

Feasibility Test of Setumu Beach in Tanjungpinang City Riau Islands Province as a Rukyatul Hilal Location

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Abstract

The basis for selecting Setumu Beach as the location of the rukyatul hilal because the failure to see the hilal in Bukit Cermin for 6 years. The Regional Office of Ministry of Religious Affairs of Riau Islands Province then conducted a survey to Setumu Beach and it was seen that Setumu Beach had wide visibility, an easily accessible location and there were various kinds of facilities and infrastructure. After further research, Setumu Beach is not supported by primary parameters, because the geographical conditions are blocked by trees, Soreh Island, highlands or small islands and lowlands at azimuth 240°-300°. Meanwhile, the weather conditions are also not supportive, because Tanjungpinang City has low air temperature, high humidity and rainfall, causing Tanjungpinang City to be more often in cloudy weather conditions and enter the wet month criteria. This is also supported by the results of rukyatul hilal report from Riau Islands Province Hisab Rukyat Team which always failed to see the hilal from 2021-2024 due to weather factors. Setumu Beach is supported by secondary parameters, because in terms of accessibility and facilities Setumu Beach is quite adequate. Because Setumu Beach is not supported by primary parameters and supported by secondary parameters, Setumu Beach is less suitable as a rukyatul hilal location.

Article Info

Received:

14 Mei 2025

Revised:

21 Juni 2025

Accepted:

23 Juni 2025

Published:

30 Juni 2025

Keywords: *Feasibility, Setumu Beach, Rukyatul Hilal*

A. Introduction

The determination of the beginning of the lunar month is very important for all Muslims, because there are many worship services whose implementation follows the calculation of the lunar month [1]. The worship is such as the obligatory fasting set time in the month of Ramadan, Eid al-Fitr prayer on 01 Shawwal, Eid al-Adha prayer on 10 Zulhijjah and other worship [2]. The activity of rukyatul hilal is the implementation of the Prophet Muhammad's command to carry out fasting and holidays based on the sighting of the hilal which is widely narrated in several hadith books. There are at least 56 hadiths about the command to carry out fasting and holidays based on the sighting of the hilal with various

redactions from several books of hadith that were successfully collected by Susiknan Azhari in his book *Hisab & Rukyat, Wacana Membangun Kebersamaan di Tengah Perbedaan*. The author then researches some of them from several hadith books including:

حَدَّثَنَا آدَمُ حَدَّثَنَا شُعْبَةُ حَدَّثَنَا مُحَمَّدُ بْنُ زِيَادٍ قَالَ سَمِعْتُ أَبَا هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ يَقُولُ قَالَ النَّبِيُّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ أَوْ قَالَ قَالَ أَبُو الْقَاسِمِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ صُومُوا لِرُؤُوسِهِ وَأَفْطِرُوا لِرُؤُوسِهِ فَإِنْ غَبِيَ عَلَيْكُمْ فَأَكْمِلُوا عِدَّةَ شَعْبَانَ ثَلَاثِينَ (رواه البخاري)

“Adam has narrated to us, narrated by Shu'bah that Muhammad bin Ziyad said: I heard Abu Hurairah say: The Prophet (SAW) or Abul Qasim (Muhammad) SAW said: Fast on the basis of seeing the new moon and break the fast on the basis of seeing it. If you are covered (by clouds) then complete the number of Sha'ban to thirty (days)” [3]. (HR. Al Bukhari)

حَدَّثَنَا عَبْدُ الرَّحْمَنِ بْنُ سَلَامٍ الْجَمْعِيُّ . حَدَّثَنَا الرَّبِيعُ (يَعْنِي ابْنَ مُسْلِمٍ) عَنْ مُحَمَّدٍ (وَهُوَ ابْنُ زِيَادٍ) عَنْ أَبِي هُرَيْرَةَ رَضِيَ اللَّهُ عَنْهُ ؛ أَنَّ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَالَ (صُومُوا لِرُؤُوسِهِ وَأَفْطِرُوا لِرُؤُوسِهِ . فَإِنْ غُمِيَ عَلَيْكُمْ فَأَكْمِلُوا الْعِدَّةَ) (رواه مسلم)

“Abu Bakr ibn Abi Shibah told us Abu Usamah told us Ubaidillah from Nasi' ibn 'Umar (may Allah be pleased with him) that the Messenger of Allah (may Allah's peace and blessings be upon him) spoke about the month of Ramadan and showed his hands and said: the moon is like this, like this, then he put his thumbs together at the third movement. So fast on the basis of the sighting of the new moon and break the fast on the basis of the sighting of the new moon, and if a cloud prevents you from doing so, then complete thirty days” [4]. (HR Muslim)

In Indonesia, the method used in determining the beginning of the lunar month is using rukyat. Every time the fasting month begins, the Ministry of Religious Affairs deploys hilal observers in 123 locations from 34 provinces in Indonesia [5]. However, from 123 locations only a few locations managed to see the hilal. Rukyatul hilal is not an easy matter, often the hilal cannot be seen even using sophisticated technology. Eye sharpness and experience are also not a guarantee of being able to see the very thin hilal. There are other factors that also greatly affect the implementation of rukyat, such as climate, observation methods, and observation sites.

Not all places determined by the Ministry of Religious Affairs can see the hilal, even certain places can see the hilal. A suitable location for the implementation of observations of the beginning of the lunar month is a location that allows observers to carry out observations around the location of sunset, especially at an azimuth of 240°-300° [6]. Another factor that

greatly affects the feasibility of rukyatul hilal location is the climate in the area. The brightness of the sky from air pollution and city lights around the direction of sunset is a very important requirement for rukyatul hilal. The ideal location for rukyatul hilal is a highland area with a free view to the west.

Most rukyatul hilal locations in Indonesia have problems with climatic conditions, most of which are tropical wet climate due to the influence of Indonesia's geographical situation which consists of islands. So that in the afternoon the area adjacent to the sea often occurs evaporation that forms thick clouds around the surface of the western horizon. This is often an obstacle in the implementation of rukyatul hilal, so often the results of rukyatul hilal report from local Hisab Rukyat Team that the hilal observation results are not visible due to thick clouds, cloudy, cloud-covered and so on [7].

The ideal location for rukyatul hilal has several parameters that are used as benchmarks to test the feasibility of an observation site. There are primary parameters and secondary parameters. Primary parameters are parameters that directly affect whether or not rukyat can be done, namely, the geographical conditions of the place and weather or climate conditions. While secondary parameters are additional parameters that do not directly affect the implementation of rukyat but affect the results of rukyat, namely, the accessibility of the place and the availability of facilities.

