Minutes of Meeting

The 23rd Meeting of Malaysia – Thailand Joint Evaluation Team

on the Golok River Mouth Improvement Project

8 – 9 May 2013
Kuala Terengganu, Terengganu
Malaysia

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AGENDA 1: OPENING ADDRESSES

Dato' Ir. Lim Chow Hock, the leader of Malaysian Delegation welcomed the Thai Delegation to the 23rd Meeting of the Joint Evaluation Team (JET) on the Golok River Mouth Improvement Project on 8 – 9 May 2013 in Kuala Terengganu, Terengganu, Malaysia.

Mr. Somkiat Prajamwong, the leader of the Thai Delegation, expressed his appreciation for the warm welcome and arrangements for the meeting. Both sides introduced their delegates to the Meeting. The list of delegates is as shown in Appendix A.

AGENDA 2: MATTERS FOR CONSIDERATION

2.1 Report of Monitoring and Evaluation of GolokRiver Mouth

Activity

1. The pre and post-monsoon survey for the 2012/2013 monsoon season was carried out by the Malaysian side in October 2012 and March 2013 respectively as shown in Appendix B.
2. Malaysian side has determined the datum relationship between MSL Thai and MSL Malaysia as shown in Appendix C.

Background

1. The design level for the entrance channel of Golok River Mouth is specified at -3m below Thai MSL.
2. The Malaysian side has converted the pre-monsoon survey done in October 2012 from Chart Datum (CD) to National Geodetic Vertical Datum(NGVD).
3. The discrepancy between Thai MSL and Malaysian MSL is 0.24m, and Thai MSL and Malaysia NGVD is 0.05m. The elevation of Thai MSL is relatively lower compared to Malaysian MSL as shown in the table below;

Reference Benchmark	Thailand MSL	Malaysia	
		MSL	NGVD
T11	+2.7337	+2.9737	+2.7837
Difference	-	+0.24	+0.05

Current status

1. It is observed from the pre and post-monsoon survey for the 2012/2013 monsoon season that the pattern of erosion and sedimentation at Golok river mouth during pre and post monsoon is similar to patterns over previous years. The post monsoon survey showed an increase of accumulation of sediment at the river mouth compared to pre monsoon survey.
2. However, the analysis on the pattern of sedimentation between the pre-monsoon survey 2012 in Malaysia NGVD and the post-monsoon survey done in March 2012 in Thai MSL showed some irregular pattern. For the pre-monsoon 2012, the river mouth was observed to be fully opened in comparison to the post-monsoon survey in March 2012 of which the river mouth was observed to be partially opened. Such behavior contradicts to the regular patterns which have been observed from the pre and post-monsoon surveys over the last couple of years.
3. The post monsoon 2013 survey in Malaysia NGVD showed that the river mouth was naturally able to maintain its design level. There is, however, some sedimentation accumulated at the centre of the river mouth (from Ch0.350 to Ch0.400) towards the Thai side.
4. The observation also showed that there was an increase in erosion occurred at TPB and the tip of Thai breakwater.

Recommendation

1. Due to the irregular behavior of sedimentation observed in the latest survey, the meeting agreed that the verification of the survey data is needed. Therefore, the next survey result (pre monsoon survey 2013) by Thai side will be used to verify if such behavior is reasonable.
2. Both sides recommend the same datum to be used for future surveys to avoid any misinterpretation for the comparison of survey results across different monsoon cycles. It is suggested the co-reference datum to be located at TPB for convenient accessibility to surveyors of both sides. The new datum is to be transferred from the benchmark at T11 at Thai side.

3. The meeting agreed that for the next surveys by Thai side, the surveyor will provide the reference datum at TPB by transferring the elevation from T11.
4. Malaysian side will convert the datum used for the three consecutive surveys done by Malaysian side in 2008, 2010 and 2012 to Thai MSL. The 2012 survey results will be rectified before JTWG meeting while the rest will be rectified before the next JET meeting.
5. The meeting agreed that all future survey works done by both sides should be officially informed to both RID and DID before the commencement of the work. The relevant information such as the number of surveyors, duration of works and working procedure should be provided.

2.2 Proposed Maintenance Dredging of Golok River Mouth

Recommendation

There is no need to carry out maintenance dredging at this stage. However, this has to be confirmed by the joint hydraulic studies.

2.3 Cableway Stations across Golok River

MUTUAL CALIBRATIONS OF RATING CURVE

Activity

- Progress on mutual gauging works:

May – October 2012	October 2012 – April 2013
1. 15 May 2012	7. November 2012
2. Jun 2012	8. December 2012
3. 22 July 2012	9. 23 January 2013
4. Aug 2012	10. 26 February 2013
5. 19 September 2012	11. 14 March 2013
6. 18 Oktober 2012	12. 17 April 2013

- Gauging works from November to December 2012 were not done by Malaysian side because of flooding.
- Thai side has completed all the gauging works according to the schedule including from November to December 2012.

Recommendation

- Malaysian side agreed to make use of data from Thai side from November to December 2012 to complete the rating curve.
- The meeting agreed to measure and plot Golok river cross section at cable way station for every mutual flow measurement and calibration to observe the river cross section changes. In addition, engineering survey should be done twice a year in order to attain more accurate river cross section especially for pre-monsoon and post monsoon. This engineering survey will be used for the adjustment of the river cross section.
- The mutual flow measurement and calibration should continue until September 2013 using datum from Thailand side to produce common rating curve and will be presented in the next JET meeting.

THE MUTUAL CALIBRATIONS OF EQUIPMENT

The Malaysian side reported that the Hornet System Gauging Equipment has been calibrated on 28 November 2012 (for hoist cable and traveler cable), while for current meter it is calibrated on 8 May 2013. For maintenance of Hornet System Gauging Equipment, greasing of hoist gear system and greasing main cable has been completed by 28 November 2012.

2.4 Progress on Real Time Monitoring System in the Golok River Basin and the Joint Website

The meeting agreed to make a table of 6 months data record for pre and post monsoon, starting from pre monsoon October 2012 and this should be completed before end of June 2013. The long term data record could be shared in numeric table form/spreadsheet for downloading.

