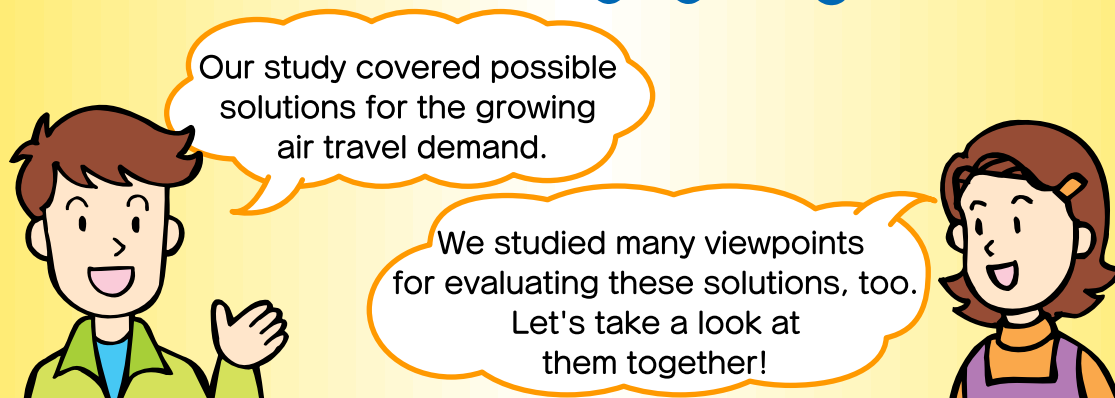


# Comprehensive Study of Fukuoka Airport Public Involvement (PI) Report Step 3



1. Foreword .....	1
2. Consideration of possible measures to deal with future demand	
(a) Distributing air travel demand of Fukuoka Airport to neighboring airports...	5
(b) Developing a second runway at the existing airport .....	7
(c) Relocation of Fukuoka Airport .....	13
3. Consideration of the viewpoints for evaluating the alternatives...	19

**What is PI?**

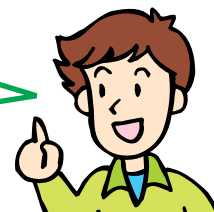
PI (Public Involvement)

This method is for fully disclosing the information in the survey to the public, and to move forward with our examination while incorporating public opinion.

The national government, Fukuoka Prefecture and City of Fukuoka organized FUKUOKA KUKO CHOSA RENRAKU CHOSEI KAIGI (Fukuoka Airport Study Commission, FASC) to conduct a comprehensive study addressing the problem of overcrowding at Fukuoka Airport. The questions involve the extent to which the current Fukuoka Airport can handle the increased airport demand forecast for the Fukuoka metropolitan area in the future, and what solutions are required for the future. We are conducting a wide-ranging survey of these and other questions, as well as considering the measures required to deal with them.

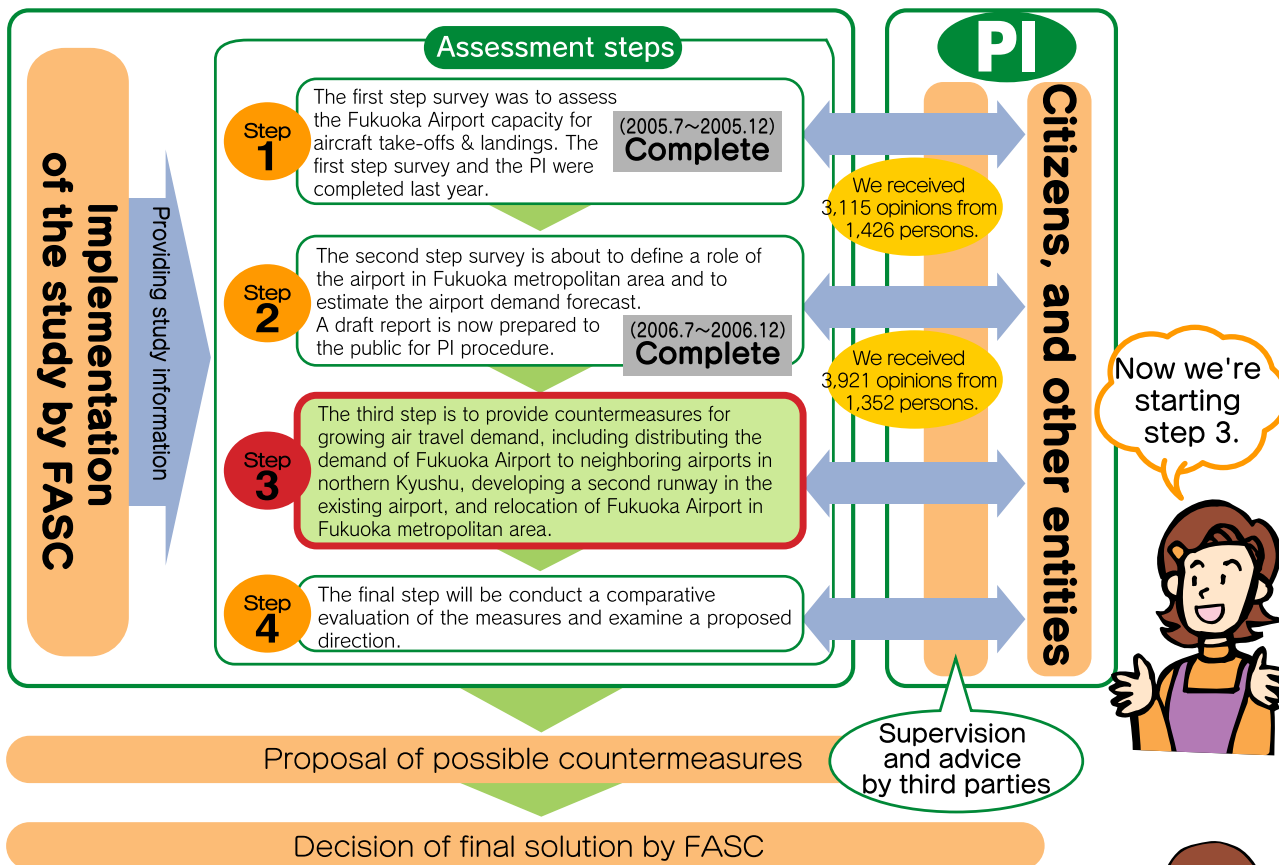
FUKUOKA KUKO CHOSA RENRAKU CHOSEI KAIGI  
(Fukuoka Airport Study Commission)

