed
- iv) Water browser for track spraying on access road and open areas
- v) Tyre cleaning

In this modelling study, the efficiency of dust removal was set at 98% for the crushers and also 98% for the fugitive sources while the normally accepted efficiency is from 98.0 to 99 % if the ground and rock products are kept wet and moist. Based on the 98% efficiencies, the potential controlled emission rate for the primary crusher is $16.534 \text{ g/s} \times 2\% = 0.331 \text{ g/s}$. By similar computation, emission rates for secondary & tertiary crusher and conveying can be obtained as summarized in **Table 2**.

Table 2 – Potential Emission Rates of the Identified Sources

Source	Emission Rate (g/s)	
	Without Control Measures	With Control Measures
Primary Crusher	16.534	0.331
Secondary Crusher	49.603	0.992
Tertiary Crusher	198.413	3.968
Conveying and handling.	66.138	1.323

2.0 POLLUTION SOURCES IDENTIFICATION

Particulate Matter (PM) refers to tiny particles of solid suspended in the atmosphere. Increased levels of fine particles in the air are linked to health hazards such as respiratory problems, altered lung function and lung cancer. Particles with size of $<25\mu\text{m}$ is commonly known as Total Suspended Particles (TSP). A smaller size of particulate matters ($<10\mu\text{m}$) is known as PM_{10} is formed part of the TSP. PM_{10} can be easily inhaled directly into the lungs and lodged in the air passages of the lungs. Accumulation of this pollutant in the respiratory system can cause numerous health effects related to respiratory and lung functions. The modelling takes into account the PM_{10} as representative pollutant for PM. Another parameter, $\text{PM}_{2.5}$ is tiny particles (<2.5 microns in diameter) in the air that reduce visibility and cause the air to appear hazy when levels are elevated. $\text{PM}_{2.5}$ is able to travel deeply into the respiratory tract, reaching the lungs. Exposure to fine particles can cause short-term health effects such as eye, nose, throat and lung irritation, coughing, sneezing, runny nose and shortness of breath. Exposure to fine particles can also affect lung function and worsen medical conditions such as asthma and heart disease. Percentage of $\text{PM}_{2.5}$ in PM_{10} could be as low as 10% at ambient rural area and as high as 90% from combustion source. The stipulated reference limit for PM_{10} and $\text{PM}_{2.5}$ is $100 \mu\text{g}/\text{m}^3$ and $35 \mu\text{g}/\text{m}^3$ for 24-hour period in year 2020 as shown in **Table 3**.

Table 3 – Ambient Air Quality Standard Limits

Parameter	Unit	Averaging Time	Standard (2020)
PM10	$\mu\text{g}/\text{m}^3$	24-hour	100
		1-year	40
PM2.5	$\mu\text{g}/\text{m}^3$	24-hour	35
		1-year	15

3.0 METHODOLOGICAL APPROACH

In order to assess the potential air pollution impact from the proposed project into the atmospheric environment, air quality modeling was undertaken. ISCST3, an air modeling software that simulates on the basis of Gaussian plume equation was used to predict the ground level concentration (GLC) of air pollutants. The software simulates on the basis of Gaussian plume equation which can be presented as follows:

$$\text{Ground Level Concentrations, } [C] = \frac{Q}{\pi \delta_y \delta_z U} e^{\left[-\frac{y^2}{2\delta_y^2} \right]} e^{\left[-\frac{H^2}{2\delta_z^2} \right]}$$

where,

- [C] = concentration in mg/m³ or µg/m³
- Q = source strength in mg/sec or µg/sec
- U = average wind speed in m/sec
- δy, δz = diffusion coefficients in y and z direction in metre
- H = effective height of source emission in metres
- π = 3.1416

The following assumptions / data were used as the modelling inputs:

1. The identified sources within the site were modelled as area sources for. As the worst case scenario, the following areas are assumed:
 - a. Primary crusher – 3m x 10m
 - b. Secondary crusher – 3m x 10m
 - c. Tertiary crusher – 3m x 10m
 - d. Conveying and handling – 20m x 20m
2. The release height is 3m;
3. A receptor grid of 6km x 6km (3km radius) with spacing of 100m is established;
4. Terrain profile is flat and open;
5. Meteorological data from the nearest meteorological station (Kuala Terengganu Airport) is used;
6. Mixing height is assumed as wind speed x 320;
7. Modeling was carried out for two scenarios: without vs. with mitigating measures; and two averaging time: 24 hour and 1 year.