Both sides proposed an IT personnel to be included in cooperation team of the joint website as follows;

	Contact Person	Division
Malaysia	Ms. Aisyah Sakina Ahmad	River Basin and Coastal Zone Management Division, DID Malaysia
	Ir. Hapida binti Ghazali	Water Resources Management and Hydrology Department of Irrigation and Drainage Malaysia
	Nur Murniwati binti Abdul Majid	IT Personnel
Thailand	Mr. Somchai Imyoo	Hydrology and Water Management Center for Southern Region, RID Thailand
	Ms.Chawee Wongprasittiporn	Office of Project Management, RID Thailand
	Mrs.Benjamas Aryameang	IT Personnel

2.5 Rehabilitation of Transit Point B

The Malaysian side reported to the meeting that the rehabilitation work at Transit Point B was completedin July 2012.

Recommendation

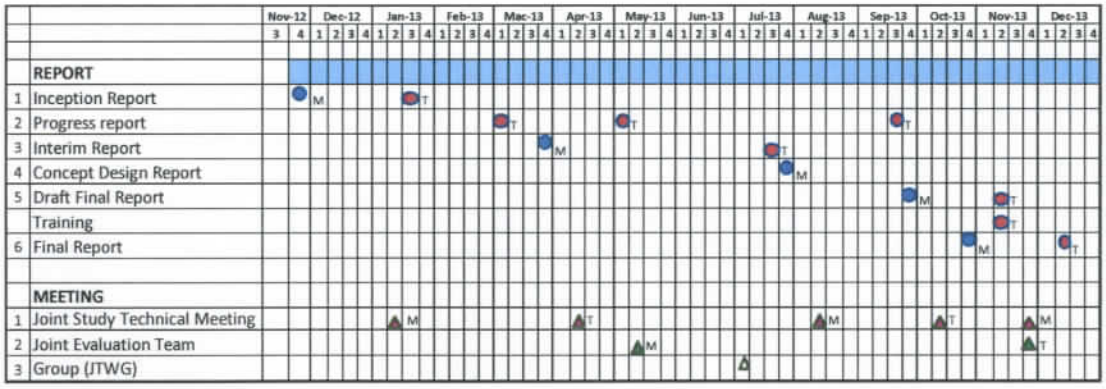
The analysis on the scouring problem at Transit Point B will be included in the joint study by Thai side and to be presented to Malaysian side for further discussion on the proposed mitigation/solutions.

2.6 Joint Hydraulic Modeling Studies

Activity

Joint Study Technical Meeting

- The schedule was proposed during the first meeting at Kangar, Perlis, Malaysia from 14th to 15th January 2013.
- 5 proposed meetings; 3 in Malaysia and 2 in Thailand



Current Status

- 2 Joint Study Technical Meetings were done
  - January 2013 at Kangar, Perlis, Malaysia
  - April 2013 at Bangkok, Thailand

Recommendation

- The minutes of each Joint Study Technical Preparation Meeting should be included as an appendix in the minutes of JET Meeting. The minutes of the first Joint Study Technical Preparation Meeting in Kangar, Perlis, Malaysia from 14th to 15th January 2013 is in Appendix D.

Activity

Joint Studies

Both sides presented the progress of each joint study. The progresses of both studies are on track according to the project scheduled. The meeting agreed that both sides should provide the relevant data as requested by each side if available.

The meeting also agreed to appoint a focal person for data sharing by both sides. The proposed focal person are as Ms. Aisyah Sakina Ahmad from DID, Malaysia and Mr. Attapan Diloksopon from RID, Thailand.

2.7 Flood Forecasting and Warning System of the Golok River Basin

Activity

Both sides have carried out a flood forecasting model for the Golok River Basin using the TANK model but the result was still not satisfactory due to inaccuracy of the rainfall data obtained.

Recommendation

The meeting urged both sides to continue a flood forecasting model for the Golok River Basin using the TANK model. The progress of the analysis will be presented by both sides in the next JET meeting.

2.8 Proposed Integrated River Basin Management (IRBM) plan for the Golok River

The meeting agreed the proposed IRBM to be discussed further concerning the concept, objectives, methodology, work plan and other relevant topics in the technical workshop and will be presented in the next JET meeting.

AGENDA 3: OTHER MATTERS

3.1 Needs for Technical Workshop

The Thai side proposed the need to have a technical workshop to discuss in details in the following matters:

1. Hydraulic Joint Studies
2. Survey method
    - Survey Boundary
    - Cross Section (same reference coordinate)
    - Survey Contour Interval and same Legend
    - Mutual Hydrograph
    - Mutual Benchmark
    - Calculation of Erosion and Sedimentation separately
3. Flood Forecast Model
4. IRBM
5. Joint Website

The proposed date for the first workshop is from 26 to 28 August 2013 in Kuala Lumpur, Malaysia (two and a halfday workshop) excluding traveling days and each workshop should be held separately. Both sides should appoint related people corresponding to each workshop and the outcome of each workshop will be presented in the next JET meeting.

3.2 ASEAN ECONOMIC COMMUNITY

The meeting agreed to use the successful cooperation of this Golok river mouth project as an example for other possible cooperation in the future, such as data sharing and joint studies. The cooperation between RID and DID provide an excellent platform for the cooperation between ASEAN countries which correspond well with the concept of upcoming AEC. This concept will support the implementation of IRBM for both countries.

3.3 Proposed date and venue for the 24th JET meeting

The meeting proposed the date and venue for the next JET meeting (24th JET meeting) as follows:

Date: Nov 2013

Venue: Loei, Thailand

AGENDA 4 Matters to be referred to the JTWG / JSC Meeting

The meeting agreed to proposed the agenda for next JTWG and JSC meeting as follows;

Matters for Information

1. Report of monitoring and evaluation of Golok River Mouth
2. Proposed maintenance dredging of Golok River Mouth
3. Cableway station across the Golok River
4. Progress of real time monitoring system in the Golok River Basin and the joint website
5. Rehabilitation program of Transit Point B
6. Joint Hydraulic Modeling Studies
   (i) Joint study on Coastal Flooding at Golok River Mouth
   (ii) Joint Hydraulic Model on the Assessment of the Golok River Mouth Improvement along Coastal Areas.
7. Flood Forecasting and Warning System of the Golok River Basin

AGENDA 5: ADOPTION OF MINUTES OF THE MEETING

The meeting agreed to adopt the minutes of meeting of the Twenty Third Meeting of Malaysia – Thailand Joint Evaluation Team on the Golok River Mouth Improvement Project.

