JABATAN PENGAIRAN DAN SALIRAN MALAYSIA
(Department of Irrigation and Drainage, Malaysia)
KEMENTERIAN SUMBER ASLI DAN ALAM SEKITAR
(Ministry of Natural Resources and Environment)
JALAN SULTAN SALAHUDDIN
50626 KUALA LUMPUR
MALAYSIA
Tel: 603-2616 1500 Fax: 603-2698 7973 Email: pro@water.gov.my
Bahagian Pengurusan Zon Pantai *Tel.:* 03-26151601/1603 *Fax :* 03-2697 3201

Ruj. Tuan :
Ruj. Kami : (4) dlm.PPS 14/7/C24
Tarikh : 11 Ogos 2017

Ketua Pengarah
Jabatan Alam Sekitar
Kementerian Sumber Asli & Alam sekitar
Aras 1-4, Podium 2 & 3
Wisma Sumber Asli No.25
Persiaran Perdana, Presint 4
Pusat Pentadbiran Kerajaan Persekutuan
62574 PUTRAJAYA (Faks: 03-88891040)

Pengarah
Jabatan Pengairan dan Saliran Negeri Negeri Pahang
Tingkat 8, Kompleks Tun Razak (KOMTUR)
Bandar Indera Mahkota
25626 KUANTAN (Faks: 09-5733440)

Pengarah
Jabatan Alam Sekitar Negeri Pahang
Tingkat 4-6, Bangunan Asia Life,Jalan Telok Sisek,
25626 KUANTAN (Faks: 09-5732412)

Tuan,

KUANTAN MARITIME HUB – FEASIBILITY STUDY
- Ulasan Akhir Laporan Kajian Hidraulik

Dengan hormatnya perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa berdasarkan kepada mesyuarat pengesahan kajian hidraulik bagi projek di atas yang telah diadakan pada 16 Jun 2017 dan laporan kajian hidraulik yang telah dikemas kini melalui surat bertarikh 22 Jun 2017, didapati pihak perunding telah melaksanakan kajian hidraulik bagi projek tersebut mengikut kehendak-kehendak garis panduan Jabatan ini.

3. Butir-butir berkenaan kajian hidraulik ini adalah seperti berikut:

i.	Penggerak Projek	: Muhibbah Engineering (M) Bhd.
ii.	Perunding Kajian Hidraulik	: DHI Water & Environment (M) Sdn. Bhd.
iii.	Skop Kajian Hidraulik	: Penambakan laut seluas 980 ekar yang dilaksanakan secara berfasa, pengerukan induk, sistem saliran dan sungai buatan serta luahan rawatan kumbahan.

Sambungan surat bil : (7) dlm PPS. 14/7/C24 bertarikh 11 Ogos 2017

2. Jabatan ini pada dasarnya tiada halangan terhadap hasil kajian laporan tersebut bagi cadangan projek di atas, tertakluk kepada syarat-syarat seperti berikut:

i. Kelulusan kajian hidraulik ini adalah bagi kerja-kerja:

- penambakan laut seluas 980 ekar yang dilaksanakan secara berfasa
- Pengerukan induk secara berfasa sehingga kedalaman -12.0 m CD
- Sistem saliran dan sungai buatan
- Luahan rawatan kumbahan

Pelan lokasi, kawasan projek, pengerukan, sistem saliran dan sungai buatan diberikan seperti di **Lampiran 1**. Maklumat bagi fasa penambakan dan juga titik luahan rawatan kumbahan bagi setiap fasa adalah seperti di **Lampiran 2.**

ii. Sebarang perubahan konsep ataupun rekabentuk skop asal adalah **TIDAK DIBENARKAN** tanpa terlebih dahulu mendapat ulasan dan kebenaran bertulis daripada Jabatan ini;

iii. Kajian hidraulik ini tidak mengambilkira aktiviti perlombongan pasir untuk tujuan bekalan pasir kepada projek ini. Kerja-kerja tersebut memerlukan kelulusan kajian hidraulik yang berasingan;

iv. Pengangkutan bekalan pasir untuk kerja-kerja penambakan ke tapak projek adalah tertakluk kepada kelulusan daripada agensi-agensi berkaitan;

v. Penggerak Projek hendaklah memastikan kerja-kerja penambakan mematuhi kaedah yang telah dijelaskan di dalam kajian hidraulik seperti di **Lampiran 3.**

vi. Penggerak Projek hendaklah memastikan kerja-kerja pengerukan mematuhi kaedah yang telah dijelaskan di dalam kajian hidraulik seperti di **Lampiran 4.**

vii. Penggerak Projek hendaklah memastikan sistem saliran dan sungai buatan yang menghubungkan dari titik asal luahan ke titik cadangan luahan baru tidak akan menyebabkan berlakunya banjir di kawasan hilir dan memastikan kaedah mitigasi seperti di **Lampiran 5** dipatuhi.

viii. Penggerak Projek hendaklah memastikan penyelenggaraan yang sempurna terhadap sistem saliran dan sungai buatan bagi memastikan muara sungai yang baru tidak akan tertutup yang mengakibatkan peningkatan aras aras di bahagian hilir.

ix. Penggerak Projek hendaklah melaksanakan pemantauan terhadap serakan sedimen sepanjang tempoh penambakan agar ianya tidak menjejaskan kawasan-kawasan sensitif yang telah dikenalpasti di dalam laporan kajian hidraulik.