## What is the comprehensive study of Fukuoka Airport?



### Overall plan

In this study, PI is conducted in four steps to provide information and hear opinions.



## What was learned from PI Steps 1 and 2?



In PI Step 1, we summarized the current conditions and challenges facing Fukuoka Airport, and examined the airport's capabilities.

- Passengers emphasized four criteria in the survey. These criteria were that (1) There are direct flights, (2) There are flights in the desired time periods, (3) It doesn't take long to arrive at the airport, and (4) The air fares are inexpensive enough to facilitate use. In these four categories, we found there was a greater degree of satisfaction with the Fukuoka Airport than with other airports.
- We learned that almost the whole area of Fukuoka City has a building height restriction, and that the annual runway capacity of Fukuoka Airport is 145,000 aircraft movements. Congestion of the airport has caused the deterioration of passenger service and inefficient aircraft operation is found in the airport.
- We learned that implementing a policy of effective utilization of the current airport grounds (building parallel taxiways) would result in an annual runway capacity of 149,000 aircraft movements.

In PI Step 2, we summarized the vision of the region for the future and the role of Fukuoka Airport, and forecasts for future airport demand.

- We identified seven aspects for the future that are regional objectives, and the four roles Fukuoka Airport must fulfill in order to achieve them.
- The annual runway capacity of the airport will reach its limit early next decade. The airport will not be able to sufficiently meet demand due to greater congestion.

### Reference

- ◆ In PI's Step 1 and 2, we provide information to the public through such activities as an "information corner", meetings, and airport tours, as well as our website. This has enabled us to receive many opinions from the public. The PI activity report, which summarizes the information provided in Steps 1 and 2, the opinions we received, and our ideas about those opinions, is available for viewing on the Fukuoka Airport Survey Liaison and Coordination Council website.

FUKUOKA KUKO CHOSA RENRAKU CHOSEI KAIGI website: <http://www.fukuokakuko-chosa.org/>

**In Step 3, we will provide information for everyone on the possible measures for dealing with future demand and the viewpoints for evaluating the alternatives.**



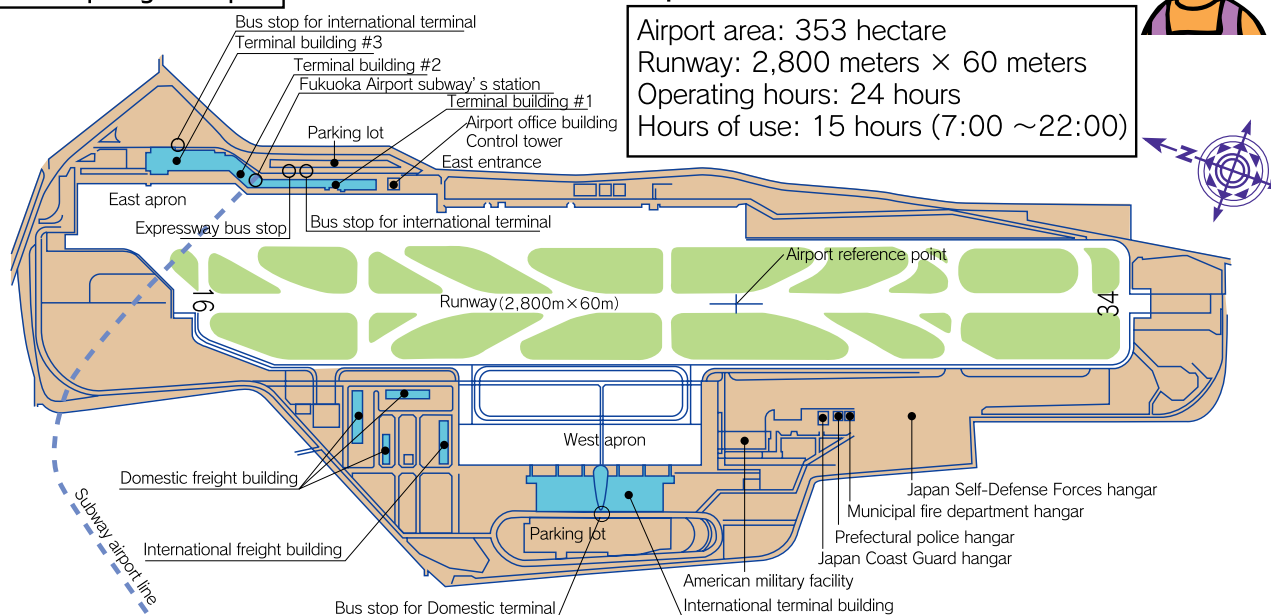
## What are conditions at Fukuoka Airport like today?