Setumu Beach is one of the rukyatul hilal location points appointed by the Indonesian Ministry of Religion to carry out rukyatul hilal in Riau Islands Province. Setumu Beach has been used as a rukyatul hilal location since 2021. The implementation of rukyatul hilal at Setumu Beach is carried out 3 times in 1 year, namely in determining the beginning of Ramadan, the beginning of Shawwal, and the beginning of Dhulhijjah. However, since 2021-2024 the Riau Islands Province Hisab Rukyat Team has always failed to see the hilal. So that if calculated there are 12 times the implementation of rukyatul hilal that failed to be seen. Meanwhile, BMKG Tanjungpinang City, which has carried out rukyatul hilal independently every month since 2020 and if calculated, there are 48 times the implementation of rukyatul hilal has also failed to see the hilal. With the problems and opinions regarding the ideal location for rukyatul hilal, as well as factors that greatly affect the feasibility of rukyatul hilal location, it is necessary to conduct further research on the feasibility test of Setumu Beach as one of rukyatul hilal locations in Indonesia.

B. Method

The research was conducted using a qualitative approach and descriptive research type. The qualitative approach is intended because the primary data is narrative data in the form of interviews, observation reports or information in the form of documents. Qualitative research emphasises the researcher as a research subject or key instrument, where the researcher himself will go directly to collect data naturally without setting. While descriptive is one of the methods used in carrying out qualitative research by describing the phenomena that occur. Data collection uses observation, interview and documentation instruments to determine the feasibility of Setumu Beach as a rukyatul hilal location.

Primary data sources are obtained by researchers to answer research questions [8]. Primary sources in this study are observation results. In this case, researchers will conduct field observations to find out more clearly about the geographical conditions of Setumu Beach. Researchers also conducted interviews with competent sources, namely from the Hisab Rukyat Team of the Ministry of Religion of Riau Islands Province. Secondary data in this study comes from books, articles, scientific works published in mass media such as magazines and newspapers, as well as scientific journals and research reports [9].

In this study, researchers conducted direct observation or observation of the object of research in order to find out more clearly about the geographical conditions of Setumu Beach so that systematic recording of symptoms that appear on the object of research can be done optimally [10]. Researchers conducted interviews with competent sources, such as the Hisab Rukyat Team of the Ministry of Religion of Riau Islands Province and parties who had carried out rukyatul hilal activities at Setumu Beach. The data to be extracted from the sources is the basis for choosing Setumu Beach as the location of the rukyatul hilal and the report on the rukyatul hilal activities that have been carried out at Setumu Beach. Researchers collect data by looking at or recording a report that is already available. This method is done by looking at official documents such as monographs, decrees from related institutions, records and existing regulation books. The data sought is documentation about the selection of Setumu Beach as the location of

rukyyatul hilal, data regarding geographical, climatological conditions and recapitulation of annual weather anomalies in Tanjungpinang City. In this case, researchers visited the relevant institutions, namely the Riau Islands Province Hisab Rukyat Team, and BMKG Tanjungpinang City.

Before collecting data, the researcher first developed a theory about the ideal parameters for rukyyatul hilal location. This theory was generalised from several expert opinions about the ideal location for rukyyatul hilal. After the data is collected, then the data is processed and analysed. In analysing the data, researchers used descriptive analysis techniques [11], by synchronising the theory of ideal parameters for rukyyatul hilal locations with the reality on Setumu Beach during observation. This kind of analysis technique is a process flow in qualitative research [12]. To get accurate data, researchers collaborated with the Riau Islands Province Hisab Rukyat Team and BMKG Tanjungpinang City. Data from documents and interview results are used to support primary data in the form of observation results.

There are two ideal parameters for an ideal location for rukyyatul hilal, namely primary parameters and secondary parameters. Primary parameters are parameters that directly affect the observation results, such as geographical conditions, weather and climate. Secondary parameters are parameters that do not directly affect the observation results, such as accessibility, facilities and others.

Based on the results of the location observation and the data that the researchers collected, the researchers then adjusted the phenomena at Setumu Beach with the theory of ideal parameters for the rukyyatul hilal location. There are several levels of assessment of the object of research, namely feasible, quite feasible, less feasible and not feasible. Setumu Beach is feasible as a rukyyatul hilal location if it is supported by primary and secondary parameters. Setumu Beach is feasible if only supported by primary parameters. Setumu Beach is less feasible for rukyyatul hilal location if it is supported by secondary parameters only and Setumu Beach is not feasible if it is not supported by primary or secondary parameters.

C. Results and Discussion

The Basis For Selecting Setumu Beach As A Rukyatul Hilal Location

The utilisation of official locations in rukyatul hilal activities at the Ministry of Religious Affairs of Riau Islands Province began in 2006, at which time there was a change in the Law of the Republic of Indonesia Number 5 of 2004 against Law Number 14 of 1985 concerning the Supreme Court. Based on this law, the Religious Courts that were originally under the auspices of the Ministry of Religious Affairs of the Republic of Indonesia moved under the auspices of the Supreme Court, also known as the One-Stop Court. So all Indonesian judicial institutions are gathered under one roof of the Supreme Court of the Republic of Indonesia. That way the transition of the task of hisab and rukyat which was originally the task of the Religious High Court moved to the duties and obligations of the Ministry of Religion. On that basis, the Ministry of Religious Affairs of Riau Islands Province began to look for rukyatul hilal locations that they thought were feasible and strategic.

However, in 2006, in the Central Ministry of Religious Affairs in Jakarta only the newly formed field of Shari'ah Development and Hisab Rukyat, while in the Regional Ministry of Religious Affairs the Hisab and Rukyat Agency had not yet been formed [13]. The Riau Islands region itself only became a province in 2004 and only had a Regional Office of the Ministry of Religion officially in 2006 and who served as Head of the Regional Office of the Ministry of Religion for the first time, Drs. H. Razali. At that time the affairs of hisab and rukyat by Razali were submitted to the field of Zakat, Waqf and Ibsos of the Ministry of Religion of Riau Islands Province [14]. At that time, the Regional Office of the Ministry of Religious Affairs of Riau Islands Province began to look for a rukyatul hilal location and found Sadap Hotel Tanjungpinang as the first rukyatul hilal location. However, due to an obstruction from the direction of view of the western horizon 0° to the south to 28.5° which is blocked by Penyengat Island [15]. On other occasions, Riau Islands Province Hisab Rukyat Team has also conducted rukyat at Nirwana Lagoi Beach together with Bintan Regency Hisab Rukyat Team with the hope that Nirwana Lagoi Beach can be used as a base for rukyatul hilal location by Riau Islands Province Hisab Rukyat Team. Nirwana Lagoi Beach has not given satisfaction to the Riau Islands Province Hisab Rukyat Team, because on a beach that is very clean from pollution obstacles it still has shortcomings, namely frequent evaporation so that clouds often appear around the western horizon at the time of carrying out rukyatul hilal, and access to the place is also relatively far.