Sambungan surat bil : (十) dlm PPS. 14/7/C24 bertarikh 11 Ogos 2017

x. Penggerak Projek hendaklah memastikan setiap fasa penambakan tidak akan memberi impak negatif kepada kawasan sekitar.

xi. Penggerak Projek hendaklah **membina dan menyiapkan *perimeter bund* yang stabil pada setiap fasa SEBELUM** kerja-kerja penambakan dijalankan.

xii. Penggerak Projek hendaklah memasang dan menyelenggara sepenuhnya "*silt curtain*" (seperti di **Lampiran 6**) dalam tempoh kerja-kerja pembinaan bagi mengelakkan serakan sedimen ke kawasan sekitarnya dan untuk mengawal dan memastikan nilai impak serakan sedimen sentiasa di dalam had yang dibenarkan. Sekiranya nilai serakan sedimen di tapak melebihi had yang dibenarkan, kerja-kerja pembinaan hendaklah dihentikan sementara supaya had serakan sedimen sentiasa dipatuhi. Selain itu, lokasi dan kaedah pemasangan "*silt curtain*" perlu mendapat kelulusan dari Jabatan Alam Sekitar;

xiii. Langkah-langkah mitigasi yang disyorkan oleh Perunding dalam laporan Kajian Hidraulik hendaklah dilaksanakan sepenuhnya oleh Penggerak Projek. Sebarang perubahan langkah-langkah mitigasi tersebut **TIDAK** dibenarkan tanpa terlebih dahulu mendapat **KEBENARAN BERTULIS** daripada Bahagian Pengurusan Zon Pantai, Jabatan Pengairan dan Saliran Malaysia dan juga Jabatan Alam Sekitar. Sekiranya berlaku pemendapan atau hakisan di sepanjang garis pantai di sekitar kawasan pemantauan dijalankan, kaedah mitigasi tambahan hendaklah dilaksanakan sepenuhnya oleh Penggerak Projek;

xiv. Laporan pemantauan berkala dan kerja pemantauan garis pantai/sungai perlu dijalankan setiap 3 bulan sekali sepanjang tempoh pembinaan dan setiap 6 bulan sekali selepas projek disiapkan. Kerja pemantauan tersebut boleh dihentikan selepas 3 tahun dari tarikh siap projek sekiranya profil pantai didapati stabil, tertakluk kepada persetujuan daripada Bahagian Pengurusan Zon Pantai JPS Malaysia dan Jabatan Pengairan Dan Saliran Negeri Pahang. Laporan pemantauan hendaklah merangkumi kawasan-kawasan sekitar berpotensi terhakis dan muara-muara sungai baru seperti yang dijelaskan di **Lampiran 7**. Laporan pemantauan profil pantai untuk '*baseline data*' perlu dikemukakan sebelum projek dilaksanakan di tapak ;

xv. Laporan pemantauan berkala yang mengandungi kerja pemantauan garis pantai hendaklah dikemukakan oleh Penggerak Projek kepada Bahagian Pengurusan Zon Pantai, Jabatan Pengairan dan Saliran Malaysia dan Jabatan Pengairan dan Saliran Negeri Pahang. Laporan pemantauan berkala perlu disediakan oleh jurutera bertauliah berdaftar dengan Lembaga Jurutera Malaysia manakala kerja ukur pemantauan garis pantai/sungai perlu disediakan oleh Jurukur Berlesen berdaftar dengan Lembaga Jurukur Tanah;

Sambungan surat bil : (7) dlm PPS. 14/7/C24 bertarikh 11 Ogos 2017

3. Tempoh sah kelulusan kajian hidraulik ini adalah dua (2) tahun dari tarikh surat ini. Penggerak Projek juga diingatkan bahawa kelulusan ini boleh ditarik balik bila-bila masa jika didapati pelanggaran mana-mana syarat kelulusan.

4. Kerjasama dari pihak Jabatan Alam Sekitar adalah dipohon agar dapat memasukkan syarat-syarat kelulusan dari Jabatan ini di dalam syarat-syarat kelulusan Laporan Kajian Penilaian Kesan Kepada Alam Sekeliling (EIA) sekiranya laporan EIA diluluskan oleh pihak tuan kelak.

5. Sekiranya terdapat sebarang kemusykilan atau memerlukan keterangan yang lebih lanjut, pihak tuan boleh menghubungi pegawai Jabatan ini, Ir Mahran bin Mahamud di talian 03-2615 1702 atau emel ke mahran@water.gov.my .

Sekian, terima kasih.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"
"Negaraku, Alam sekitarku"
"Warga Berintegriti, Organisasi Berkualiti"