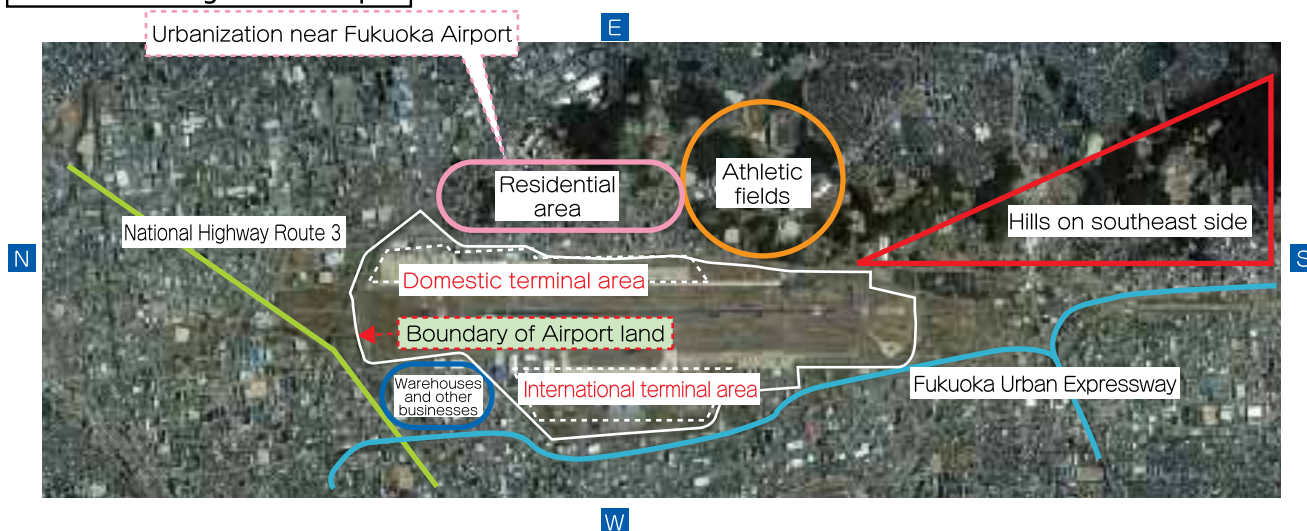
Fukuoka Airport ground plan

Airport overview

Airport area: 353 hectare  
Runway: 2,800 meters × 60 meters  
Operating hours: 24 hours  
Hours of use: 15 hours (7:00 ~ 22:00)



Area surrounding Fukuoka Airport

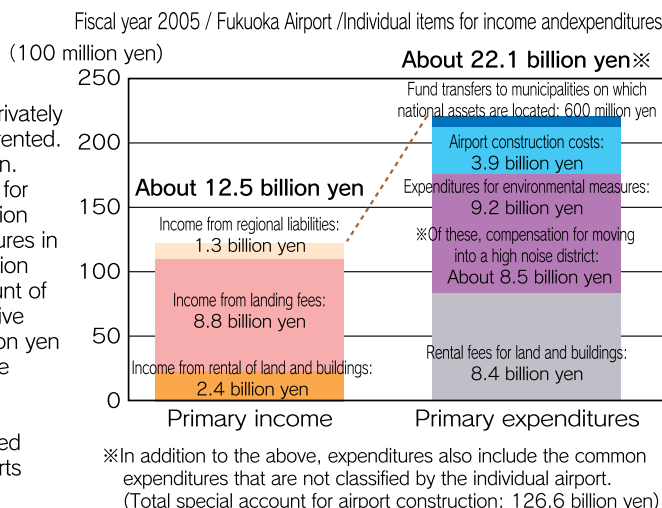


Area surrounding Fukuoka Airport: Urbanization is progressing in the area around Fukuoka Airport. Surrounding the immediate vicinity is a residential area, offices, Fukuoka Urban Expressway, National Highway Route 3, and hills.

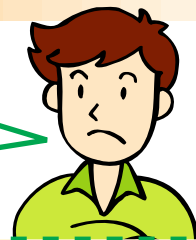
### Reference

#### ■ Regarding individual items for income and expenditure by Fukuoka Airport

- The area of the airport is 353 hectares, but 109 hectares are privately owned and seven hectares are owned by the city. That land is rented. The amount of rent paid in fiscal 2006 was about 8.4 billion yen.
- Expenditures for environmental measures include compensation for moving into a high noise district and the funds for sound insulation work. The total amount of expenditures for environmental measures in fiscal 2005 was about 9.2 billion yen, and of this about 8.5 billion yen was for moving into a high noise district. The average amount of annual expenditures for environmental measures over the past five years was about 6.0 billion yen. Of that amount, about 5.3 billion yen per year was spent in compensation for moving into a high noise district.
- A breakdown of individual items for income and expenditures by Fukuoka Airport in fiscal 2005 shows that expenditures exceeded income. The common operating expenses for all domestic airports were omitted from the calculations.