(Dato' Ir. Lim Chow Hock)
Co-Chairman
Joint Evaluation Team, Malaysia

(Mr. Somkiat Prajamwong)
Co-chairman
Joint Evaluation Team, Thailand

APPENDIX A

Attendance List
23rd Meeting of Malaysia – Thailand Joint Evaluation Team on the Golok River Mouth Improvement Project

8 – 9May 2013

Kuala Terengganu, Terengganu

MALAYSIAN DELEGATES

1.	Dato' Ir. Lim Chow Hock	Director River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
2.	Ir. C. Poobalan	Senior Deputy Director River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
3.	Ir. Hj Shahimi Sharif	Deputy Director (Coastal Zone) River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
4.	Mohd Said in Dikon	Deputy Director (River Basin) River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
5.	Mohd Sor Othman	Senior Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
6.	Zulkefli bin Sidek	Senior Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
7.	Mohd. Zulkifli bin Ahmad	Project Engineer Department of Irrigation and Drainage Malaysia
8.	Mohd Shawal Abd Wahid	Water Resources Management and Hydrology Department of Irrigation and Drainage Malaysia
9.	Aisyah Sakina Ahmad	Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
10.	Mohd Eizam bin Yusof	Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia

SECRETARIAT TEAM

1.	Noor Hidayah binti Abdul Rani	Assistant Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
2.	Mohammed Hairey bin Md Salih	Technician River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia

APPENDIX A

Attendance List
23rd Meeting of Malaysia – Thailand Joint Evaluation Team on the Golok River Mouth Improvement Project

8 – 9May 2013

Kuala Terengganu, Terengganu

THAI DELEGATES

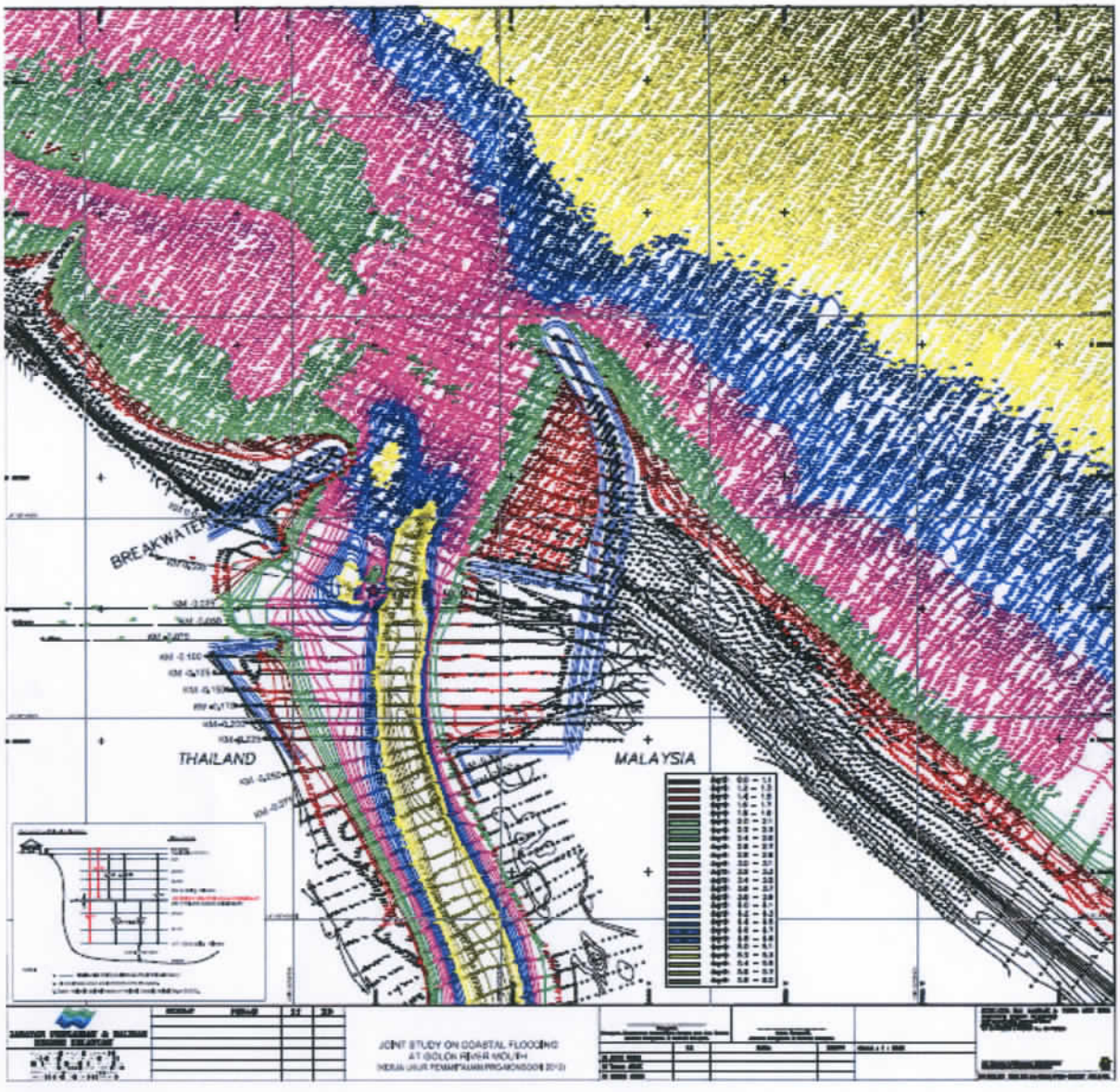
1.	Mr. Somkiat Prajamwong	Director, Office of Project Management, Royal Irrigation Department, Thailand
2.	Mr. Prinya Kamolsin	Expert on Hydraulic Engineering, Office of Research and Development, Royal Irrigation Department, Thailand
3.	MrWaemamuWaehama	Director, Golok River Basin Operation and Maintenance Project, Regional Irrigation Office 17, Royal Irrigation Department, Thailand
4.	Mr. Somchai Imyoo	Director, Hydrology and Water Management Center for Southern Region Office of Hydrology and Water Management, Royal Irrigation Department, Thailand
5.	Mr. Chaiwat Chantawee	Civil Engineering, Professional Level, Office of Project Management, Royal Irrigation Department, Thailand
6.	Mr. Attaporn Wonglimaswat	Senior Surveyor, Survey and Engineering Bureau, Marine Department
7.	Mr. Jirat Laksanalamai	Civil Engineer, Practitioner Level, Engineering Bureau Marine Department
8.	Mr. Attapan Diloksopon	Civil Engineering, Professional Level, Office of Project Management, Royal Irrigation Department, Thailand
9.	Mrs. Jittra Boonrod	Foreign Relation Officer, Professional Level, Office of Project Management, Royal Irrigation Department, Thailand