Saya yang menurut perintah,

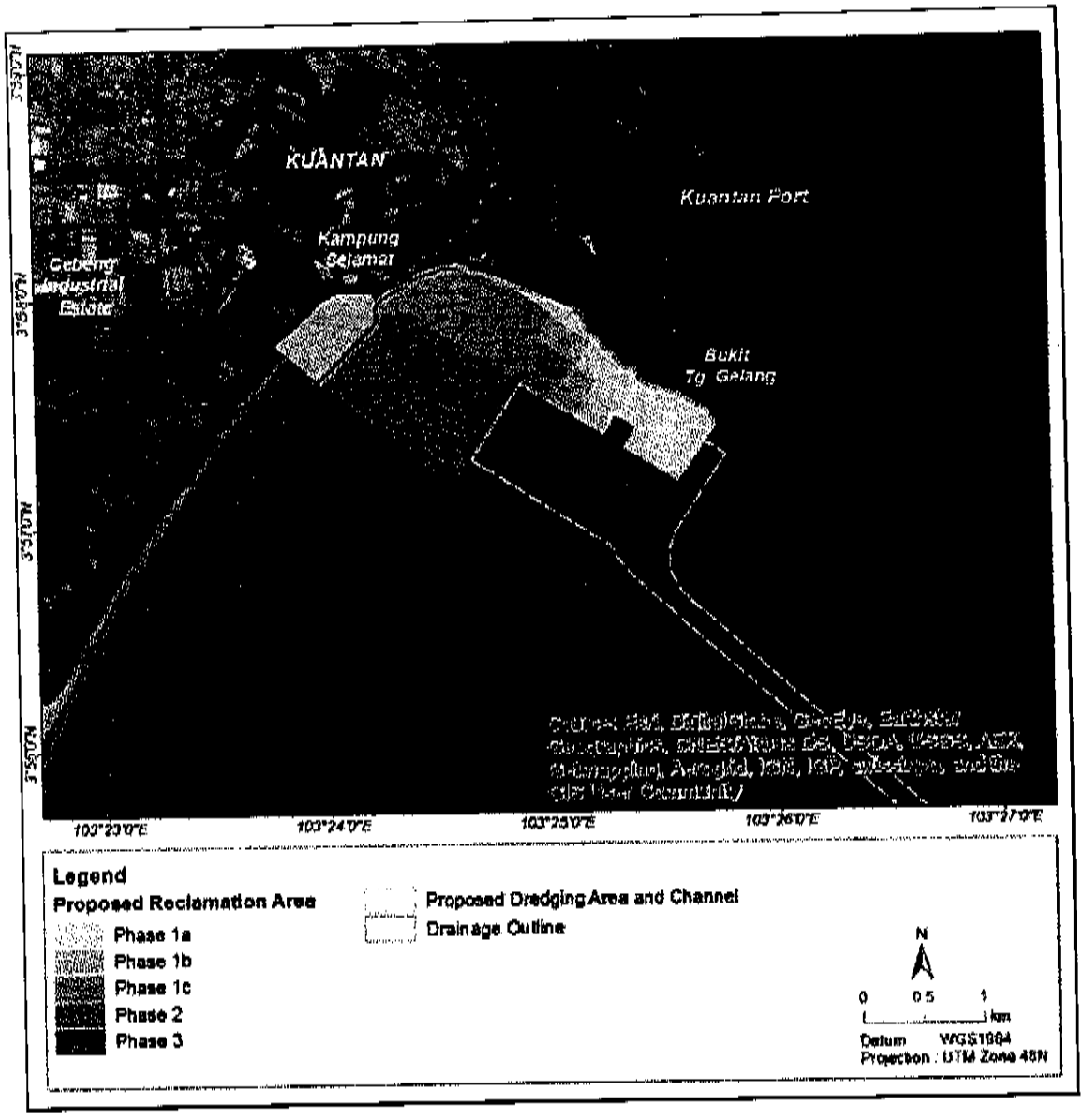
KAPT. (B) DATO' Ir. HAJI ANUAR BIN HAJI YAHYA
Bahagian Pengurusan Zon Pantai
b.p: Ketua Pengarah
Jabatan Pengairan dan Saliran, Malaysia
Sah/ny/mm

Salinan Kepada :

1. Pengarah Urusan
   Muhibbah Engineering (M) Bhd
   Lot 579 & 586, 2nd Mile Jalan Batu Tiga Lama
   41300 KLANG (Faks : 03-33424327)

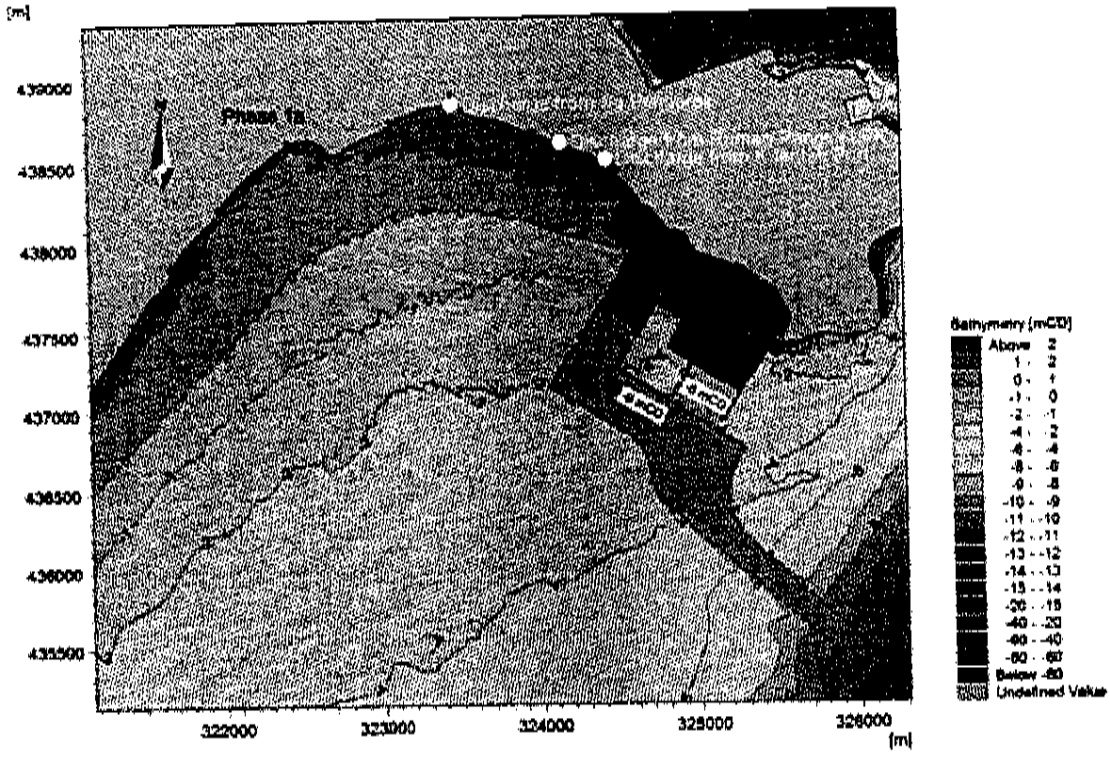
2. Pengarah Urusan
   DHI Water & Environment (M) Sdn. Bhd.,
   3A01, Block G, Phileo Damansara
   No. 9, Jalan 16/11, Off Jalan Damansara
   46350 PETALING JAYA (Faks : 03-7958 1162)