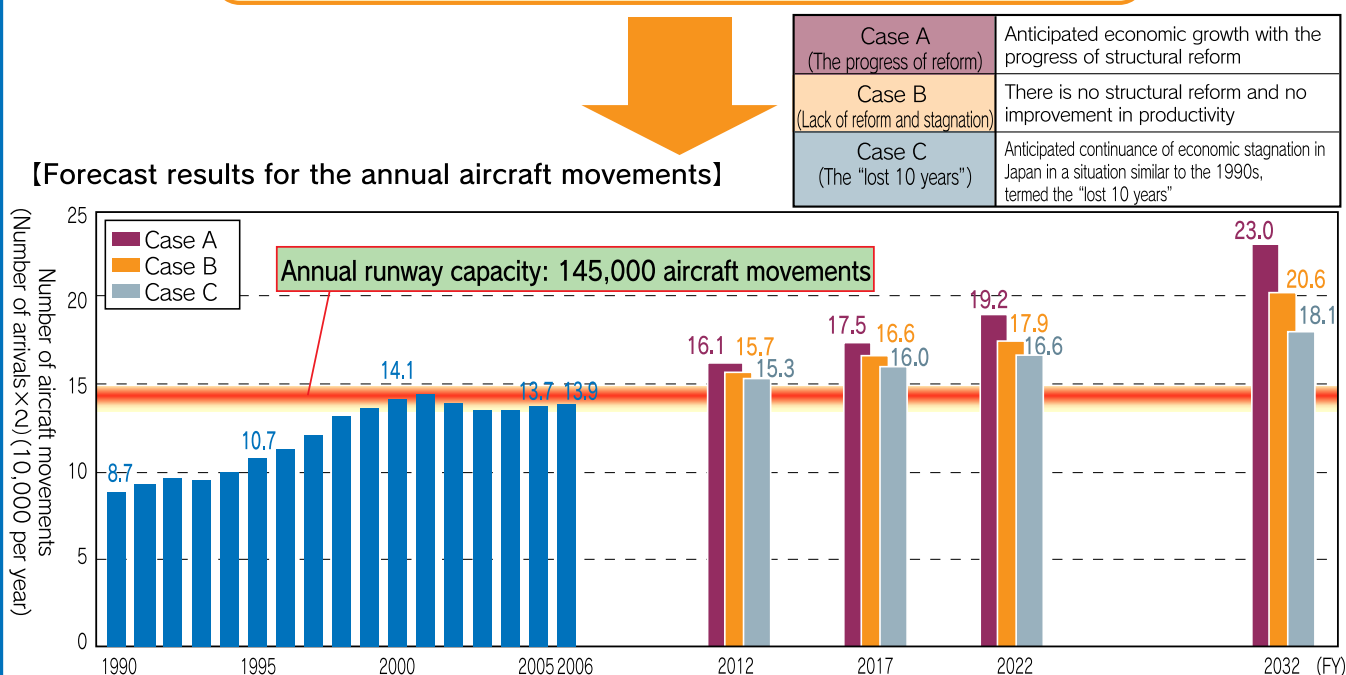


## What happens if we don't do anything?



- Restriction on the use of Fukuoka Airport have already begun to emerge. It would be difficult to add flights during the hours of peak use: 9:00 a.m. to noon and 5:00 to 8:00p.m.
- PI's Step 2 anticipates that the annual runway capacity for the airport will reach its limit around 2010.
- If no steps are taken, Fukuoka Airport will be unable to meet the demands of its users. These include supporting the expansion of international and domestic interaction, promoting improvements in services and supporting airport demand, supporting fast, inexpensive, and comfortable movement, and supporting the independent growth of Fukuoka and Kyushu. This will have an effect on user convenience and the achievement of regional aspirations in the future.

If nothing is done



Annual runway capacity to reach its limit around 2010

Cannot add more flights

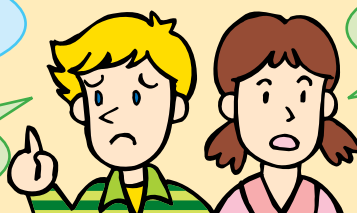
Inability to establish new air routes

Worse delays



I want to get back quickly, but there are no flights for same-day return.

Interaction with the region is difficult due to the lack of direct flights to Fukuoka.



Flights are always delayed, so I have to take one earlier than I planned.

The flight I wanted to take is fully booked.



If nothing is done, Fukuoka Airport will fail to serve the need of passengers and the region. We must think about solution to these problems.







## What measures do we have to solve these problems?

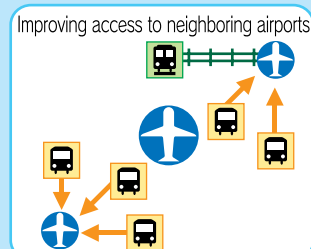
In response to forecasts of supply and demand problems in the future, the December 2002 report of the Aviation Subcommittee for the Transportation Policy Council declared it was necessary to proceed with comprehensive surveys of the following: (1) the effective use of existing assets, (2) distributing the demand of Fukuoka Airport to neighboring airports, (3) substantial improvement of the airport, including relocation and developing a second runway.

The June 2007 report by the same subcommittee declared that in light of the results of the comprehensive surveys, it was necessary to devise policies for appropriately responding to the future demand. These were to include facility construction for substantially improving airport capacity. In regard to **policies for the effective use of the existing assets**, we examined the possibility of making parallel taxiways. Therefore we will examine three measures.