4.0 ASSESSMENT RESULTS

The project site is remotely located more than 0.7km away from sensitive receptors. The nearest receptors are Kampung Tebing Tembah, Kg Baharu and Kampung Kongs, which is also baseline monitoring site A2, A3 and A4 respectively. PM10 concentration at these locations is predicted in the modelling exercise.

Results of the modelling are presented in incremental Ground Level Concentrations (GLC). Incremental GLC refers to additional concentrations of pollutant at ground level due to the proposed project. In addition to the baseline concentrations, cumulative ambient GLC can be obtained and this will compare with the stipulated ambient air limits.

Incremental air pollutant (PM10) contours during the quarry operations for both scenarios – without mitigating measures; and with mitigating measures are illustrated in **Figures 1 to 4**. Based on the modeling results, the effect of flying dust is localized with control measures in place. Without control measures, the level of PM10 is estimated more than $400\mu\text{g}/\text{m}^3$ (24 hours) and $35\mu\text{g}/\text{m}^3$ (1 year) at the receptors (**Table 4**). With control measures in place, the incremental GLC of PM10 is lowered to $9\mu\text{g}/\text{m}^3$ at the surrounding receptors as shown in **Table 5**. These levels are low and could hardly pose any significant impact to the surrounding receptors. In addition to the baseline concentrations, the cumulative GLC is estimated below $59\mu\text{g}/\text{m}^3$ at the receptors with control measures in place. Hence, control measures are essential to be implemented on site at all times to minimize the impact.

PM2.5 is a subset of PM10. The ratio of PM2.5 to PM10 depends on the source of the particulate matter. For instance, combustion process may contain PM2.5 as high as 80% of total PM. However, for flying dust, content of PM2.5 is expected to be lower than 50% of total PM. In view of the PM10 modeling results are acceptable with control measures in general, modelling of PM2.5 for the proposed project is not necessary in this case.

Table 4 - Predicted Incremental Ground Level Concentration (GLC) of PM10 due to Emissions from the Proposed Project (without Control Measures)

Sensitive/discrete receptor	Existing baseline conc.	Incremental conc.		Cumulative air conc. 24-hr average
		24-hr average	Annual average	
Kg Tebing Tembah, A2	46	415.27	77.57	461.27
Kg Baharu, A3	47	428.04	62.65	475.04
Kg Kongs, A4	50	416.30	37.19	466.30

Note: all units in $\mu\text{g}/\text{m}^3$.

Table 5 - Predicted Incremental Ground Level Concentration (GLC) of PM10 due to Emissions from the Proposed Quarry (with Control Measures)

Sensitive/discrete receptor	Existing baseline conc.	Incremental conc.		Cumulative air conc. 24-hr average
		24-hr average	Annual average	
Kg Tebing Tembah, A2	46	8.31	1.55	54.31
Kg Baharu, A3	47	8.56	1.25	55.56
Kg Kongs, A4	50	8.33	0.74	58.33

Note: all units in $\mu\text{g}/\text{m}^3$.

5.0 MITIGATING MEASURES

Mitigating measures / monitoring below are proposed to implement during the quarry operations.

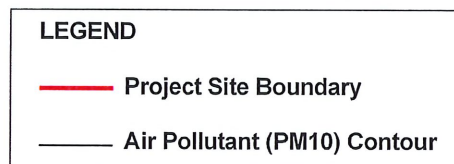
- Covered conveyor and hopper.
- Crushers with water sprinkler installed.
- Enclosed screen and transfer points with water sprinkler installed.
- Regular water spraying of access roads and internal roads within the project site particularly during dry and windy weather conditions.
- Establish hoarding and maintain vegetation stripes along the site boundary to minimize the spread of flying dust to the surroundings.
- All loaded vehicles going to and leaving the construction site should be adequately covered to prevent spillage of materials from the vehicle during transport.