In the same year, on August 30, 2007, the Head of the Regional Office of the Ministry of Religious Affairs of Riau Islands, Drs. H. Razali, formed and appointed the Management of Riau Islands Province Hisab Rukyat Team for the 2007-2010 Period, chaired by Drs. H. Marwin [16], the current chairman of the Regional Office of the Ministry of Religious Affairs of Riau Islands, who at that time served as the Head of URAIS of the Regional Office of the Ministry of Religious Affairs of Riau Islands [17]. Regarding the Decree on Legal Entities such as Riau Islands Province Hisab Rukyat Team, it should have been decided by the Provincial Government, however, at that time the proposal for the establishment of Riau Islands Province Hisab Rukyat Team by the administrators and the Governor was not accepted by the Legal Bureau, even though the Decree had been signed by the Governor of the Riau Islands, who at that time was Ismeth Abdullah. This happened until twice rejected by the Legal Bureau, finally the Head of the Riau Islands Ministry of Religion together with members of the Religious Court and Islamic organizations agreed to make a decree derived from the Provincial Ministry of Religion.

Considering that Lagoi Beach was not recommended as a rukyatul hilal location, Riau Islands Province Hisab Rukyat Team began to look for other places for the next rukyatul hilal implementation. The search for the rukyatul hilal location lasted from 2007 to 2011. From the restaurant Sungai Enam Tanjungpinang, Bukit Berakit Bintan, and finally the tower of the Riau Islands Provincial Grand Mosque, all places have never seen the hilal. After the process of moving from one place to another, Riau Islands Province Hisab Rukyat Team decided to utilize the Sungai Enam Tanjungpinang restaurant as the rukyatul hilal location for 2012-2014. Considering that among the three places, the Sungai Enam Restaurant is the most feasible to use for some time until a better and more feasible rukyatul hilal location can be found by the Regional Office of the Ministry of Religious Affairs of Riau Islands.

Then in 2015, the rukyatul hilal activity moved to Bukit Cermin, Tanjungpinang City, Riau Islands Province. The base of the place used is Kafe Puncak which is at the top of Bukit Cermin. This was based on the results of Utha Chuandra's research when he first took office in 2012. However, what is unfortunate is that this research is only based on the access to a place that is easily accessible because it is in the middle of the city and from a geographical point of view, namely the height of the place, has a view of the horizon that makes it possible to rukyatul hilal, although in reality there is still a little barrier, namely the signal tower owned by PT. Telkomsel at azimuth 279° 32' 50" [18]. While scientifically about the natural

conditions in the location has never been researched. Whereas in depth research on natural conditions is important to be a reference material for determining the location of the next rukyatul hilal. Because learning from previous experiences at Nirwana Beach Lagoi, Sadap Hotel, Sungai Enam restaurant, and the tower of the Great Mosque Dompok Riau Islands have problems with weather, climate and horizon views.

And no less important to be guided by the determination of the location of rukyat in PBNU Decree No. 311/A.II.03/01/1994 points 1 and 2 regarding Operational Guidelines for the Implementation of *Rukyat Bil Fi'li* in the Nahdlatul Ulama region, where the locations for organizing rukyatul hilal are determined based on the following considerations [19]:

- 1) That the location in question has proven the success of rukyatul hilal at previous times.
- 2) That geographically and astronomically the location in question allows rukyatul hilal.

Rukyatul hilal activities in Bukit Cermin have been carried out since 2015 until 2021 in determining the beginning of Shawwal 1442 H. During these 6 years, the hilal was never successfully sighted. So that the Regional Office of the Ministry of Religion of Riau Islands Province is looking for a new location to carry out rukyatul hilal for determining the beginning of Dzuhijjah 1442 H. The Regional Office of the Ministry of Religious Affairs of Riau Islands Province once asked BMKG Tanjungpinang City for recommendations to determine the ideal location for rukyatul hilal [20]. BMKG Tanjungpinang City has never conducted a survey regarding the ideal location for rukyatul hilal in Tanjungpinang. BMKG Tanjungpinang feels that to determine an ideal location requires a survey over a long period of time, so BMKG Tanjungpinang City cannot provide recommendations for the ideal location for rukyatul hilal to the Regional Office of the Ministry of Religious Affairs of Riau Islands Province [21].

The Regional Office of the Ministry of Religious Affairs of Riau Islands Province then conducted a survey with Mr. Muhammad Hasbi and Mr. Utha Chuandra to determine the location of the next rukyatul hilal. They surveyed Setumu Beach and saw that Setumu Beach has wide visibility, an easily accessible location and there are various kinds of facilities and infrastructure. So they decided Setumu Beach as the location of rukyatul hilal in determining the beginning of Dzuhijjah 1442 H. After conducting several rukyatul hilal activities at Setumu Beach, BMKG Tanjungpinang City also considered that Setumu Beach was more suitable as a rukyatul hilal location than Bukit Cermin. There are fewer obstacles at Setumu

Beach compared to Bukit Cermin, so the visibility of the hilal is wider and Setumu Beach also has supporting facilities, such as electricity and internet.

Feasibility Test Of Setumu Beach As A Rukyatul Hilal Location

The name Tanjungpinang is taken from its position jutting into the sea which the Malays call as Tanjung. The Tanjung is overgrown by Pinang trees, the pinang tree then becomes a sign for sailors who will enter the Bintan or Hulu Riau River area. Tanjungpinang City is the capital of Riau Islands Province, located on Bintan Island, at coordinates 00° 50' 25.93" to 00° 58' 54.62" North latitude and 104° 23' 23.40" s/d 104° 34' 49.9" East longitude. Tanjungpinang's position is very strategic, because it is adjacent to Batam City as one of Indonesia's trade gateways and Free Trade Zone. The area of Tanjungpinang city reaches 258.82 km², which consists of 150.86 km² of land and 107.96 km² of ocean with geological conditions partly hilly and valleys sloping down to the edge of the sea. In Tanjungpinang City there is a beach that is used as a rukyatul hilal location, namely Setumu Beach.