Lampiran 1

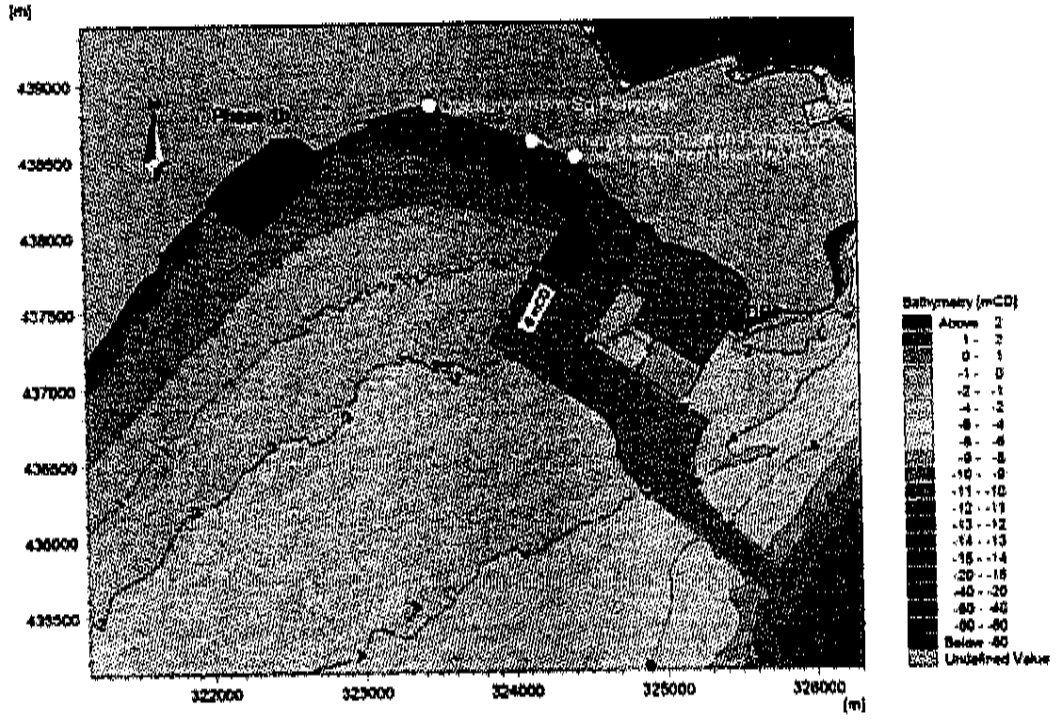


Pelan lokasi, kawasan projek, pengerukan dan sistem saliran serta sungai buatan

Lampiran 2

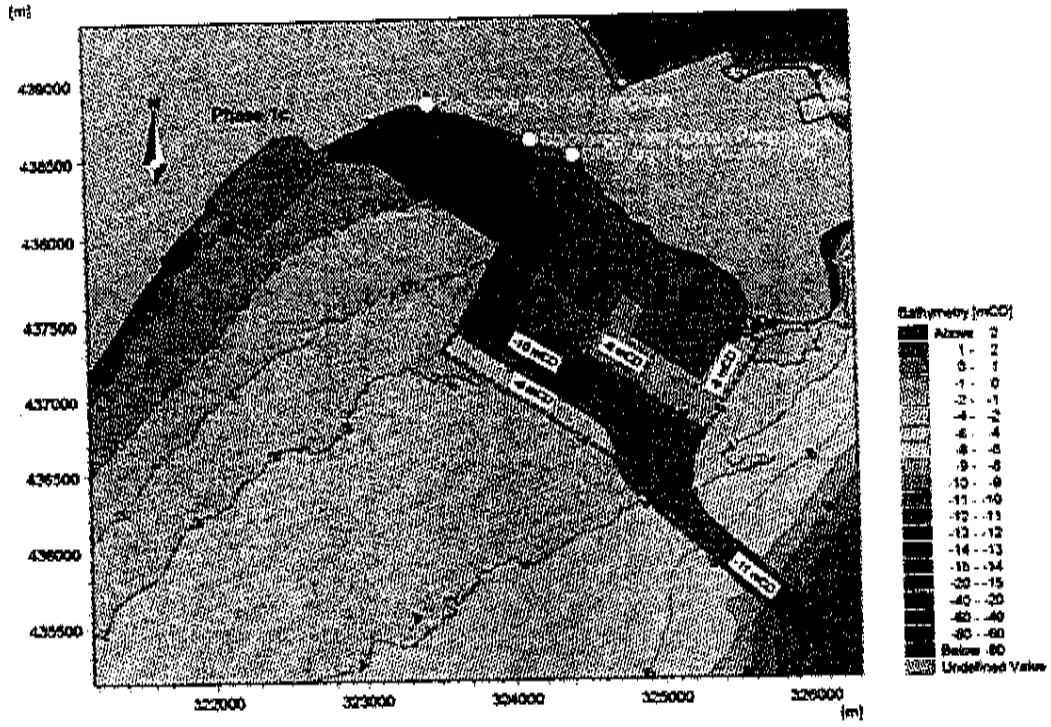


Fasa 1a – Penambakan 191 ekar, pengerukan induk sehingga kedalaman di antara - 8 m Datum Carta dan - 9 m Datum Carta dan titik luahan (DP1)