APPENDIX B

PRE- AND POST MONSOON SURVEY

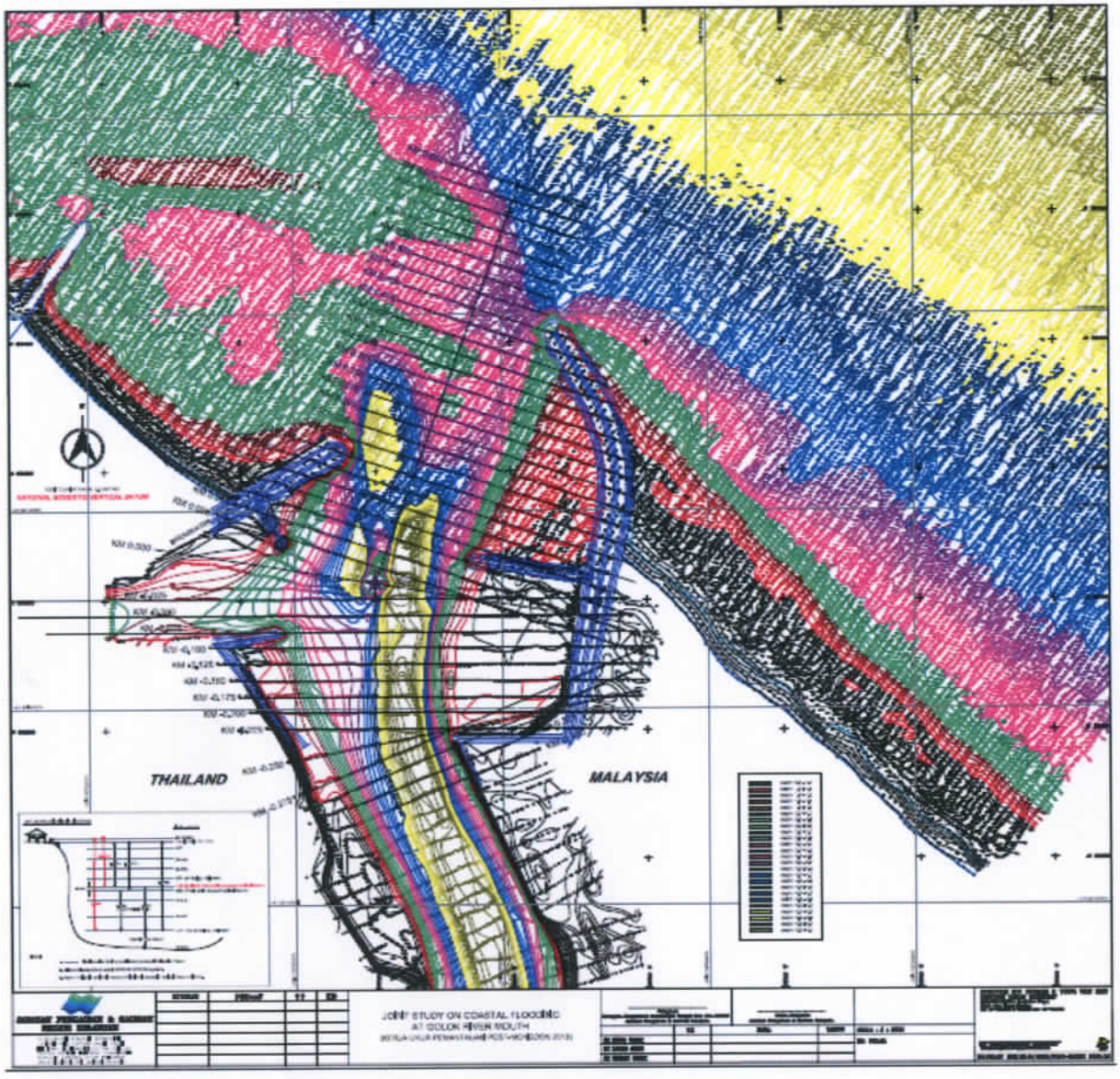
APPENDIX B1

PRE-MONSOON SURVEY
(OCTOBER 2012)



APPENDIX B2

POST-MONSOON SURVEY
(MARCH 2013)