Setumu Beach is one of the rukyatul hilal location points appointed by the Indonesian Ministry of Religion to carry out rukyatul hilal in Riau Islands Province. Setumu Beach has been used as a rukyatul hilal location since 2021. The implementation of rukyatul hilal at Setumu Beach is carried out 3 times in 1 year, namely in determining the beginning of Ramadan, the beginning of Shawwal, and the beginning of Dzulhijjah. Since 2021-2024 the Riau Islands Province Hisab Rukyat Team has always failed to see the hilal. So that if calculated there are 12 times the implementation of rukyatul hilal that failed to be seen. Meanwhile, BMKG Tanjungpinang City, which has carried out rukyatul hilal independently every month since 2021 and if calculated, there are 48 times the implementation of rukyatul hilal has also failed to see the hilal. The following author summarizes the report on the results of rukyatul hilal from Riau Islands Provincial Hisab Rukyat Team at Setumu Beach:

Table 1. Rukyatul Hilal Report For 2021-2024

Year	Month	Hilal Altitude	Hilal Position	Information
2021	Ramadhan	03° 27.13'	Above Horizon	Invisible
	Syawal	05° 42.43'	Above Horizon	Invisible
	Dzulhijjah	03° 41.35'	Above Horizon	Invisible
2022	Ramadhan	01° 58.25'	Above Horizon	Invisible
	Syawal	05° 08.71'	Above Horizon	Invisible
	Dzulhijjah	02° 36.18'	Above Horizon	Invisible

2023	Ramadhan	08° 17.07'	Above Horizon	Invisible
	Syawal	01° 57.87'	Above Horizon	Invisible
	Dzulhijjah	01° 41.72'	Above Horizon	Invisible
2024	Ramadhan	00° 39.34'	Above Horizon	Invisible
	Syawal	06° 54.48'	Above Horizon	Invisible
	Dzulhijjah	-02° 38.80'	Under Horizon	Invisible

There are two parameters of the ideal location for rukyatul hilal, primary parameters and secondary parameters. Primary parameters are parameters that directly affect the observation results, such as geographical conditions, weather/climate. Secondary parameters are parameters that do not directly affect the observation results, such as accessibility, facilities. The geographical condition of the rukyatul hilal location that is suitable for the implementation of observations of the beginning of the lunar month is a location that allows observers to carry out observations around the location of sunset, especially at an azimuth of 240° -300°. The area is necessary especially if lunar observations are carried out throughout the season taking into account the shift of the sun and moon over time. To obtain a clear view, observers should choose a location on the seafont without any islands or mountains blocking the view.

The azimuth numbers 240° to 300° are approximate. It means that the observer's view is free from any physical obstructions, both natural and artificial along 30° to the south and 30° to the north. As is known, the center points of the sun and the moon at the time of ijtima' are on one arc of the polar circle of the ecliptic. The ecliptic itself intersects the equator at an angle of 23° 27'. Consequently, the arc of the ecliptic polar circle intersects the arc of the solar declination circle with an angle of 23° 27' as well. On the other hand, the moon's circular circle intersects the ecliptic at an angle of 5° 8', so the moon is north of the sun and sometimes south of the sun [22].

If the sun is at its highest declination on June 22 or December 22, then the sun at sunset will be approximately 23° 27' to the north or south of the western point. If the pu moon is also at its highest declination, then at sunset the position of the hilal may be 5° 8' further away than the farthest position of the sun at its highest declination. If the farthest declination of the sun is 23° 27' and the farthest declination of the moon is 5° 8', then the farthest distance of the moon's position at sunset is 29° 47' from the west to the north or south. With this, to be able to carry out hilal observation throughout the year, it requires a field of view that is open to 29°

47' or rounded to 30° from the western point to the north or south or from an azimuth of 240° - 300° .

a. Primary Parameter

• **Geographic Conditions**

The following authors describe the geographical conditions of Setumu Beach at azimuth 240° - 300° :



Figure 1. View Of Setumu Beach at Azimuth 240°

View of Setumu Beach at azimuth 240° there are trees with a height of about 3 meters which become obstacles. Then there is also an island that becomes an obstacle when the hilal azimuth is at 240° . So that if the hilal azimuth position at 240° azimuth with a low hilal altitude, then automatically the hilal is covered by the obstacle (barrier) and the hilal is not successfully seen. The author also uses an software called *Google Earth* to prove that at azimuth 240° there is indeed an object that becomes an obstacle. The following picture is taken by the author using the *Google Earth* software:

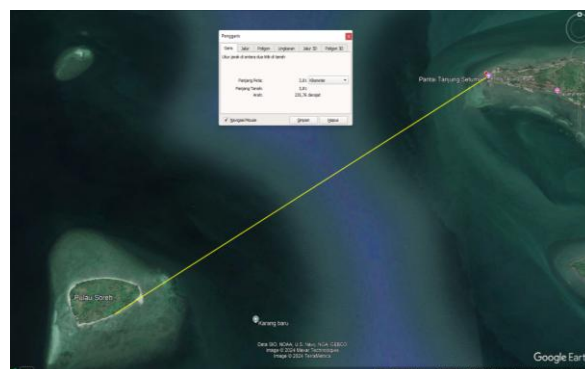


Figure 2. View Of Setumu Beach at Azimuth 235° Using Google Earth Software

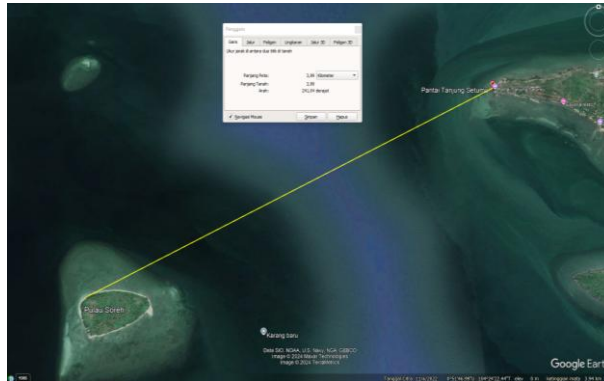


Figure 3. View Of Setumu Beach at Azimuth 241° Using Google Earth Software

From figures 2 and 3 it can be seen that there is an island that becomes an obstacle, namely Soreh Island. This island becomes an obstacle at azimuth 235° - 241° . So if the position of the hilal azimuth during rukyatul hilal at azimuth 240° with a low hilal altitude, then this island can be the cause of not seeing the hilal.