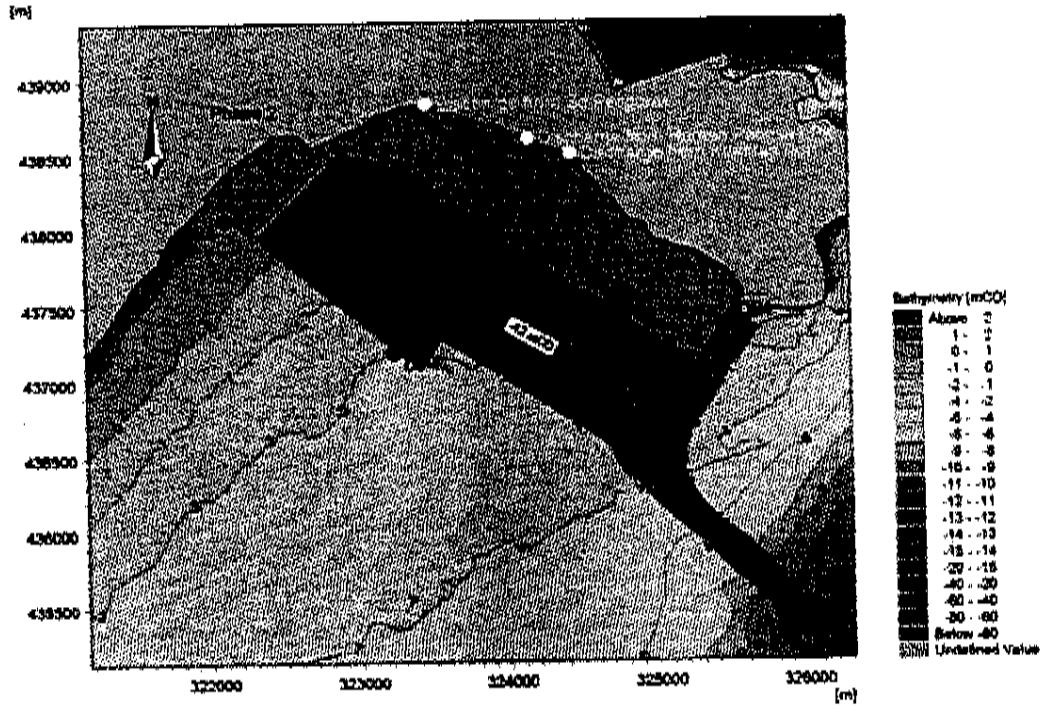


Fasa 1b – Penambakan 120 ekar, pengerukan induk sehingga kedalaman -9 m Datum Carta dan titik luahan masih di DP1

Lampiran 2



Fasa 1c – Penambakan 189 ekar, pengerukan induk sehingga kedalaman di antara -6 m Datum Carta dan -11 m Datum Carta dan titik luahan (DP2) dan (DP3)



Fasa 2 – Penambakan 365 ekar, pengerukan induk sehingga -12 m Datum Carta dan titik luahan (DP4)

Lampiran 3

Preparation and Construction Sequence of Reclamation Works

The preparation and sequence of reclamation works will be as follows:

- The boundary, hydrographical and bathymetric surveys will be carried out by licensed surveyor in order to determine the project boundary and existing ground and seabed levels prior to the commencement of reclamation works. Project and work boundaries will be indicated with floating markers and/or navigation markers.
- Mobilisation of manpower and machineries to the project site and setting up the site office and temporary facilities are among the preparatory works.
- Erosion and sediment control measures such as containment bunds will be installed around the reclamation areas to contain the sediment and thus reduce sediment spillage.
- Silt curtain will be installed at the water discharge points. The assembled silt curtains will be secured with anchor blocks to maintain their position. Regular checking and maintenance of the silt curtains will be carried out throughout the reclamation works to ensure that they are in good working conditions. Tears of damaged of silt curtains will be repaired.
- A temporary bund will be constructed along the perimeter of the reclamation area during Phase 1a, 1b, and 1c (see also Figure 2.13). The bund will be shaped using long-arm excavator. The anticipated cross-section of the temporary bund is shown in Figure 2.14.
- The reclamation within the bunded area will only commence after the containment bund is in place.
- Ground treatment and/or surcharge will be carried out after the completion of reclamation works if required.
- The protection of the reclamation frontage (permanent structures) will be constructed after the completion of each phase of the reclamation works. Figure 2.15 shows the proposed stretches and types of protection following Phase 1a, 1b and 1c.

Kaedah penambakan seperti yang dijelaskan di dalam laporan hidraulik

Adopted Model of Reclamation

For the purpose of the modelling, the following conservative approach shall be adopted in the modelling framework:

- Sand carrier will be used to extract sand from the existing sand concessionaires in the area and transported to the reclamation site for discharging.
- At the sand source area, sand carrier will lower its suction arm onto the seabed and trails. The suction arm will dredge and load the sand into the hopper. When the hopper is full, the sand carrier will then sail to the reclamation site for discharging.
- At the reclamation site, the sand will be discharged onto the reclamation via a conveyor belt similar to that shown in Photo 2.1. When sand has accumulated sufficiently above the water level, bulldozers will be used to level the sand within the reclamation area until a stockpile platform is formed.
- When the sand fill area is at the shallower area (around -5.0 m CD) and beyond the reach of the sand carrier, the sand from the sand carrier will be discharged into the sand transfer pump barge (see Photo 2.2) and re-handled by hydraulic pumping. The sand will be pumped hydraulically to the reclamation site via a discharge floating pipeline

Konsep kaedah penambakan yang diambilkira di dalam permodelan di dalam laporan hidraulik. Penggerak Projek hendaklah memastikan kaedah penambakan ini dipatuhi sepanjang perlaksanaan projek