### ■ Measures

#### (1) Distributing the demand of Fukuoka Airport to neighboring airports

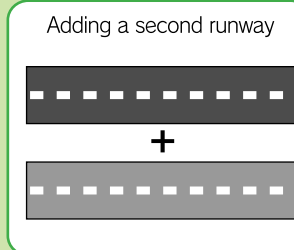
- We studied restricting the use of Fukuoka Airport and promoting demand at neighboring airports, with consideration of the location of three airports in northern Kyushu and other examples of operations at multiple airports.



### Policies to substantially improve airport capacity

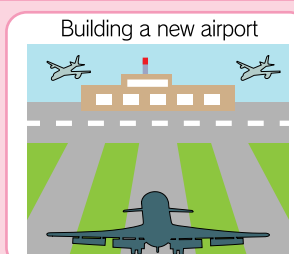
#### (2) Developing a second runway at the existing airport

- We examined typical airport layouts which developed a second runway east or west of the current runway. We also examined the placement of airport facilities if the space between runways were narrow due to changes in the surrounding area.

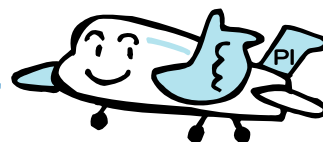


#### (3) Relocation of Fukuoka Airport

- We examined potential positioning of runways, considering such factors as topography, airspace and noise, and selected sites.



Next we present the possible solutions in greater detail.



## 2. Consideration of possible measures to deal with future demand

### (1) Distributing the demand of Fukuoka Airport to neighboring airports

- In regard to distributing the demand of Fukuoka Airport to neighboring airports, we referred to examples of operations at multiple airports both in Japan and overseas. We examined possibilities from perspectives of “restricting use” and “promoting demand”, taking into consideration the location of airports in northern Kyushu and their characteristics.
- Two important characteristics of Fukuoka Airport are the great distance between it and other neighboring airports, and that most of its passengers either live in or are visiting the Fukuoka area.
- The restriction of use inconveniences passengers and prevents the Fukuoka metropolitan area from acting as a major transport hub and is thus not a viable option.
- Promoting demand would have only a minimal impact on alleviating the tightness of the supply-demand balance, so this is not possible as a large-scale measure.

#### Restricting use of Fukuoka Airport

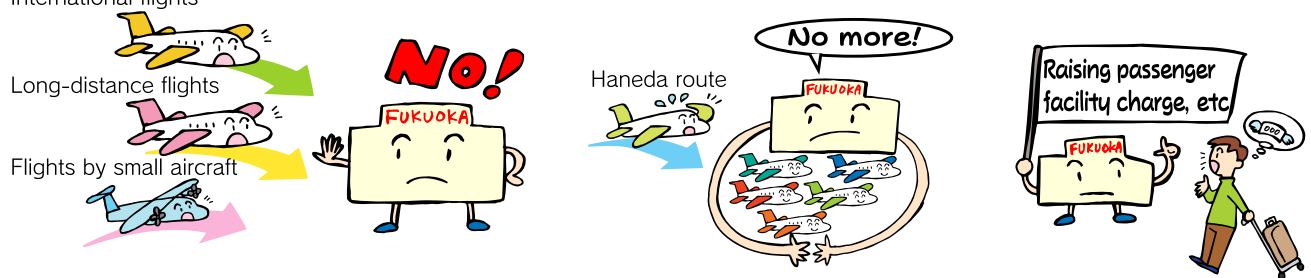
- Restricting use is a method to transfer the demand of Fukuoka Airport to neighboring airports.
- Some examples of usage restriction would limit international and long-distance flights, and flights by small aircraft; limiting the number of flights on routes with high demand; and increasing the liabilities of the passenger.

International flights

Long-distance flights

Flights by small aircraft

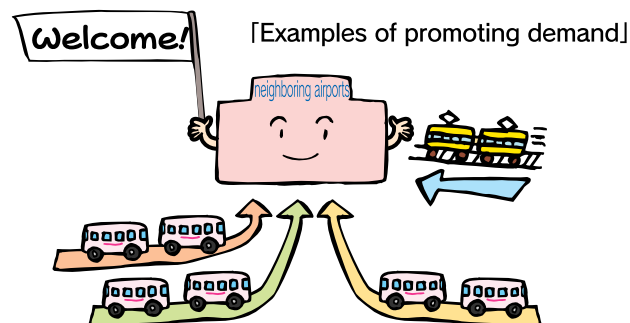
[Examples of usage restriction]



- This would run counter to the trend toward aviation deregulation, and would be difficult to implement as an aviation policy. Even if incoming flights and the number of flights on individual routes were limited, under market principles, it is by no means certain that the routes and flights for which usage were limited would shift from Fukuoka Airport to neighboring airports.
- Moving routes and flights to neighboring airports would have the following serious drawbacks for users and communities in the Fukuoka metropolitan area. It would be inconvenient for the users in the Fukuoka metropolitan area. It would restrict interaction with other areas. Northern Kyushu would lose its function as the regional hub.