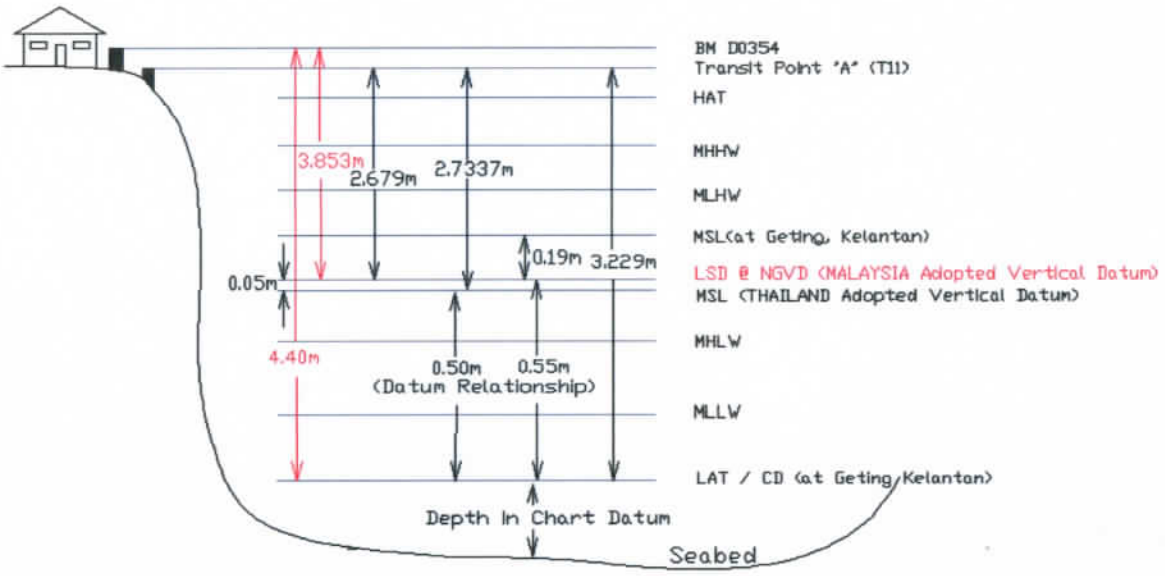


APPENDIX C

DATUM RELATIONSHIP

DATUM RELATIONSHIP DIAGRAM

TIDAL LEVELS



Notes;

— Tidal level at Geting (published by Royal Malaysian Navy)

1. Mean Sea Level (MSL) at Thailand side as was given by Mr. AttapanDiloksopn which is 2.7337m (MSL) below Transit Point A (T11).
2. JurukurNikHisham& Tung Sdn. Bhd. was leveled from Government Benchmark BM D 0354 (RL: 4.40m CD, 3.853m NGVD) to Transit Point A (T11) and the Chart Datum (CD) value at T11 is 3.229m (CD) or 2.679 m above NGVD.
3. The datum relationship between LSD @ NGVD (Malaysia) and MSL (Thailand) is 0.05m
4. The datum relationship between MSL (at Geting, Kelantan) and MSL (Thailand Adopted Vertical Datum) is 0.24m. The conversion formula of survey data in MSL (Thailand Adopted Vertical Datum) to MSL (at Geting, Kelantan) as below:

Survey Data in MSL (at Geting, Kelantan) = Survey data in MSL (Thailand Adopted Vertical Datum) – 0.24m

APPENDIX D

MINUTES OF MEETING
OF
JOINT STUDY TECHNICAL MEETING

KANGAR, PERLIS, MALAYSIA
14TH TO 15TH JANUARY 2013

Minutes of Meeting
Joint Study Pre-Meeting
14 – 15 January 2013 in Kangar, Perlis, Malaysia

MATTERS DISCUSSED AND AGREED

1. Thai side to reconfirm the catchment boundary on Thai side i.e. based on the topographic map
2. Both sides to provide daily and hourly data (if available) of all stations within catchment area for hydrological analysis.
3. Both sides to determine the gauging types i.e. telemetry or manual or automatic, and location of each station.
4. Both sides to provide flood map to combine with each others flood maps.
5. Both sides to provide all structural geometrical dimension information (if the as built info is not available).
6. Both sides to provide tide data to compare and expand the tidal analysis.
7. Both sides to provide detailed topographical map of 1m contour interval (for flood prone area).

INFORMATION

8. Malaysia side has 4 stream flow stations; 2 discharge and rainfall gauging stations at RantauPanjang and Jenob which is located along Golok river; 1 water level gauging stations at Sg. Lanas and Sg. Lemal (main tributaries of Golok river), and 1 water level station further upstream of Golok river.
9. Thailand side has 3 telemetry stations; 1 water level station with rating curve at RantauPanjang; 2 water level gauging stations at Waeng and Muno.
10. Thailand side has 1 suspended sediment station in RantauPanjang (manual).Malaysia side also has 1 suspended sediment station in RantauPanjang
11. Both sides to review the flood map before and after the construction of breakwater (pre and post monsoon) – Both side would review all past flood

event and compare with the timeline of river and river mouth structure construction.

12. Malaysia side to focus on the coastal flooding at the GolokRivercatchment.
13. Thai side to focus on the shoreline change study along the coastline.
14. Malaysia side to provide respective findings in the river mouth (the overlap study area) to Thailand side to assess the impact on shoreline change
15. Both sides to provide each other respective findings at river mouth in order to come up with the recommended options (Malaysia – breakwater options, Thai – erosion impact assessment).
16. Thai side useMIKE21, MIKE11 and Genesis software in the analysis.
17. Malaysia side useMIKE21, XP-SWMM, HEC-HMSand RORB software.
18. Thai side to consider scouring problem at Transit Point 'B'
19. There are no tides stations at TakBairiver. Malaysian side will use regional tide projectionto estimate sea water level at TakBai.
20. The active discussion between both consultants and surveyors are allowed. However, all data sharing between both countries must go through appropriate authorities through JET on both sides
21. Upstream boundary of hydraulic modelling by Malaysia side is up to RantauPanjang and at Thai sideup toWaengdistrict.
22. Malaysiafield data survey collection includes water level, suspended sediment and current at Area 1(Primary survey data for calibration)
23. Thai side to study the effectiveness of the groynes.
24. Malaysia side inform the significant contribution of Sg Kelantan on sediment volume

APPENDIX I

Attendance List
Joint Study Pre-Meeting
14 – 15 January 2013
Kangar, Perlis, Malaysia