Lampiran 3

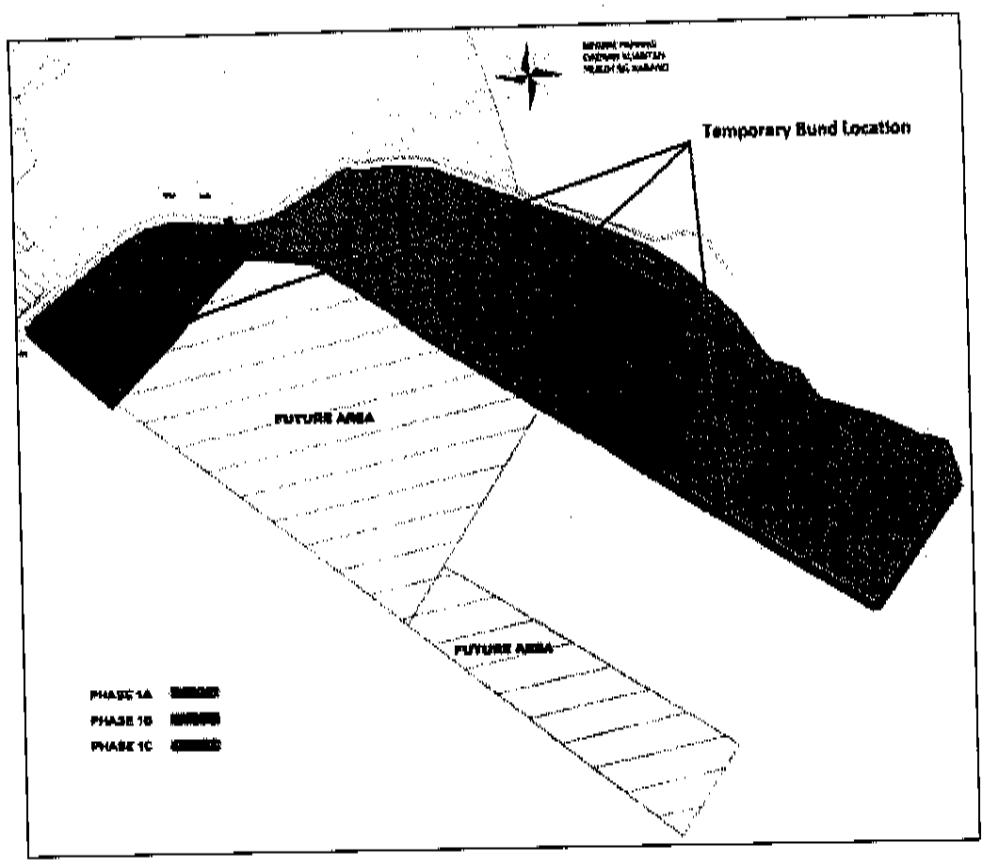


Figure 2.13 Proposed location of temporary bund. The bunds for Phase 1A, 1B and 1C are shown in brown, red and green, respectively.

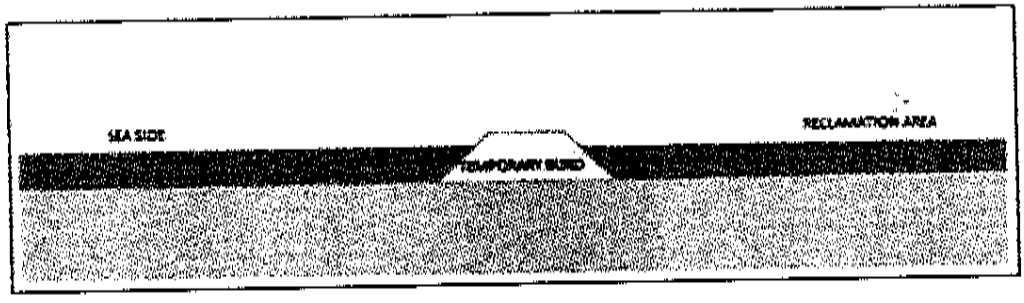


Figure 2.14 Cross-section of proposed temporary bund.

Lampiran 3

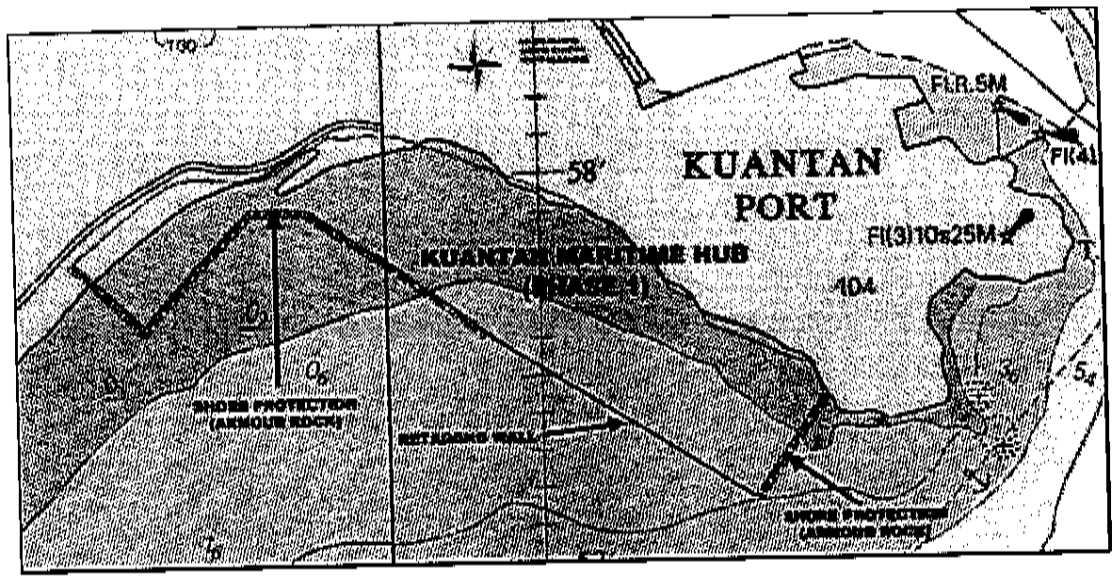


Figure 2.15 Types of protection for the Phase 1 reclamation frontage.