#### Promoting the demand at neighboring airports

- Promoting demand by leveraging the characteristics of regional airports is a method to promote the transfer of demand from Fukuoka Airport and utilize neighboring airports based on market principles.
- Some examples of promoting demand would include improving access to nearby airports, building the infrastructure for that access, reducing the liabilities on users, and implementing a multi-airport policy. The latter would include a system of uniform fares and the elimination of fees at neighboring airports.



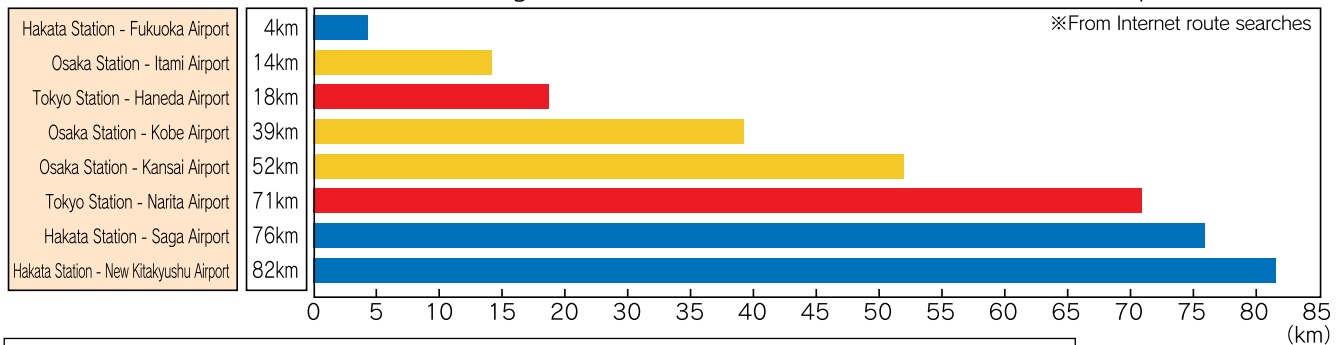
- This would have only a minimal effect on ameliorating the tightness of supply and demand at Fukuoka Airport.
- The burden of costs and corporate profitability would be a problem.

## The characteristics of Fukuoka Airport

### Comparing Fukuoka Airport to neighboring airports

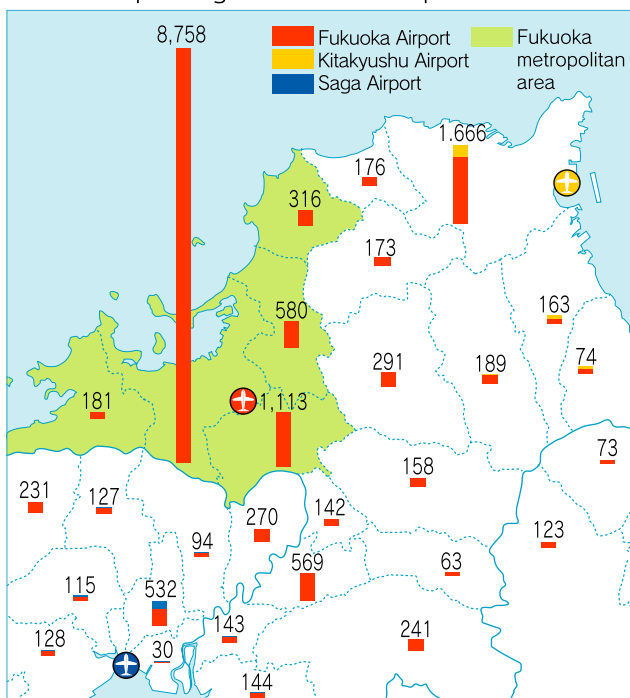
A comparison of the distance from urban center train stations to airports shows that the driving distance from Fukuoka City's Hakata Station to the New Kitakyushu Airport and Saga Airport is farther than the station-airport distance in the Tokyo and Kansai areas.

▼The driving distance from the urban center train station to the airport



### Distribution of passengers for Fukuoka Airport, Kitakyushu Airport, and Saga Airport

Most of the passengers of Fukuoka Airport are concentrated in the Fukuoka metropolitan area.



†The number of passengers for three airports (Total of residences and travel destinations) (2003 Units: persons/day)  
Data: Created based on air travel passengers surveys for 2003 (Before the New Kitakyushu Airport opened)

### Aviation deregulation

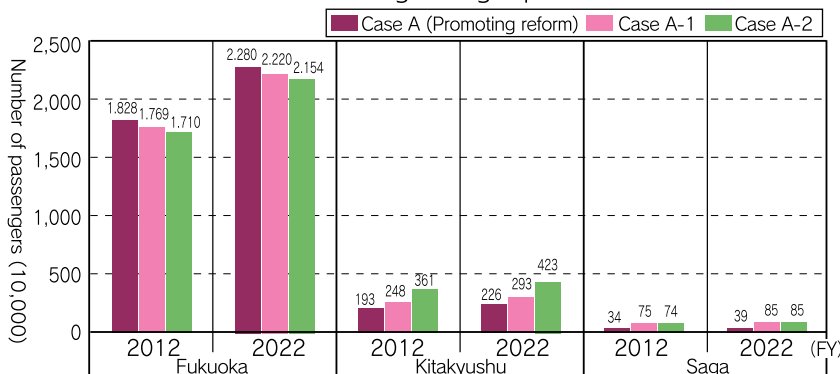
The amendment of the Airport Law in February 2000 eliminated restrictions on regulating supply and demand in the Japanese air transport business. Also, there was an alleviation in both restrictions on entry in the industry, and fares and fees. As a result, the responsibility for shifting air routes and flights to neighboring airports, and reducing or eliminating flights, was entrusted to the business decisions taken by each airline.