MALAYSIAN DELEGATES

1.	Dato' Ir. Lim Chow Hock	Director River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
2.	Ir C. Poobalan	Senior Deputy Director River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
3.	Ir Abdullah Isnin	Deputy Director River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
4.	Mohd Sor Othman	Senior Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia
5.	Mohamad Radzi Abdul Talib	Engineer Water Resources and Hydrology Management Division Department of Irrigation and Drainage Malaysia
6.	Mohamed Nazif Daud	Engineer Department of Irrigation and Drainage Malaysia
7.	W. Mohd Asraff bin Wan Hanafi	Assistant Engineer Department of Irrigation and Drainage of Kelantan Malaysia
8.	Mohd Eizam Yusof	Engineer Department of Irrigation and Drainage Malaysia
9.	Aisyah Sakina Ahmad	Engineer River Basin and Coastal Zone Management Department of Irrigation and Drainage Malaysia

APPENDIX II

Attendance List
Joint Study Pre-Meeting

14 – 15 January 2013
Kangar, Perlis, Malaysia

CONSULTANTTEAM (MALAYSIA)

1.	Ir Khor Chai Huat	Angkasa Consulting Services Sdn. Bhd.
2.	Ir Lim See Tian	Angkasa Consulting Services Sdn. Bhd.
3.	Dr Lim Foo Hoat	Angkasa Consulting Services Sdn. Bhd.
4.	Ir Norzana Mohd Anuar	Angkasa Consulting Services Sdn. Bhd.
5.	Darren Soh	Angkasa Consulting Services Sdn. Bhd.
6.	Sr Nik Hisham Nik Mansor	NikHisham and Tung Sdn. Bhd.
7.	Shafizie Mokhtar	NikHisham and Tung Sdn. Bhd.

THAILAND DELEGATES

1.	Mr. Somchai Imyoo	Director Hydrology and Water Management Center for Southern Region Office of Hydrology and Water Management Royal Irrigation Department
2.	Ms. Chawee Wongprasittiporn	Civil Engineer, Professional Level Office of Project Management Royal Irrigation Department
3.	Mr. Attapan Diloksopon	Civil Engineer, Professional Level Office of Project Management Royal Irrigation Department

CONSULTANT TEAM (THAILAND)

1.	Dr. Sutat Vesakul	Thammasat University Research and Consultancy Institute
2.	Dr. Mana Patarapanich	Thammasat University Research and Consultancy Institute

APPENDIX III

STUDY ISSUES

All Data to be provided by End of February 2013 by both sides

No	Issues	Description	Remarks/ Actions
1	Flood Extent	• Flood peak and duration in hourly data to be provided from 1965 to most recent year • Annual peak and historical flood event (hourly data) • Flood peak for all water level and streamflow stations in located in the catchment area on Thailand side	• Similar data to be provided to Thailand
2	Historical Flood (Inundated Area)	• Revise Golok river catchment boundary on Thailand side to be defined by Thailand to be provided for reference • Maximum inundation area of Thailand flood map for each flood event to be provided in the basin from 1965 onwards	• Data from Thailand available 2007, 2008, 2009, 2010, & 2011 • Similar data to be provided to Thailand • Thailand to reconfirm the catchment boundary on Thailand side
3	River Structures – History, Levels (eg. Crest, Roads), Length 1. River Bund 2. Culvert 3. Breakwater/ Groyne	• Dimensions and geometry of all existing river structures along the Golok river by Thailand • Crest level and length of river and outlet structures to be provided for reference (Base on As-built drawings, if available) • Road, culverts and bund embankment levels and lengths to be provided for reference (Base on As-built drawings, if available)	• Similar data to be provided to Thailand
4	Tidal Station	• Tidal/water level in hourly (if available) and tidal constituents data	• Data from Narathiwat Province • Geting, Kelantan, Chendering, Terengganu and TanjungGelang, Pahang

No	Issues	Description	Remarks/ Actions
5	Rainfall Data (Daily, Hourly), ie. currently Monthly	• Data required for in-depth hydrological analysis • Daily data from manual station • Hourly data from automatic station for selected events • Refer to Appendix 'A' - Malaysia and Appendix 'B' - Thailand	• Data request is within Golok catchment boundary • Data request also from nearby catchment boundary • Webpage location of hydrological data set from Malaysia; www.h2o.water.gov.my
6	Water Quality Data (Baseline assessment)	• Water quality data request is from any available records near the study area for all duration for the purpose to determine baseline conditions	• Similar data will be provided to Thailand
7	Coastal Study – Literature Review, Overlap	• Coastal modeling study would result in potential overlap of works particularly at river mouth area at 5km north and 5km south along the coastline • Malaysia side would only model 5km north and 5km south of survey data along the coastline from the river mouth and any extension will be based on available secondary data	• Similar digitize dataset to be provided to both parties • Year of survey to be mentioned for Malaysia and for Thailand respectively
8	Coastal Protection (eg. Breakwater) – Sedimentation Impacts	• Dimension and geometry information of coastal and river structures, eg. Breakwater and Groyne, for within the scope of the study area to be provided for reference • Reports on siltation and sediment, erosion and accretion in the vicinity of the structure	• Past reports may be available but in Thai language, eg. EIA study after construction on possible additional structures, and SEATEC study on the extension of the groyne, if available • Thailand consultant would be undertaking the study and the report will be provided to the joint study after completion
9	Wind Data	• Wind data from 1965 onwards, from Thailand Meteorological Department to be used for Storm Surge analysis	• Similar data to be provided, if available
10	Topographic	• Topographic map contour at 1m interval shall	• Similar to Thailand

No	Issues	Description	Remarks/ Actions
	Map Contour	encompass all historical flood areas	
11	Landuse map	• Landuse information	• Similar to be provided to Thailand
12	Aerial Photo	• Request made by Thailand	• Malaysia to search and confirm availability
13	Satellite image	• Request made by Thailand	• Malaysia to search and confirm availability
14	Suspended Sediment Data	• Request made by Thailand	• Data obtained and processing progress. Will be made available soon
15	Bathymetric Survey	• Area 1, 2M, & 5M has been completed and requested by Thailand	• Data has been provided to Thailand
16	Field Survey Measurement, eg. ADCP, current and water level	• Request made by Thailand	• Data to be provided to Thailand • Location of field survey by Thailand will be discussed further with Thailand

SURVEY INFORMATION AND ISSUES:

No	Issues	Description	Remarks/ Action
1	Reference Datum - Control Station at Site	• Thailand side is to provide Height values (z), eg. Chart Datum (CD), &MSL, and Horizontal values (x,y) at Transit Point 'A' and the x,y,z values at benchmark RantauPanjang cableway • Reference Datum at Intersect Point 'A' and at the benchmark RantauPanjang cableway	• Similar to be provided to Thailand • Malaysia side will establish benchmark opposite Transit Point 'A'
2	Sounding Datum for Bathymetric	• Malaysian side is to provide Datum at Transit Point 'B' and shall provide such Datum for future reference to Thailand. • Malaysian side will provide Chart Datum (CD), MSL, & LSD (NGVD) levels for Transit Point 'B' to Thailand.	• To be carried out in next JET meeting
3	Projection Universal Transverse Mercator, UTM48	• Thailand side is to provide Horizontal coordinates (x,y) at Transit Point 'A' in UTM	• Similar to be adopted for Thailand

		48	
4	Establish Control Point (Station) at Transit Point 'B'	• Intersect Point 'B' is a Coastal datum suitable for Joint Coastline studies. • In Malaysia, the datum is well established at Geting, located at LKIM Jetty and is approximately 2km away, reducing possibility of 'mis-closure' error. Eg. RantauPanjang cableway station is located approximately 40km away from the river mouth.	• To be discussed later in the next JET meeting
5	River Cross Section (Malaysia Side, Area 5M) 1. River Cross Section at First 4.2km (Interval=25m & 200m) 2. Inland Cross Section from 4.2km up to RantauPanjang Station	• River cross section at Area 5T to be provide by Thailand side to match with survey data at Area 5M • Interval of survey for Area 5M is 100m inland extending from the river bank, at 1,000m intervals • River cross sections drawn in AutoCAD to be provided and to indicate Datum, to allow matching with Area 5M	• Excel site survey raw data from Thailand to be given first and the AutoCAD processed data to be made available later • Completed cross section data to be shared between Thailand and Malaysia

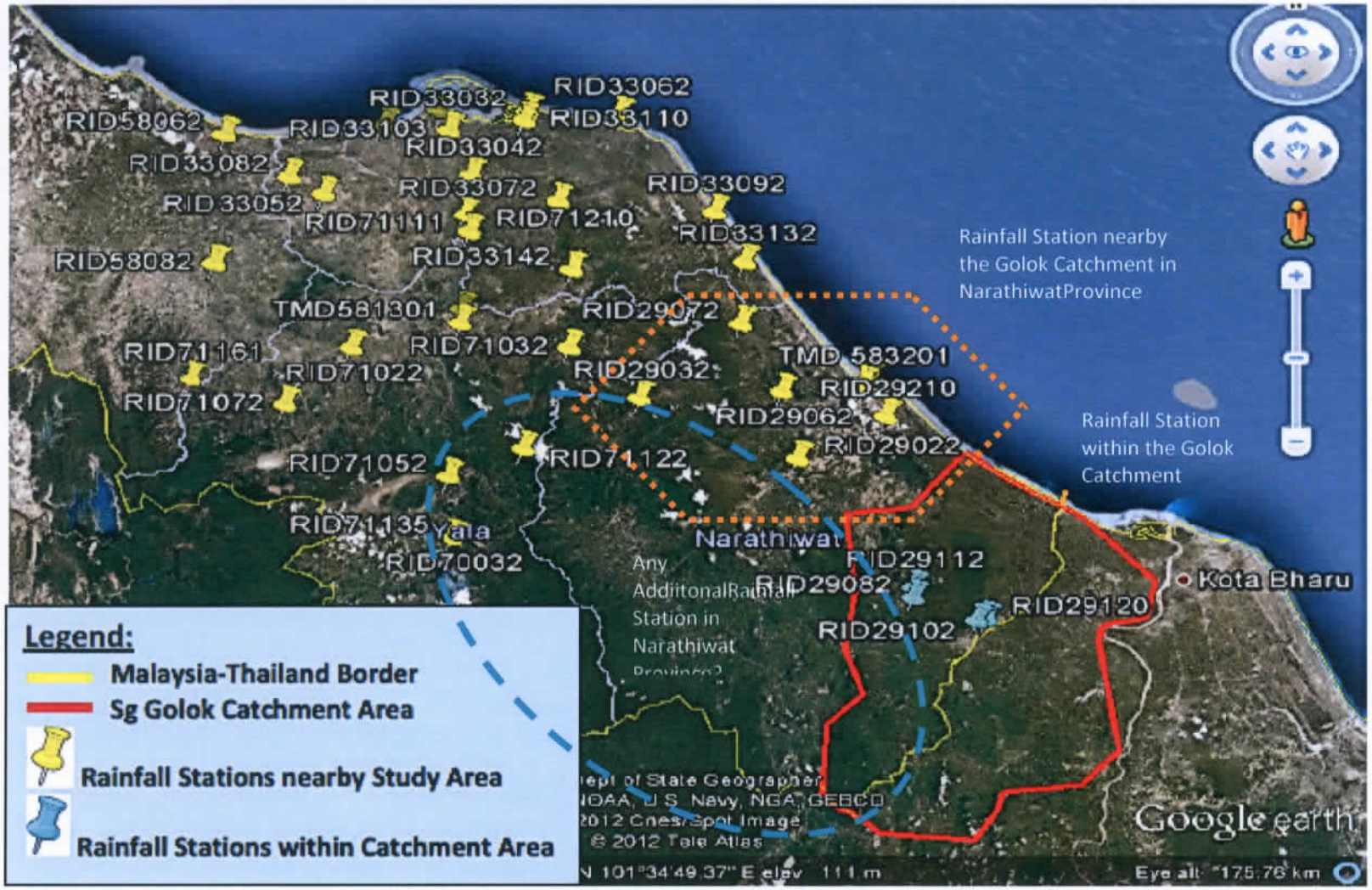
DATA REQUESTED BY MALAYSIAN SIDE

A. Rainfall Stations within the Golok Catchment Boundary (Thailand)

No	Station No.	StationName	Province	Latitude	Longitude	Duration (Years)	Missing Data (Years)	Duration (minus Missing Data)
1	RID29082	KhokPripheng Rubber Experimental Sub-Station	Narathiwat	6° 4' 0.012"	101° 52' 59.988"	1954-1970		17
2	RID29102	A. Sungai Kolok	Narathiwat	6° 1' 38.9994"	101° 58' 8.004"	1968-2011		44
3	RID29112	A. SumgaiPadi	Narathiwat	6° 4' 58.0074"	101° 52' 59.016"	1971-2010		40
4	RID29120	Pesemut, A. Su Ngai Kolok	Narathiwat	6° 1' 51.9954"	101° 58' 49.0074"	1971-2001	1990-1995	25