- All vehicles' wheels should be cleaned prior to exiting the site and entering the main road to minimize dust generated during vehicle's movements.
- Regular maintenance of vehicles and machinery to reduce their emissions of smoke and soot into the atmosphere.
- Open burning of cleared vegetation or debris is strictly prohibited.
- Speed limits shall be imposed on all vehicles entering and leaving the Project Site to prevent dust turbulence.

List of References

1. Department of Environment (DOE), *Notice 1-2015: New Ambient Air Quality Standard*.
2. JICA, Air Quality Management Study for Kelang Valley Region, Final Report, Vol. 2, Main Report, Japan International Cupertino Agency, August 1993.
3. US EPA (1995), *User' Guide For ISCST3 Dispersion Models*, U.S. Environmental Protection Agency, Office of Air and Radiation. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711, USA.

Topographic map of the Paka area in Terengganu, Malaysia. The map shows the Paka River and surrounding villages. Key locations include Kg. Baharu Darat Kubur, Kg. Nik, Kg. Baharu, Kg. Gong Samak, Kg. Cerung Melintang, Kg. Kongs, Kg. Pantai, Kg. Limbung, and Kg. Baharu. The map also shows the Paka River, Telaga Mas, and various contour lines. A red rectangle highlights a specific area near the river.



**Figure 2 : Predicted Incremental GLC of PM10 (24 hr Averaging Time)
Without Mitigating Measures**



Figure 3 : Predicted Incremental GLC of PM10 (1 yr Averaging Time) With Mitigating Measures



Without Mitigating Measures



Appendix 7-2

**FLOOD RISK
ASSESSMENT**

1.0 Hydrological Impacts

1.1 Introduction

The potential impact on the hydrological regime is a change in runoff within the catchment. This arises from the increased proportion of lower infiltration rate and shorter retention because of land use conversion. The removal of vegetation cover and site clearing at the construction site will increase surface runoff particularly during the rainy season. In view of the flood history in the area, the development may worsen the flood situation if clearing is carried out during monsoon periods. Downstream flash flooding may take place during the site preparation and development stages.

1.2 River Catchments of the Project Site

The hydrological study covers quarry projects. At present, the project site is mainly drained by Sungai Dol on the western of the project site before finally flow into Sungai Paka (**Figure 1**).

As the project sites located at upstream of Sungai Dol catchment, significant land use changes implicate higher runoff at upstream and consequently, it may cause flooding or flushing downstream. In this respect, a comparison between the present and future water catchments is made as tabulated in **Table 1**.