Figure 4. View Of Setumu Beach at Azimuth 250°

Setumu Beach View at azimuth 250° there is a lowland that becomes an obstacle. So that if the position of the hilal azimuth at azimuth 250° with a low hilal height, then automatically the hilal is covered by the obstacle (barrier) and the hilal is not successfully seen. The author uses *Google Earth* software to prove that at azimuth 250° there is an object that becomes an obstacle. The following picture is taken by the author using *Google Earth* software:

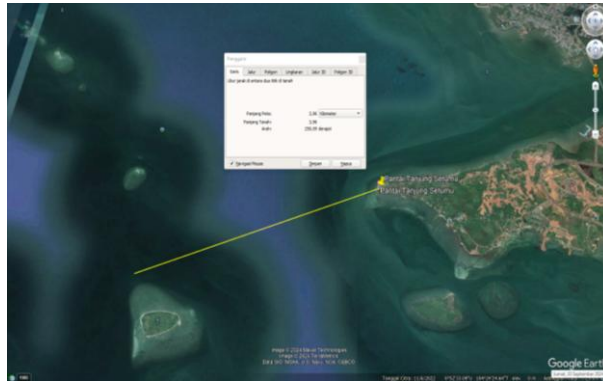


Figure 5. View Of Setumu Beach at Azimuth 250° Using Google Earth Software

From figure 5 it can be seen that there is a lowland that becomes an obstacle. This lowland becomes an obstacle at azimuth 250° . So if the hilal azimuth position at azimuth 250° with a low hilal altitude, then this lowland can be the cause of not seeing the hilal.



Figure 6. View Of Setumu Beach at Azimuth 260°

Still the same as the previous view, the view of Setumu Beach at azimuth 260° there is a lowland that becomes an obstacle. So that if the hilal azimuth position at azimuth 260° with a low hilal altitude, the hilal is automatically covered by the obstacle and the hilal is not successfully visible. The author uses *Google Earth* software to prove that at azimuth 260° there is an object that becomes an obstacle. The following picture is taken by the author using *Google Earth* software:

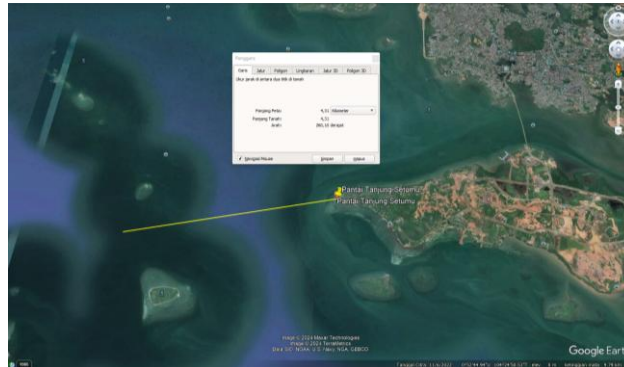


Figure 7. View Of Setumu Beach at Azimuth 260° Using Google Earth Software

From figure 7 it can be seen that there is a lowland that becomes an obstacle. This lowland becomes an obstacle at azimuth 260° . So if the hilal azimuth position at 260° azimuth with a low hilal altitude, then this lowland can be the cause of not seeing the hilal.



Figure 8. View Of Setumu Beach at Azimuth 270°

Setumu Beach View at 270° azimuth there is a plateau or small island that becomes an obstacle. So that if the position of the hilal azimuth at 270° azimuth with a low hilal altitude, then automatically the hilal is covered by the obstacle (barrier) and the hilal is not successfully seen. The author uses *Google Earth* software to prove that at 270° azimuth there is an object that becomes an obstacle. The following picture is taken by the author using *Google Earth* software:

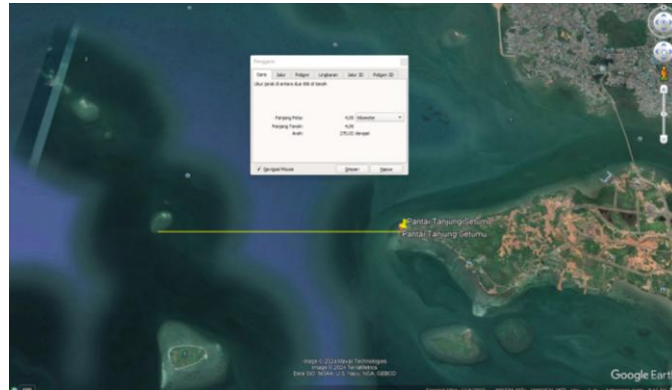


Figure 9. View Of Setumu Beach at Azimuth 270° Using Google Earth Software

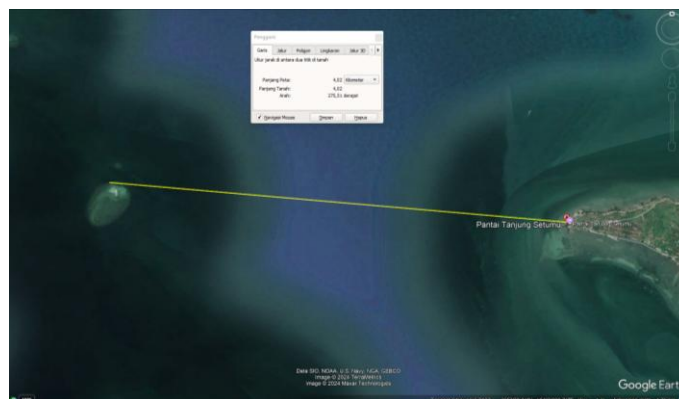


Figure 10. View Of Setumu Beach at Azimuth 275° Using Google Earth Software

From figures 9 and 10, it can be seen that there is a small island plateau that becomes an obstacle. This small island becomes an obstacle at azimuth 270° - 275° . So if the position of the hilal azimuth during Rukyatul Hilal at azimuth 270° - 275° with a low hilal altitude, then this small island can be the cause of not seeing the hilal.