B. Rainfall Stations Near the Golok Catchment Bounday (in Narathiwat Province)

No	Station No.	StationName	Province	Latitude	Longitude	Duration (Years)	Missing Data (Years)	Duration (minus Missing Data)
1	RID29013	A. Muang	Narathiwat	6° 25' 26.004"	101° 49' 35.004"	1952-2011		60
2	RID29022	A. Rangae	Narathiwat	6° 17' 39.9834"	101° 43' 51.996"	1953-2011		59
3	RID29032	A. Ruso	Narathiwat	6° 23' 35.9874"	101° 31' 15.9954"	1968-2011		44
4	RID29062	A. Yi-Ngo	Narathiwat	6° 24' 15.0114"	101° 42' 33.984"	1952-2011		60
5	RID29072	A. Bacho	Narathiwat	6° 30' 52.9914"	101° 39' 20.0154"	1964-2011		48
6	RID29210	Klai Ban Tank (TNK.154)	Narathiwat	6° 21' 48.996"	101° 50' 53.016"	1986-2006		21


RID33062
RID33082
RID33110
RID58062
RID33103
RID33042
RID33082
RID33072
RID33092
RID33052
RID71111
RID71210
RID33132
RID58082
RID33142
Rainfall Station nearby the Golok Catchment in NarathiwatProvince
TMD581301
RID29072
RID71161
RID71032
TMD 583201
RID71022
RID29032
RID29210
RID71072
RID29062
RID29022
RID71052
RID71122
Rainfall Station within the Golok Catchment
RID71135
Yala
Narathiwat
RID70032
RID29112
Any AddiitonalRainfall Station in Narathiwat Province?
RID29082
Kota Bharu
RID29120
RID29102
Legend:
Malaysia-Thailand Border
Sg Golok Catchment Area
Rainfall Stations nearby Study Area
Rainfall Stations within Catchment Area
Dept of State Geographer
NOAA, U.S. Navy, NGA, GEBCO
2012 Cnes/Spot Image
© 2012 Tele Atlas
Google earth
N 101°34'49.37" E elev 111 m
Eye alt 175.76 km

DATA REQUESTED BY THAILAND SIDE

Summary of rainfall stations inside Go-lok Catchment and its vicinity

No.	Station Code	Station Name	District	River	River Basin	Latitude	Longitude	Data Period
1	5718001	Kg. GemangBahru	Jeli	Lanas	Kelantan	5º 45' 40"	101º 52' 00"	1956 - Present
2	5718002	Air Lanas	Jeli	Lanas	Go-lok	5º 46' 30"	101º 53' 20"	1980 - Present
3	5719001	Kg. Durian Daun (Lawang)	Tanah Merah	Jedok	Go-lok	5º 46' 50"	101º 58' 05"	1979 - Present
4	5818001	Jenob	Tanah Merah	Go-lok	Go-lok	5º 49' 58"	101º 52' 59"	
5	5820005	Pej. PertanianBatangMerbau	Tanah Merah	Go-lok	Go-lok	5º 48' 45"	102º 01' 15"	1964 - Present
6	5820006	BendangNyior	Tanah Merah	Jegor	Kelantan	5º 50' 40"	102º 04' 25"	1980 - Present
7	5821007	Stn.KeretapiBkt. Panau	Tanah Merah	Kelantan	Kelantan	5º 53' 30"	102º 09' 30"	1948 - Present
8	5919003	Bkt. Kwong	P. Mas/R. Paniang	Go-lok	Gp-lok	5º 55' 35"	101º 57' 30"	1960 - Present
9	5920008	Kg. BatuKarang	P. Mas/R. Paniang	Go-lok	Go-lok	5º 57' 25"	102º 04' 56"	
10	5920011	Tandak Mount	P. Mas/R. Paniang	Go-lok	Go-lok	5º 55' 13"	102º 01' 37"	1958 - Present
11	5920012	Tandak Village	P. Mas/R. Paniang	Tasik	Go-lok	5º 55' 00"	102º 02' 15"	1980 – Present
12	5921009	IbuBekalan To' Uban	Pasir Mas	Jegor	Go-lok	5º 58' 10"	102º 08' 15"	1948 - Present
13	6019004	Custom Quarters	RantauPanjang	Go-lok	Go-lok	6º 01' 25"	101º 58' 45"	1948 – Present
14	6020012	Stn.KeretapiGualPeriok	Pasir Mas	Lemal	Go-lok	6º 01' 45"	102º 01' 20"	1984 - 1966
15	6021010	Rumah Pam Repek	Pasir Mas	Lemal	Go-lok	6º 00' 45"	102º 06' 10"	1940 - Present
16	6021013	DID Quarters at Meranti	Pasir Mas	Kelantan	Kelantan	6º 06' 00"	102º 06' 30"	1964 – Present
17	6120014	Kuala Jambu	Tumpat	Go-lok	Kelantan	6º 09' 00"	102º 05' 45"	1957 – Present
18	6121015	ChabangAmpat	Tumpat	Kelantan	Kelantan	6º 09' 20"	102º 09' 25"	1963 - Present

Remark Requested rainfall data are daily data duration in the past 30 years at 18 stations listed above

WORK PROGRAM FOR JOINT STUDY ON COASTAL FLOODING AT GOLOK RIVERMOUTH, KELANTAN DARUL NAIM