In fact, indications suggest that Japan must become more open in the international air transport business. The government is promoting its Asia Gateway Concept, and it will be important for establishing Japan's international appeal in the future to incorporate overseas growth and dynamism. For these reasons, we think a policy of use restrictions would run counter to the trend of aviation deregulation.

### If the ground access of neighboring airports is improved...

●Forecasts showed that the annual total of arrivals and departures at Fukuoka Airport would decline from 2,000 to 7,000, and passenger totals would drop 3% to 6%.

Therefore, it was clear that the effect of improving the supply and demand balance at Fukuoka Airport by improving the convenience of the access to neighboring airports would be minimal.



Results of forecasts for domestic passenger totals at Fukuoka Airport	Upper row: Number of passengers (10,000 people/year)		Lower row: Arrival/departure total (10,000 times/year)	
	2012 (FY)	2022 (FY)	2012 (FY)	2022 (FY)
Case A (Promoting reform)	1,828	2,280	14.0	15.8
Case A-1	1,769 (59)	2,220 (60)	13.8 (0.2)	15.7 (0.1)
Case A-2	1,710 (118)	2,154 (126)	13.3 (0.7)	15.5 (0.3)

The numbers in parentheses indicate the difference from Case A

▲The effect of ameliorating the tight supply and demand balance at Fukuoka Airport

▲Results of forecasts for domestic passenger totals at Fukuoka Airport, New Kitakyushu Airport, and Saga Airport

## 2. Consideration of possible measures to deal with future demand

### (2) Developing a second runway at the existing airport

#### Conditions for examining the options to develop a second runway

There were several factors that had to be considered when examining the options to develop a second runway at Fukuoka Airport. These included the impact of the surrounding area, including the hilly section to the southeast of the airport and Fukuoka Urban expressway. Other factors included the convenience of the passengers, construction costs, and runway capacity. Moreover, other factors, including the length of a second runway, the amount of space between it and the existing runway, and the placement of the second runway, must be considered as parts of a whole, and considerations change for each different option. Therefore, it is necessary to examine this issue comprehensively from several different perspectives. In view of this, the conditions for examining options were established with existing domestic situations and current standards were used as a reference.

##### 【Examination conditions】

Runway length: Current runway, 2,800meters; second runway, 2,500 meters

Runway placement: Parallel to the existing runway (Close parallel)

Space between runways: 300 meters or 210 meters

Approach procedure: Precision approach procedure or non-precision approach procedure

- In regard to the current runway, we will maintain its length of 2,800 meters. A 3,000- meter runway is the ideal for creating an international aviation network. But extension of the existing runway is of lower priority than the proposal for developing a second runway, a policy that would significantly improve capacity.
- In principle, a second runway would have to be 2,500 meters long to enable takeoffs and landings of large aircraft for domestic flights.
- In principle, the distance between the two runways would be 300 meters so that planes landing or taking off would not interfere with large aircraft waiting on the other runway. We also considered a distance of 210 meters, which is the shortest distance between runways in Japan (at an airport now under construction). Large aircraft waiting on one runway would interfere with planes taking off or landing on the other runway, however.
- In principle, a precision approach procedure will be adopted, which enables landings using guidance systems even in bad weather. We also examined the nonprecision approach, which would render landings difficult in bad weather, because it reduced the impact on the surrounding area.

#### Explanation: Parallel runways

Generally speaking, there are two types of parallel runways: open parallel runways and close parallel runways.

Open parallel runways have large spaces between them, which enables them to be operated independently of each other. Usually, the terminal area is placed between runways. If one runway is only used for takeoffs and the second only for landing, the total capacity of the two runways will be only 1.6 times that of single runway. On the other hand, if both runways are used for takeoffs and landings, the total capacity will be 2.0 times that of single runway, though, in both cases, runway capacity differs depending on terminal placement.

In contrast, close parallel runways have narrower space between them. This enables overall size of the airport to be reduced, but this will have an effect on the use of the other runway. The total runway capacity of close parallel will be 1.3 times that of single runway, depending on the terminal placement.

Narita and Haneda airports are examples of open parallel runways, and Osaka International and New Chitose airports are examples of close parallel runways (with 300 meters distance), Hyakuri Airbase (Ibaraki Airport) , under construction, is an example of close parallel runways (with 210 meters distance).



An example of open parallel runways: Haneda Airport

Examples of close parallel runways



New Chitose Airport



Osaka International Airport



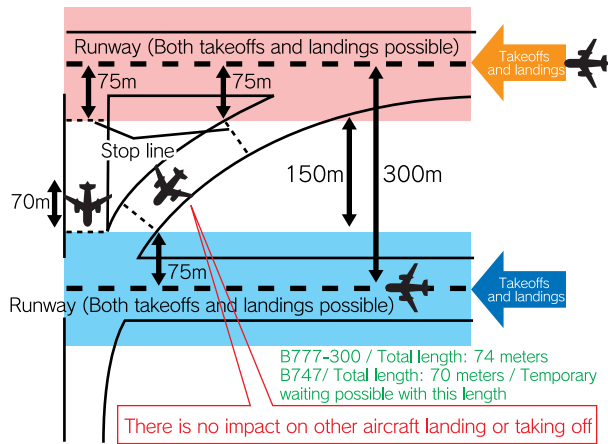
Hyakuri Airbase(Artist' s conception after completion)