Figure 11. View Of Setumu Beach at Azimuth 280°

Setumu Beach View at azimuth 280° there is a lowland that becomes an obstacle. So that if the position of the hilal azimuth is at azimuth 280° with a low hilal altitude, then automatically the hilal is covered by the obstacle (barrier) and the hilal is not successfully visible. The author uses *Google Earth* software to prove that at azimuth 280° there is an object that becomes an obstacle. The following picture is taken by the author using *Google Earth* software:

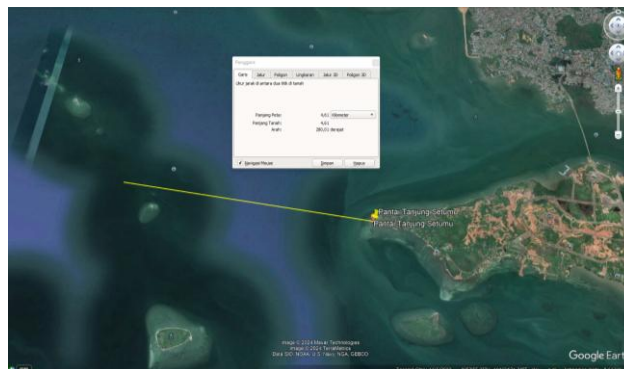


Figure 12. View Of Setumu Beach at Azimuth 280° Using Google Earth Software

From figure 12 it can be seen that there is a lowland that becomes an obstacle. This lowland becomes an obstacle at azimuth 280° . So if the hilal azimuth position at azimuth 280° with a low hilal altitude, then this lowland can be the cause of not seeing the hilal.



Figure 13. View Of Setumu Beach at Azimuth 290°

Setumu Beach View at azimuth 290° there is a highland or small island that becomes an obstacle. So that if the hilal azimuth position at azimuth 290° with a low hilal altitude, then automatically the hilal is covered by the obstacle (barrier) and the hilal is not successfully seen. The author uses *Google Earth* software to prove that at azimuth 290° there is an object

that becomes an obstacle. The following picture is taken by the author using *Google Earth* software:

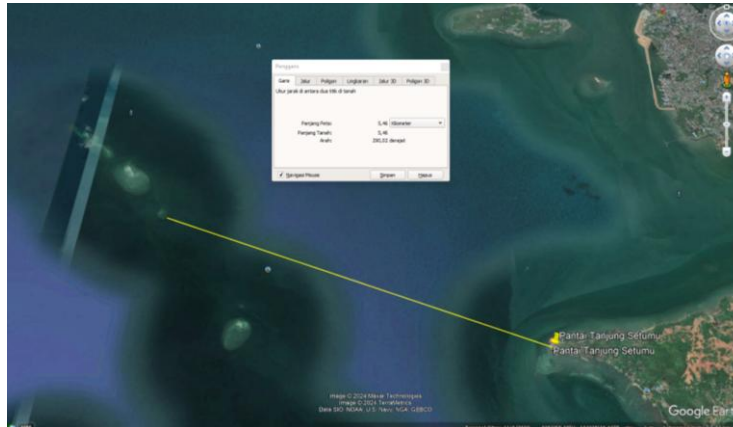


Figure 14. View Of Setumu Beach at Azimuth 290° Using Google Earth Software

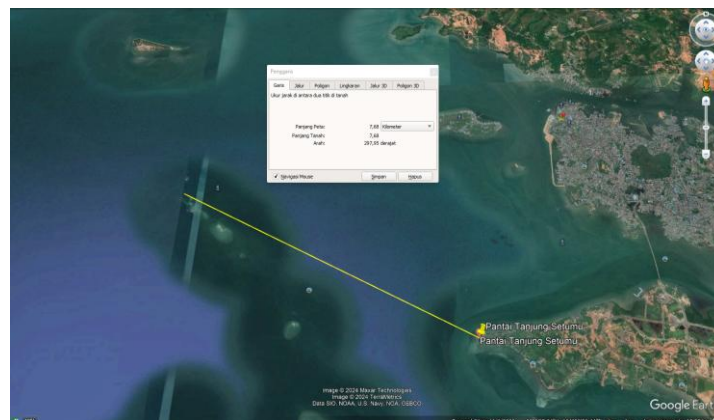


Figure 15. View Of Setumu Beach at Azimuth 297° Using Google Earth Software

From figures 14 and 15, it can be seen that there is a plateau or small island that becomes an obstacle. This plateau or small island becomes an obstacle at azimuth 290°-297°. So if the position of the hilal azimuth at azimuth 290°-297° with a low hilal height, then this plateau or small island can be the cause of not seeing the hilal.



Figure 16. View Of Setumu Beach at Azimuth 300°

Setumu Beach View at azimuth 300° there is a lowland that becomes an obstacle. So that if the position of the hilal azimuth is at an azimuth of 300 ° with a low height of the hilal, then automatically the hilal is covered by the obstacle (barrier) and the hilal is not successfully seen. The author uses *Google Earth* software to prove that at azimuth 300 ° there is an object that becomes an obstacle. The following picture is taken by the author using *Google Earth* software:

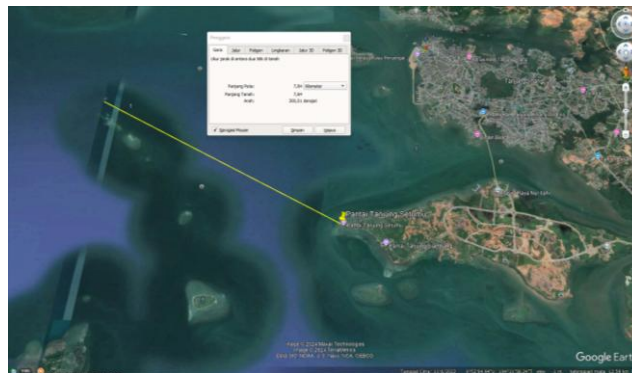


Figure 17. View Of Setumu Beach at Azimuth 300° Using Google Earth Software

From figure 17 it can be seen that there is a lowland that becomes an obstacle. This lowland becomes an obstacle at azimuth 300°. So if the position of the hilal azimuth at azimuth 300° with a low height of the hilal, then this lowland can be the cause of not seeing the hilal.

From the various explanations of the picture above, it can be concluded that Setumu Beach as a rukyatul hilal location at azimuth 240°-300° has various kinds of obstacles, such as trees, Soreh Island, highlands or small islands and lowlands. This is certainly a problem if the hilal altitude is in a low state. As is known that the MABIMS Imkanur Rukyah Criteria is 3°, where this criterion is still in the low category in terms of hilal height. Of course, with the view of Setumu Beach, which has various obstacles, this can be the cause of not seeing the

hilar. The following authors summarize the various obstacles (obstacles) found at azimuth 240°-300° at Setumu Beach in the table:

Table 2. Obstacles At Azimuth 240°-300°

Azimuth (Degree Unit)	Obstacles		Objects
	Available	Unavailable	
240°	√	-	Trees & Soreh Island
250°	√	-	Lowlands
260°	√	-	Lowlands
270°	√	-	Highlands/Small Islands
280°	√	-	Lowlands
290°	√	-	Highlands/Small Islands
300°	√	-	Lowlands

- **Weather/Climate Conditions**

Various kinds of weather are caused by differences in temperature, air pressure, wind, humidity, clouds and evaporation that occur in the atmosphere. Weather is a description of the atmosphere at any given moment with respect to evaporation, wind, temperature and other factors [23]. Weather affects visibility. Visibility is defined as the farthest distance a person can see a black object in the sky above the horizon. Light rain will limit visibility to 3-10 km while heavy rain to 50-500 meters. Fog can also limit visibility to a distance of 1 km. It is clear that in rainy conditions it is not possible to rukyatul hilal which is 400,000 km away [24].