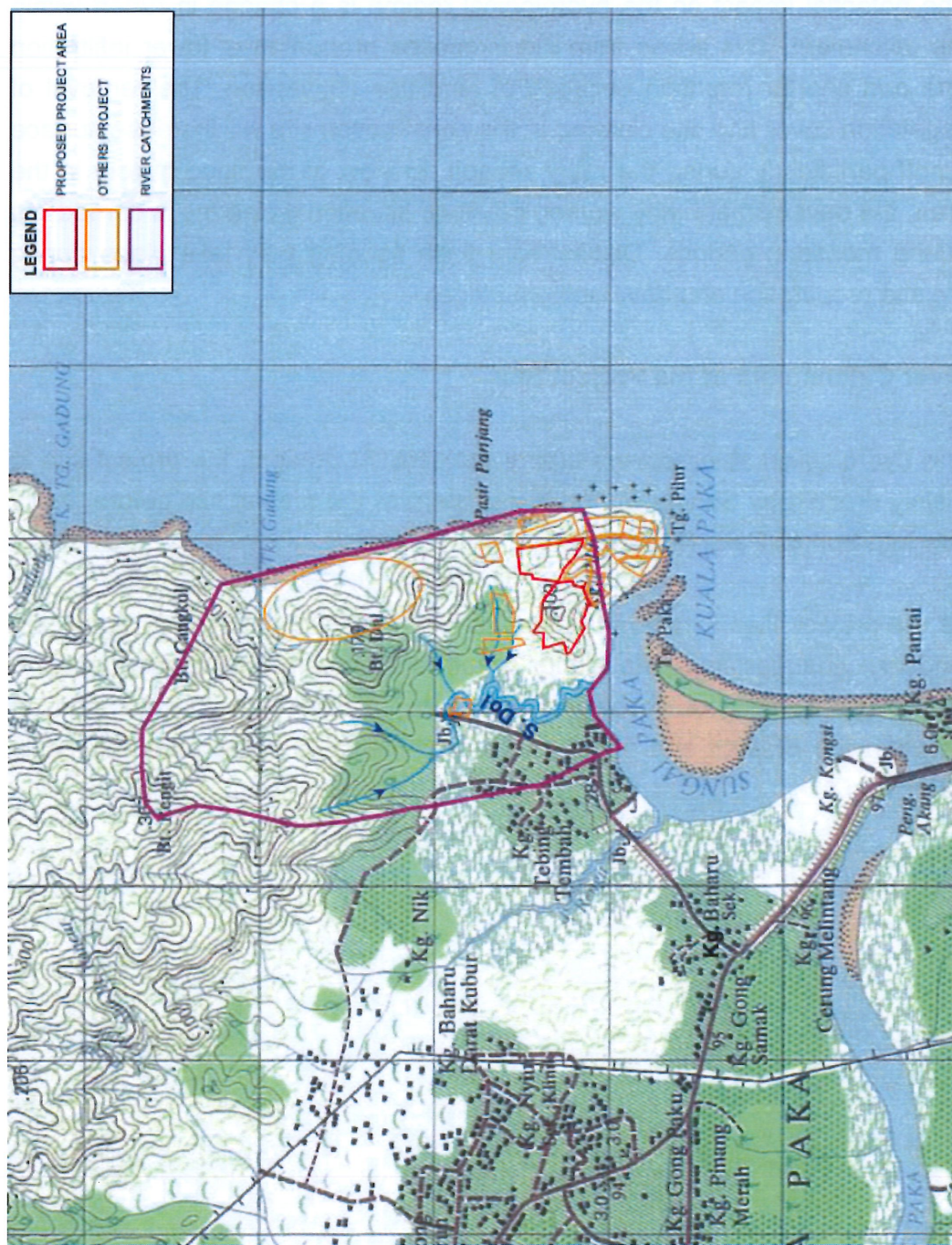


Table 1: River Catchments of the Project Site

River Catchment	River Catchment Area (ha)	River Subcatchment / Tributary within Project Site	Project Area within the River Subcatchment (ha)	Project Area (%) within River Catchment
Sungai Dol	354.604	Tributaries of Sg. Dol	Phase 1 & 2 – 13.486	21.02%
			Others – 61.067	

As shown in **Table 1**, changes of land use in the river catchment area are 21.02% for Sungai Dol.

1.3 Methodological Approach

In order to access the increase in runoff as a result of the proposed development, peak flow value for the project site was estimated by using Rational Method. The empirical equation of this method is presented as below:

$$Q_y = \frac{C \cdot y_{lt} \cdot A}{360}$$

Where,

- Q_y = y year average recurrence interval (ARI) peak flow (m³/s)
- C = dimensionless runoff coefficient
- y_{lt} = y year ARI average rainfall intensity over time of concentration (mm/hr)
- A = drainage area (ha)

The following conditions and criteria were selected for the peak flow estimation:

- Average return interval (ARI) of 50 years.
- Rainfall Intensity-Duration-Frequency (IDF) Curves and temporal rainfall pattern are designed according to IDF curves in JPS station – Almuktafibillah Shah Station.