Lampiran 4

Preparation of Dredging Works

The preparation of dredging works are as below:

- Before the commencement of dredging works, the boundary, hydrographical and bathymetric surveys will be carried out by licensed surveyor in order to determine the project boundary and existing ground and seabed levels. Project and work boundaries will be indicated with floating markers or navigation markers.
- The silt curtain application for dredging is only for grab dredger. Silt curtain will be installed with a frame attached to the dredger and sediment from dredging will be contained within the curtain frame.
- No overflow from transportation barges shall be implemented if the dredged materials are of clay in which will have high sediment plume risk.
- TSHD used for the dredging works shall have green valve which minimise the sediment plume impacts.

Kaedah pengerukan seperti yang dijelaskan di dalam laporan kajian hidraulik

Adopted Model of Dredging

For the purpose of the modelling, the following conservative approach shall be adopted in the modelling framework:

Grab Dredger:

- Grab dredgers will be used to dredge the seabed to about -5.0 m CD. The dredge spoils will be loaded into a hopper barge berthed alongside the dredger. When the hopper is full, a tug boat will be used to tow the fully loaded hopper barge to the approved dumping ground for disposal.
- It is always arranged in such a way that, while the tug is towing the hopper to the dumping ground, a second hopper will be berthed alongside the dredger for loading of dredged spoil. This is to ensure continuity of dredging work and optimization of the dredger's output.
- The dredging works will be operating on a 24 hours schedule, continuously on every working day available (including Sunday and public holidays).

Trailer Suction Hopper Dredger (TSHD):

- TSHD will be used to dredge from -5.0 m CD and deeper.
- The TSHD trails it suction pipe when dredging. The pipe which is fitted with a dredger drag head will dredge and load the dredged spoil into the hopper in the vessel. When the hopper is full, the TSHD will then sail to the approved disposal ground and dump the materials through the doors in the hull out of the hopper.
- The dredging works will be guided by GPS and the navigation software on board.

Konsep kaedah pengerukan yang diambilkira dl dalam permodelan di dalam laporan hidraulik. Penggerak projek hendaklah memastikan kaedah pengerukan ini dipatuhi sepanjang perlaksanaan projek

Lampiran 5

To minimize the project-related impacts on flooding, the following measures have been recommended in the channel design:

- An increase of the width of the extended Kuantan Port channel from 7 m to 10 m. The width of 10 m's has already been incorporated in the models and the modelling results presented above. It has also been adopted in the KMH masterplan.

- The (top-) width of the Sg. Pengorak extension channel being increased from 30 to 40 m. A (top-) width of 40 m is approximately 10 m's wider than that of the (top-) width of the existing engineered outlet which is nearly 30 m. A channel with a (top-) width of 40 m has already been incorporated in the model and the results of the modelling. It is also adopted in the KMH masterplan. It is noted that the relatively large channel width will ensure that the extended channel can convey severe flows to the sea without aggravating upstream flooding; both:
  - For Phases 1, 2 and 3 of the development, and
  - When the combined flows from Sg Pengorak and the culvert of Rumah Pangsa LPK peak concurrently.

- A decrease of the curvature of the bends in the channels near the existing outfalls. The proposed bends will generate super-elevations along the outer bank of the bend as well as impose a general head loss to the drainage system. See also in Figure 10.1. It is noted that the bend at the Sg. Pengorak river mouth can be accomplished only upon the approval to encroach the small parcel of land west of Sg. Pengorak and just seaward of the coastal road.

- A reduction of the channel bottlenecks. This has been achieved by streamlining the reclamation frontage - see also Figure 10.2. This has already been incorporated in the model and the results of the modelling as well as the KMH masterplan.

- Adopt the L-shaped cross-sections for the Kuantan Port and Rumah Pangsa LPK drain extensions.

Penggerak projek hendaklah memastikan perlaksanaan kaedah mitigasi seperti yang dijelaskan di dalam laporan kajian hidraulik tidak akan menyebabkan banjir di kawasan hilir.

Lampiran 6

In addition, it is also recommended that silt curtains are used to control sediment spills in the nearshore areas, in particular to be arranged near reclamation overflows and to shelter the ambient waters during critical dredging activities. Silt curtains are proposed to be installed at the water discharge points at reclamation area. The assembled silt curtain will be secured with anchor blocks to maintain its position. Regular checking and maintenance of silt curtains will be carried out throughout the reclamation to ensure that they are in good working conditions. Any tears of damaged of silt curtains will be repaired as soon as possible.

Pemasangan dan penyelenggaraan silt curtain

LAMPIRAN 7

SHORELINE MONITORING

1. *Regular Monitoring Reports*

A monitoring report should be provided to JPS Negeri Pahang and Bahagian Pengurusan Zon Pantai, JPS Malaysia not later than three (3) months after the end of each shoreline monitoring survey. Changes in the bathymetry between subsequent surveys must be analysed using appropriate monitoring tools (e.g. GIS based programme). The report should include but not limited to the following:

a) A map showing the movement of the beach profiles. On this map, private or public properties that potentially might be affected by erosion or accretion must be shown;

b) The monitoring profiles shall be setup with a permanent benchmark and surveyed prior to the start of works to provide baseline data. The data collected in the coastal monitoring program include both the upper part of the coastal profile (which is above the water line) and the coastal profile below the water line. The monitoring survey shall carried out by considering the following feartures and given as figure 1.

c) The coastal erosion and the sedimentation of river mouths and outfalls should be monitored closely. The determination of location, length and spacing of profile surveys must take the following features into consideration :

- River mouths (Kuala Pengorak during Phase 1a and 1b, Kuala Balok)
- Existing storm water / industrial outfalls nearby (if any)
- Recreational spots
- Homestays and beach resorts including the beaches resorts just south of Kuala Balok, i.e, Swiss Garden, Muara and De Rhu.
- Potential erosion/accretion areas from this development to Kuala Balok

If coastal erosion associated with the development is identified by the monitoring servey survey, then proper mitigation measures should be implemented. Due to the recreational value and the usage of the coastline south of the development, any incremental erosion should be mitigated using either carefully designed hard structures or simply nourishment of the foreshore with suitable sand. Foreshore nourishment should be targeted to strategic locations and nourishment volumes should be sufficient to secure coastal stability for 5 – 10 years.

d) Beach cross-section drawings certified by Licensed Land Surveyor (hardcopy & CAD format) showing the changes in the profile;

e) Identification of any impacts and drainage problems due to the proposed project such as sedimentation / erosion;

f) Proposals for any mitigation measures if necessary;

g) All survey data complete with drawings and digital bathymetry data in ASCII text file (comma delimited) as the format shown in **Annex 1** must be submitted to Bahagian Pengurusan Zon Pantai, JPS Malaysia and JPS Negeri Pahang no later than three (3) month after the end of each survey.