Weather or climate conditions are widely inseparable from the influence of weather or climate elements, namely: air temperature, air humidity, rainfall and several other weather elements. Factors that can influence the elements of climate so as to cause differences in climate between one place and another are called climate controls. Climate controls include: sun or geographic latitude, land and water distribution, semi-permanent cells of high pressure and low pressure, wind and air masses, altitude, mountain ranges, ocean currents and storms [25]. The process of climate formation from the existence of climate controls that produce climatic elements as described above so that it affects the state of the earth or a particular place that forms its own type of climate in that place.

The primary parameter that directly affects the results of the next observation is weather or climate conditions. Good weather is also necessary for successful rukyatul hilal. At the beginning of the month, the light of the crescent moon is so thin, almost as thin as the light

of the sun, so the cleanliness of the sky from cloudy clouds on the western horizon where the sun sets at the time of observation is very necessary. Rukyatul hilal is performed in clear weather and there are no obstructions between the observer and the hilal. This barrier can be clouds, smoke or fog. No matter how high the hilal is, if the weather is cloudy then the hilal is unlikely to be seen.

The following is the monthly Air Temperature data (°C) for Tanjungpinang City for 2021-2024 obtained from BMKG Tanjungpinang City:

Table 3. Air Temperature Of Tanjungpinang City In 2021-2024

Month	Year			
	2021	2022	2023	2024
January	26.00.00	27.00.00	26.01.00	26.04.00
February	26.08.00	27.00.00	26.06.00	27.06.00
March	27.02.00	27.06.00	26.03.00	28.02.00
April	27.04.00	27.02.00	27.05.00	28.01.00
May	27.07.00	28.02.00	27.09.00	27.07.00
June	27.05.00	26.07.00	27.07.00	27.05.00
July	27.05.00	27.08.00	27.06.00	28.02.00
August	26.06.00	27.02.00	27.06.00	27.06.00
September	27.02.00	26.08.00	27.07.00	27.08.00
October	27.06.00	26.08.00	27.06.00	27.05.00
November	26.08.00	26.04.00	26.08.00	-
December	27.03.00	26.01.00	26.07.00	-
Total	325.06.00	324.08.00	326.01.00	282
Average	27.13.00	27.06.00	27.17.00	28.02.00

The air temperature in Tanjungpinang City from 2021-2024 that has been recorded ranges from 26.1°-28.2° C. The lowest air temperature between 2021-2024 was at 26.01° C, while the highest air temperature was recorded at 28.2° C. Meanwhile, when averaged, the air temperature of Tanjungpinang City for the past 4 years is in the range of 27.06°-28.2° C. Sunny conditions occur when the air temperature is > 29 ° C, cloudy conditions occur when the air temperature ranges from 26°-29 ° C and rainy conditions occur when the temperature is < 26° C [26]. Because the air temperature in Tanjungpinang City is in the range of 27.06-28.2° C, Tanjungpinang City is more often in cloudy conditions.

The following is the monthly Air Humidity (%) data for Tanjungpinang City for 2021-2024 obtained from BMKG Tanjungpinang City:

Table 4. Air Humidity Of Tanjungpinang City In 2021-2024

Month	Year			
	2021	2022	2023	2024
January	85.00.00	79.06.00	86.08.00	88.04.00
February	77.03.00	82.05.00	87.06.00	82.01.00
March	81.06.00	82.00.00	90.00.00	81.00.00
April	82.09.00	84.09.00	89.08.00	86.08.00
May	84.06.00	82.05.00	89.05.00	89.09.00
June	83.08.00	86.08.00	86.09.00	87.04.00
July	83.00.00	82.04.00	84.01.00	82.04.00
August	85.06.00	84.03.00	82.00.00	83.07.00
September	83.08.00	86.03.00	80.09.00	82.09.00
October	83.05.00	85.04.00	82.00.00	85.05.00
November	86.00.00	86.07.00	87.01.00	-
December	82.09.00	85.05.00	88.07.00	-
Total	1000	1009.09.00	1035.04.00	850.01.00
Average	83.33.00	84.07.00	86.28.00	70.84

The recorded humidity in Tanjungpinang City from 2021-2024 ranges from 77.3%-89.9%. The lowest air humidity between 2021-2024 was 77.3%, while the highest air humidity was recorded at 89.9%. Meanwhile, when averaged, the air humidity of Tanjungpinang City for the past 4 years is in the range of 70.84%-86.28%. Sunny conditions occur when the air humidity is at < 70%, cloudy conditions occur when the air humidity is at 70%-85% and rainy conditions occur when the air humidity is at > 85%. Because the air humidity in Tanjungpinang City is in the range of 70.84%-86.28%, Tanjungpinang City is included in the criteria for cloudy and rainy weather conditions.

The following is the monthly rainfall data (mm) of Tanjungpinang City from 2021-2024 obtained from BMKG Tanjungpinang City :

Tabel 5. Curah Hujan Kota Tanjungpinang Tahun 2021-2024

Month	Year			
	2021	2022	2023	2024
January	932.01.00	112.02.00	491	668.06.00
February	03.09	281.09.00	103.09.00	120.06.00
March	188.05.00	224	690.02.00	146.06.00
April	382.08.00	304.07.00	109.08.00	343
May	272.04.00	280.04.00	344.05.00	420.03.00
June	229.08.00	426.01.00	148.04.00	330.04.00

July	165	194.05.00	169.02.00	114.07.00
August	481.06.00	359.06.00	198.03.00	233.04.00
September	395	309.01.00	166.08.00	115.09.00
October	227.07.00	420.07.00	250.02.00	314.05.00
November	408.01.00	316.07.00	491	-
December	191.07.00	276.05.00	103.09.00	-
Total	3878.06.00	3506.04.00	3267.02.00	2808
Average	323.21.00	292.02.00	272.26.00	234