The following development phases are adopted:

- Site clearing of Phase 1 of Hexatrend Quarry and part of others project to be carried out simultaneously. Upon completion of Phase 1 with rehabilitation, it will move on to Phase 2.

- Development phases above are assumed to be entirely cleared with bare land during site clearing phase and it will be entirely covered with cover crops upon completion.

Three scenarios are considered as follows:

- *Existing condition* – the entire river catchment including the project site is covered with secondary forest;
- *Development phase* – the project site is cleared according to the development phases while the rest of the areas within the catchment remain as secondary forest;
- *Project completion phase* – the project site is entirely covered with cover crops while the rest of the areas within the catchment remain as secondary forest.

1.4 Assessment Input Data

Runoff Coefficient (C)

Runoff coefficient is derived from Table 2.5 of MSMA:

- ♦ 0.4 for existing condition (where the project site is entirely covered by forest)
- ♦ 0.6 for development phase (where the project site is entirely bared, worst-case scenario)
- ♦ 0.5 for operational phase (where the project site is entirely covered with cover crops)

Rainfall Intensity

Rainfall intensity is derived from the Intensity-Duration-Frequency (IDF) empirical equation below:

$$i = \lambda T^k / (d + \Theta)^n$$

Where i = average rainfall intensity (mm/hr)

T = average recurrence interval, ARI of 50 years

d = storm duration (hours) equals to time of concentration for the sub catchment

λ , k , Θ & n = fitting constants dependent on the rain gauge location

Time of concentration for the sub catchment is computed via the following overland flow equation:

$$t = 107n L^{1/3} / S^{1/5}$$

Where t = overland sheet flow travel time (minute)
 L = overland sheet flow path length (m)
 n = Horton's roughness value for the surface
 S = slope of overland surface (%)

Based on the above equations, time of concentration and the corresponding rainfall intensity for the respective sub catchment can be determined as shown in **Table 2**.

Table 2 : Rainfall Intensity for Sungai Dol Catchments

Project	Subcatchment	Coefficient of the IDF empirical equation				Duration, t			Rainfall intensity, I (mm/hr)		
		λ	K	Θ	n	t (min), pre	t (min), dev	t (min), post	I, pre	I, dev	I, post
Sungai Dol											
Hexatrend Quarry	Phase 1 & 2	66.029	0.199	0.165	0.629	20	9	15	221	294	248
	Others	66.029	0.199	0.165	0.629	27	12	20	195	268	221
Remaining		66.029	0.199	0.165	0.629	39	39	39	163	163	163

Note: Pre means pre-development / existing condition; dev means development / site clearing stage; and post means post-development / completion of cover crops.

1.5 Assessment Results & Findings

The results of peak flow discharge for each subcatchment are tabulated in **Table 4**.

Table 4: Estimation of Peak Flow, Q (m³/s) for Subcatchments

Project	Subcatchment	Area (Ha)	Q _{pre}	Q _{con}	Q _{post}
<i>Sungai Dol (354.604 ha)</i>					
Hexatrend Quarry	Phase 1 & 2	13.486	3.31	6.61	4.65
Others	-	61.067	13.22	27.26	18.77
Remaining		280.051	50.79	50.79	50.79

Note: Pre means pre-development / existing condition; dev means development / site clearing stage; and post means post-development / completion of cover crops.

Further, peak discharge of the river catchments is computed according to the development phases, starting from Phase 1 followed by Phase 2. In the mean time, rehabilitation activity will be carried out concurrently in phase 1 during development in phase 2. The results are tabulated in **Table 5** for Sungai Dol Catchment.

Table 5: Estimation of Peak Flow Q (m³/s) for Sungai Dol Catchment

Project	Subcatchment	Area (Ha)	Q _{pre}	Q _{dev}	Q _{post}
Hexatrend Quarry	Phase 1 & 2	13.4862	3.31	6.61	4.65
Others	-	61.067	13.22	27.26	18.77
Remaining		280.0508	50.79	50.79	50.79
Total		354.604	67.32	84.66	74.21
% Increase		-	-	25.7	10.2

Note:

1. Development phases above are assumed to be entirely cleared with bare land during site clearing phase and it will be entirely covered with cover crops upon completion.
2. % Increase refers to percentage increased during the respective phase compared with the pre-development / existing condition.