Based on the monitoring and evaluation reports, if there is any mitigation measures need to be done as recommended by the Engineering Consultant, the project proponent should get the written approval from Bahagian Pengurusan Zon Pantai, JPS Malaysia before commencing of the mitigation works.

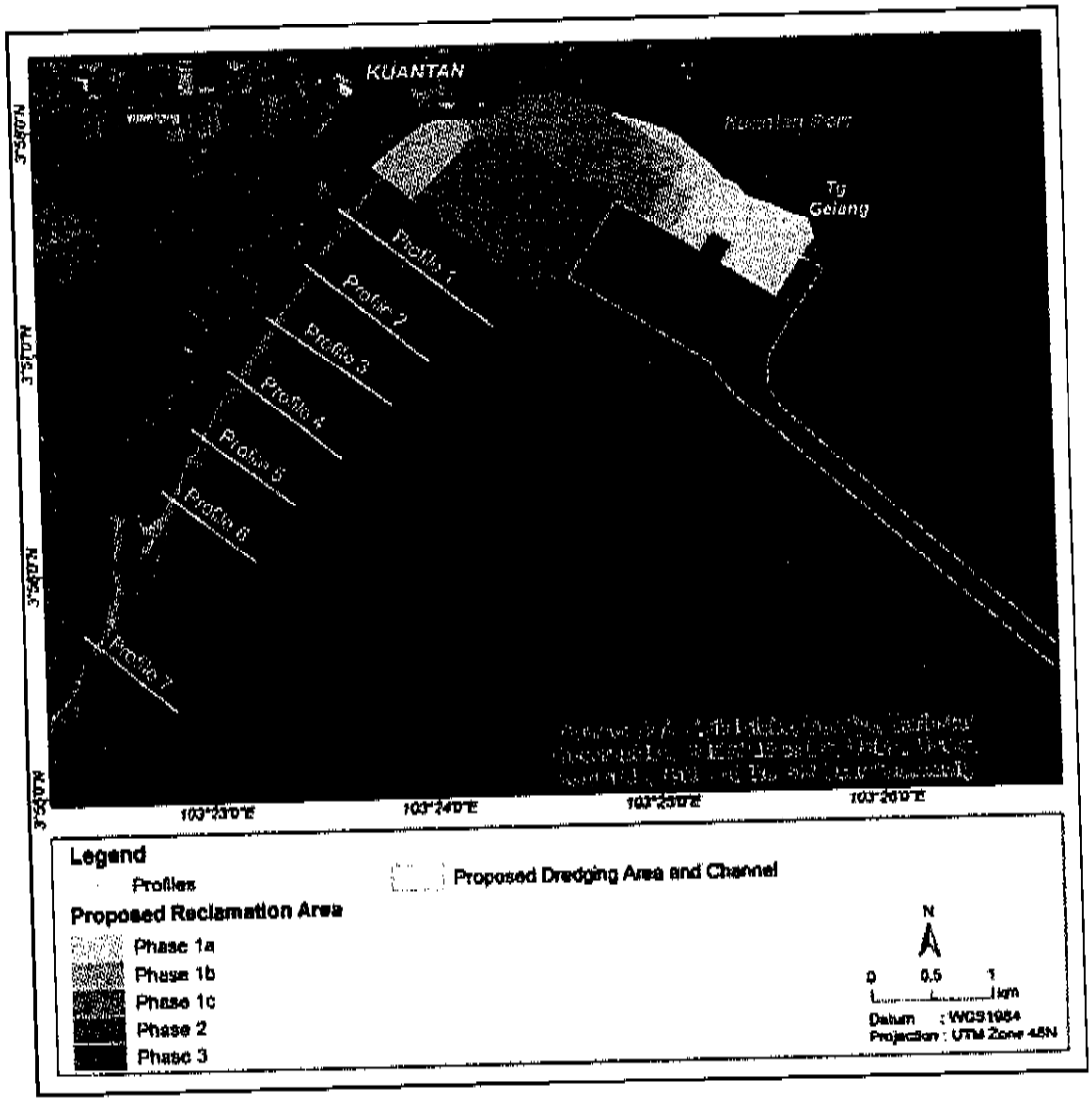


Figure 1 : Extent of shoreline monitoring programme

ANNEX 1

Langkawi CH-100	-	Name of Chainage / Profile
23/12/2012	-	Date of the Survey
MRSO	-	Projection used
Langkawi	-	Location the Survey
136	-	Bearing of the Profile from the true north
22	-	Number of spot level
-2.0 , 632701.6, 236617.6, 4.561	-	offset in meters,x-coord.,y-coord.,vertical levels

-1.0 , 632715.5 , 236603.0 , 2.422

0.0 , 632725.1 , 236592.8 , 2.388

1.0 , 632726.4 , 236591.5 , 2.548

2.0 , 632729.3 , 236588.5 , 2.478

3.0 , 632731.6 , 236586.0 , 2.108

4.0 , 632734.1 , 236583.4 , 2.458

5.0 , 632736.0 , 236581.3 , 2.478

6.0 , 632749.8 , 236566.8 , 2.728

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