Rainfall in Tanjungpinang City from 2021-2024 that has been recorded ranges from 3.9-932.1 mm. The lowest rainfall between 2021-2024 was at 3.9 mm, while the highest rainfall was recorded at 932.1 mm. Meanwhile, when averaged, the rainfall of Tanjungpinang City for the past 4 years is in the range of 234-323.21 mm. Based on rainfall, the climate can be divided into three categories, namely if the rainfall is < 60 mm, then this month is called a dry month. If the rainfall is between 60-100 mm, it is called a humid month. If the amount of rain in 1 month > 100 mm, then this month is called a wet month. Because the rainfall in Tanjungpinang City is in the range of 234-323.21 mm, then Tanjungpinang City is included in the wet month criteria.

b. Secondary Parameters

- **Accessibility**

Secondary parameters are parameters that do not directly affect the results of observations, such as accessibility, facilities. Access to the entrance of Setumu Beach from Tanjungpinang City can be reached using two-wheeled or four-wheeled vehicles in about 30 minutes. The condition of the road which is quite good and wide also makes it easier for the Riau Islands Province Hisab Rukyat Team to get to this location. However, about 2 km before arriving at Setumu Beach, the road condition has not been paved with red soil texture. So that when it rains the ground will bring up puddles and it is a little difficult to pass. While road markers to get to Setumu Beach are also not available, so it takes extra effort for people who have never gone to this location.



Figure 18. Land Road Access To Setumu Beach

Secondary parameters that do not directly affect the results of further observations are facilities. Rukyatul hilal requires facilities to support the implementation of these activities. These facilities are used to facilitate mobility, coordination and tools for the implementation of rukyatul hilal. These facilities should be available at the observation site to support the implementation of rukyatul hilal . To facilitate mobility, access to the observation site should be smooth and can be reached by vehicles capable of transporting equipment. To facilitate coordination, the observation site should be within cellular and internet coverage. To be able to operate the equipment properly, the observation site should have an adequate source of electricity. The observation site should also be safe and comfortable for observations to be made there.

- **Facility**

Setumu Beach has a fairly good internet signal, making it easier to coordinate with the Jakarta Hisab Rukyat Team. Because the report of the rukyatul hilal conducted by the Riau Islands Province Hisab Rukyat Team is always quickly reported to the Jakarta Hisab Rukyat Team. Setumu Beach has adequate electricity resources, so that rukyatul hilal activities at Setumu Beach can run smoothly.

Based on the explanation above, it can be concluded that Setumu Beach is not supported by primary parameters, because from the geographical conditions the view of Setumu Beach at azimuth 240° - 300° is blocked by such as trees, Soreh Island, highlands or small islands and lowlands. Setumu Beach is also not supported by the next primary parameter, namely weather conditions. The weather of Tanjungpinang City has a low air temperature in the range of 27° - 28° C, so Tanjungpinang City is more often in cloudy conditions. Air humidity in Tanjungpinang City is also high, in the range of 75%-83%, so

Tanjungpinang City is included in the criteria for cloudy weather conditions. Rainfall in Tanjungpinang City is high, in the range of 172.7-221.8 mm, so Tanjungpinang City is included in the wet month criteria.

Setumu Beach is supported by secondary parameters, in terms of accessibility Setumu Beach is quite easy to access. Because it can be reached 30 minutes from Tanjungpinang City and has good and wide road conditions. Although about 2 km before arriving at Setumu Beach, the road conditions have not been paved with red soil texture. So that when it's finished raining the ground will appear puddles and a little difficult to pass. Setumu Beach has a fairly good internet signal, making it easier to coordinate with the Jakarta Hisab Rukyat Team. Setumu Beach also has adequate electricity resources, so that rukyatul hilal activities at Setumu Beach can run smoothly. Setumu Beach is not supported by primary parameters but supported by secondary parameters, it can be concluded that based on these parameters Setumu Beach is less feasible as a rukyatul hilal location.

Table 6. Feasibility Of Setumu Beach As A Rukyatul Hilal Location

Location	Primary Parameter	Secondary Parameter	Description
Setumu Beach	x	√	Less Feasible

D. Conclusion

Based on the discussion that the author has described above, the author concludes that :

1. The basis for selecting Setumu Beach as the location of rukyatul hilal is the failure to see the hilal in Bukit Cermin for 6 years. So that the Regional Office of the Ministry of Religion of Riau Islands Province asked for recommendations to the BMKG Tanjungpinang City to determine the ideal location for rukyatul hilal. BMKG Tanjungpinang City has never conducted a survey regarding the ideal location for rukyatul hilal in Tanjungpinang. The Regional Office of the Ministry of Religious Affairs of Riau Islands Province then conducted a survey with Mr. Muhammad Hasbi and Mr. Utha Chuandra to determine the next rukyatul hilal location. The Regional Office of the Ministry of Religious Affairs of Riau Islands Province conducted a survey to Setumu Beach, Tanjungpinang City and it turned out that Setumu Beach has wide visibility, an easily accessible location and there are various kinds of facilities and infrastructure. So that the

Regional Office of the Ministry of Religious Affairs of Riau Islands Province decided Setumu Beach as the location of rukyatul hilal in determining the beginning of Dzulhijjah 1442 H .

2. Setumu Beach is not supported by the primary parameters, because from the geographical conditions the view of Setumu Beach at azimuth 240°-300° is blocked by trees, Soreh Island, highlands or small islands and lowlands. Setumu Beach is also not supported by the next primary parameter, namely weather conditions. The weather of Tanjungpinang City has a low air temperature in the range of 27-28° C, so Tanjungpinang City is more often in cloudy conditions. Air humidity in Tanjungpinang City is also high, in the range of 75-83%, so Tanjungpinang City is included in the criteria for cloudy weather conditions. Rainfall in Tanjungpinang City is high, in the range of 172.7-221.8 mm, so Tanjungpinang City is included in the wet month criteria. Setumu Beach is supported by secondary parameters, in terms of accessibility Setumu Beach is quite easy to access. Because it can be reached 30 minutes from Tanjungpinang City and has good and wide road conditions. Although about 2 km before arriving at Setumu Beach, the road conditions have not been paved with red soil texture. So that when it's finished raining the ground will appear puddles and a little difficult to pass. Setumu Beach has a fairly good internet signal, making it easier to coordinate with the Jakarta Hisab Rukyat Team. Setumu Beach also has adequate electricity resources, so that rukyatul hilal activities at Setumu Beach can run smoothly. Setumu Beach is not supported by primary parameters but supported by secondary parameters, it can be concluded that based on these parameters Setumu Beach is less feasible as a rukyatul hilal location.

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