It is essential to estimate the downstream carrying capacity of Sungai Dol, prior to discharging into Sungai Paka and finally to South China Sea. Carrying capacity of the rivers in volumetric flowrate can be estimated via the following equation:

$$Q = A/n R^{2/3} S^{1/2}$$

Where Q = volumetric flowrate of the river (m^3/s)
 A = cross sectional area of the river (m^2)
 R = hydraulic radius or wetted perimeter
 S = river bottom slope (m/m)
 n = Manning's roughness coefficient

The results of river volumetric flow rate are shown in **Table 6**. The resultant river carrying capacity are compared with the estimated peak discharge of the river catchment as shown in graphical presentation in **Figure 2**.

Table 6 : Estimated Volumetric Flowrate at Downstream

River	Average Width (m)	Average Depth (m)	R	S (m/m)	n	Q (m^3/s)
Sungai Dol	16	1	18.00	0.043	0.035	651.08

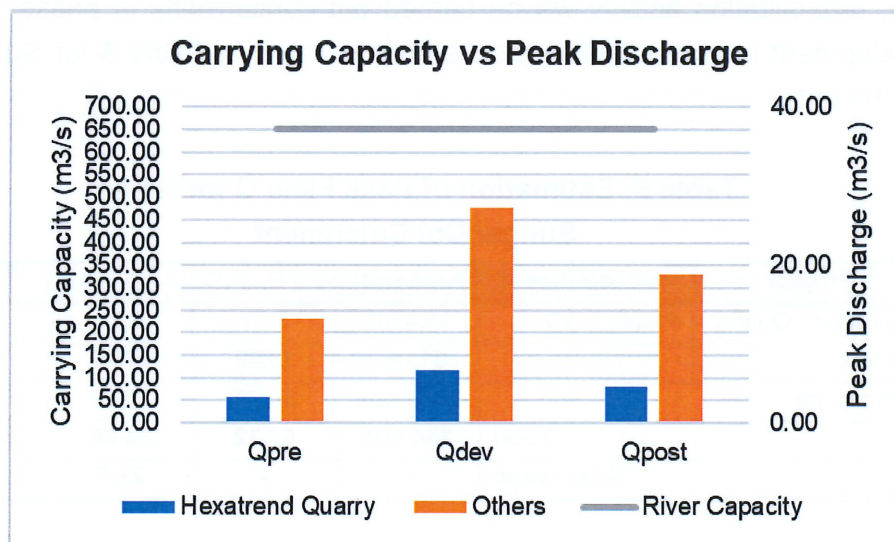


Figure 2: Sungai Dol Carrying Capacity vs Peak Discharge of the Catchment

Findings of the assessment are summarized as follows:

- During the development phase, the highest peak flow for Sungai Dol catchment is $6.61\text{m}^3/\text{s}$ for Hexatrend Quarry and $27.26\text{m}^3/\text{s}$ for others project corresponding to 25.7% increment due to contribution area of surrounding project which is estimated 61 hectares.
- Volumetric flowrate / carrying capacity at downstream of Sungai Dol is estimated at $651\text{m}^3/\text{s}$. This value is higher than the estimated peak discharge of each project catchment as mention above during the development phase.

Based on the above findings, volumetric flowrates / carrying capacity at downstream of Sungai Dol are higher than the estimated peak discharge during the development phase. Hence, flash flooding at downstream the rivers are not expected. Nevertheless, the impact could be considerably minimized via mitigation measures as recommended as in the following section.

1.6 Mitigation Measures

Development Phase

- Sediment basins proposed will act as temporary retention ponds.
- All surface runoff from the project site shall be directed to the sediment basins. This will help to reduce the sediment load being discharged into any drainage flows and consequently maintain it carrying capacity.
- On-site activities will be carried out in phases to reduce the simultaneous effect of increased surface runoff.
- Site clearing should be carried out during dry seasons, where possible.

Post Development Phase

- Proper drainage system is necessary to provide adequate diversion of the runoff.
- Retain and plant cover crops as much as possible to alleviate runoff flow.

Appendix 8-1

**ENVIRONMENTAL
QUALITY (SEWAGE)
REGULATIONS 2009**

SECOND SCHEDULE

(Regulation 7)

ACCEPTABLE CONDITIONS OF SEWAGE DISCHARGE OF STANDARDS A AND B

(i) New sewage treatment system

Parameter (1)	Unit (2)	Standard	
		A (3)	B (4)
(a) Temperature	°C	40	40
(b) pH Value	—	6.0-9.0	5.5-9.0
(c) BOD ₅ at 20°C	mg/L	20	50
(d) COD	mg/L	120	200
(e) Suspended Solids	mg/L	50	100
(f) Oil and Grease	mg/L	5.0	10.0
(g) Ammoniacal Nitrogen (enclosed water body)	mg/L	5.0	5.0
(h) Ammoniacal Nitrogen (river)	mg/L	10.0	20.0
(i) Nitrate – Nitrogen (river)	mg/L	20.0	50.0
(j) Nitrate – Nitrogen (enclosed water body)	mg/L	10.0	10.0
(k) Phosphorous (enclosed water body)	mg/L	5.0	10.0

Note: Standard A is applicable to discharges into any inland waters within catchment areas listed in the Third Schedule, while Standard B is applicable to any other inland waters or Malaysian waters.

(ii) Existing sewage treatment system (approved before January 1999)

This category refers to all sewerage treatment systems which were approved before the Guidelines for Developers: Sewerage Treatment Vol. IV, 2nd edition and were enforced by the Department of Sewerage Services, Ministry of Housing and Local Government, beginning January 1999. Below are the acceptable conditions for sewage discharge according to type of sewage treatment systems:

Parameter (1)	Unit (2)	Type of Sewage Treatment System									
		Communal Septic Tank		Imhoff Tank		Aerated Lagoon		Oxidation Pond		Mechanical System	
		A (3)	B (4)	A (5)	B (6)	A (7)	B (8)	A (9)	B (10)	A (11)	B (12)
(a) BOD ₅ at 20°C	mg/L	200	200	175	175	100	100	120	120	60	60
(b) COD	mg/L	—	—	—	—	300	300	360	360	180	240

		Type of Sewage Treatment System									
		Communal Septic Tank	Imhoff Tank		Aerated Lagoon		Oxidation Pond		Mechanical System		
Parameter (1)	Unit (2)	A (3)	B (4)	A (5)	B (6)	A (7)	B (8)	A (9)	B (10)	A (11)	B (12)
(c) Suspended Solids	mg/L	180	180	150	150	120	120	150	150	100	120
(d) Oil and Grease	mg/L	—	—	—	—	—	—	—	—	20	20
(e) Ammoniacal Nitrogen	mg/L	—	—	100	100	80	80	70	70	60	60

Note:

1. Standard A is applicable to discharge into any inland waters within catchment areas listed in the Third Schedule, while Standard B is applicable to any other inland waters or Malaysian waters.
2. These standards are applicable to the sewerage treatment systems that may have been constructed prior to 1999 based upon approval given by other agency, other than the Department of Sewerage Services, Ministry of Housing and Local Government.

(iii) Existing sewage treatment system (approved after January 1999)

All sewerage treatment systems which were approved after the Guidelines for Developers: Sewerage Treatment Vol. IV, 2nd edition and were enforced by the Department of Sewerage Services, Ministry of Housing and Local Government, beginning January 1999 and up to the date of coming into operation of these Regulations.

Parameter	Unit	Standard	
		A	B
(a) BOD ₅ at 20°C	mg/L	20	50
(b) COD	mg/L	120	200
(c) Suspended Solids	mg/L	50	100
(d) Oil and Grease	mg/L	20	20
(e) Ammoniacal Nitrogen	mg/L	50	50

Note:

Standard A is applicable to discharge into any inland waters within catchment areas listed in the Third Schedule, while Standard B is applicable to any other inland waters or Malaysian waters.

Appendix 9-1

**FORMAT OF
ENVIRONMENTAL
MAINSTREAMING
TOOLS (EMT)
REPORT**

**ENVIRONMENTAL MAINSTREAMING TOOLS COMPLIANCE REPORT
(EMT COMPLIANCE REPORT)**

NOTE ON SUBMISSION REQUIREMENT:

The EMT Compliance Report must be submitted to the DOE, at a latest thirty days before the company/organization commences operation.

Name of Company/organization:

Address:

DOE's reference file:

Name of EMT Compliance Report preparer:

Designation:

Date:

Signature:

ENVIRONMENTAL MAINSTREAMING TOOLS COMPLIANCE TABLE

EMT		Date of Implementation	Self-assessment of strength of EMT	Comments (if any)
EP				
EB				
EMC	EPMC			
	ERCMC			
EF	BMPs			
	IETS			
	APCS			
	SWMI			
EF	LABF			

EMT		Date of Implementation	Self-assessment of strength of EMT	Comments (if any)
EF	PMI			
	Others			
EC	CSEC			
	CePIETSO			
	CePSWAM			
	CePSO			
	CeBFO			
	Others			
ERC	CC			
	DA			
	OR			
	Others			
ET	ESR			
	WS			
	BB			
	FL			

Explanatory notes for filling out the above table;

EP= Environmental Policy

Give the date the EP was formulated and the review date, if EP review was made. If EP is newly formulated, give the date of its formulation. Make your own assessment of the strength of the message of environmental commitment in your EP by assigning your own rating (1 : Poor; 2:Fair; 3:Average; 4:Good; 5:Excellent). Submit your current EP as evidence.

EB = Environmental Budgeting

Give the date your organization started or will start allocating budget specifically for environmental purposes. Make your own assessment of the adequacy of the EB for implementing measures to comply with environmental requirements of the EQA and its regulations or approval conditions by assigning your own rating (1: Poor; 2:Fair; 3: Average; 4:Good; 5:Excellent). Provide a statement stating the amount of EP for the previous year as evidence.

EMC = Environmental Monitoring Committee

Give the dates the EPMC and ERCMC were set up or will be set up in your organization. Make your own assessment of the strength of the representativeness of the members of the committees by the assigning your own rating (1:Poor; 2:Fair; 3: Average; 4:Good; 5:Excellent). Submit the organization charts of the EPMC and ERCMC as evidence.

EF = Environmental Facility

IETS = Industrial effluent treatment system; APCS = Air pollution control system; BMP=Best management Practices; SWMI= Scheduled Waste Management Infrastructure. LABF = Laboratory facilities; PMI= Performance monitoring Instruments.

Give the dates the EF components were installed or will be installed in your organization. Make your own assessment of the adequacy of the EFs installation and their effectiveness in complying with the regulatory standards and requirements or approval conditions by assigning your own rating (1: Poor; 2:Fair; 3:Average; 4:Good 5:Excellent). Provide information only on EF components which are relevant to your organization.

EC = Environmental Competency

CESC= Certified sediment and erosion control; CePIETSO: certified environmental professional in IETS operation; CEPISO= Certified environmental professional in scrubber operation; CeBFO = Certified environmental professional in bag filter operation; CEPISWAM = Certified environmental professional in scheduled waste management.

Give the dates the organization's personnel were certified or will be attending the certification course(s). Make your own assessment of the adequacy of the number of personnel required by your organization to comply with the regulatory requirements or approval conditions by assigning your own rating (1:Poor; 2:Fair; 3:Average; 4:Good; 5:Excellent). Provide the names of Competent Persons in your organization or submit your training plan to get your staff certified as evidence. Provide information only on EC requirements which are relevant to your organization.