Photographs: Tokyo Regional Civil Aviation Bureau, Osaka Regional Civil Aviation Bureau websites



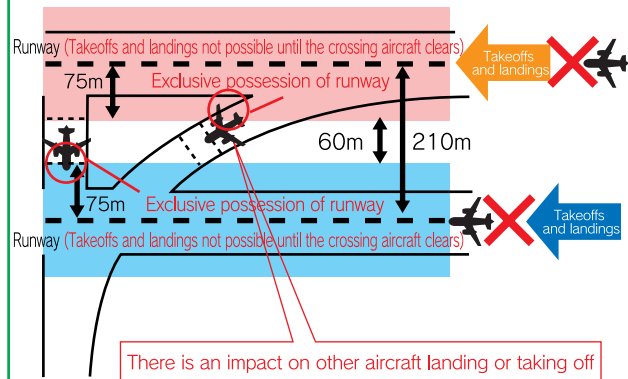
### Explanation: The differences in runway spacing

When the space between the center line of both runways is 300 meters



When the space between the center line of both runways is 300 meters, there is no impact on other aircraft landing or taking off, even when a large aircraft is waiting between the runways.

When the space between the center line of both runways is 210 meters



When the space between the center line of both runways is 210 meters, there is an impact on other aircraft landing or taking off, because when a large aircraft is waiting between the runways, it has exclusive possession of the runway.

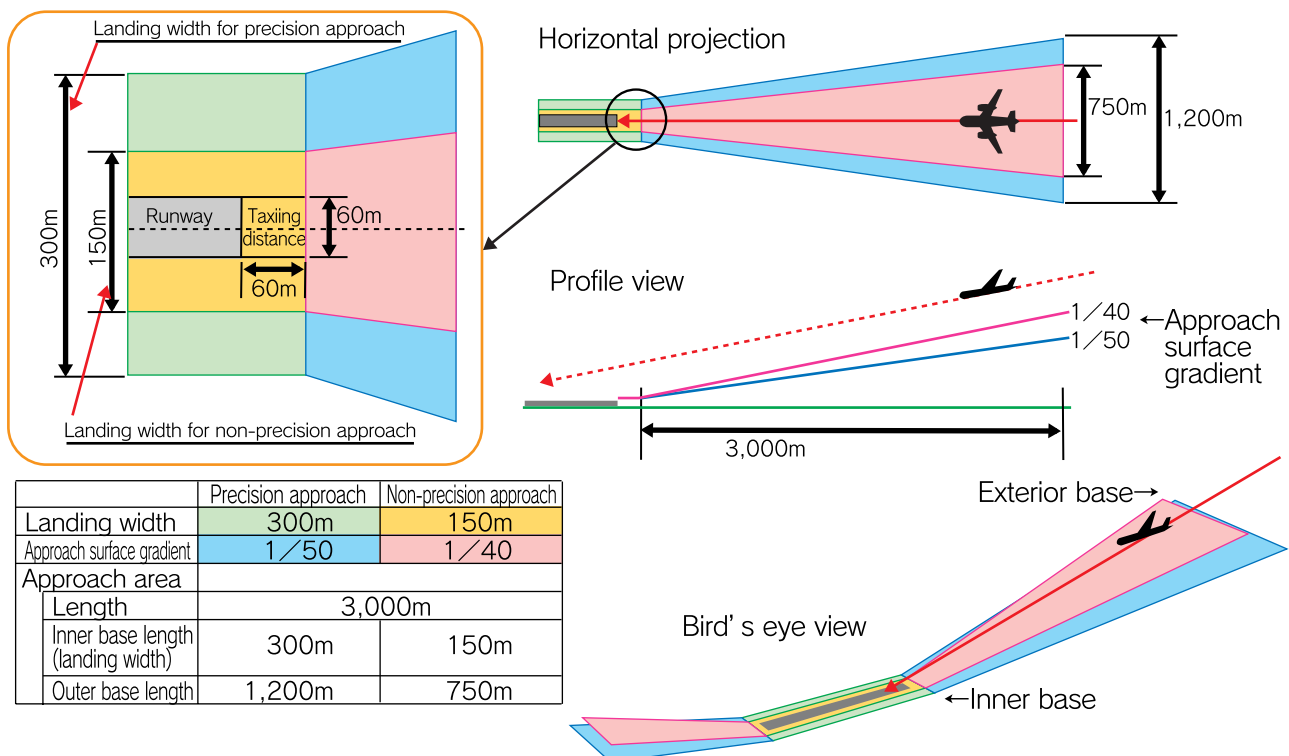
### Explanation: What is precision approach and non-precision approach?

Precision approach is a procedure of approach using instrument flight in which an aircraft can receive instructions from two types of guide beams (approach direction for the aircraft and descent path). An aircraft can approach and land even during bad weather by following a designated course.

The non-precision approach procedure refers to an approach other than precision approach when approaching using instrument flight. It is an approach and landing in which instructions are received for approach direction or location information. Therefore, it cannot be used in bad weather.

The Aviation Law provides for the approach area and the plane of approach that should be used during both precision approach and non-precision approach. The size of the twodimensional surface and the plane's angle of descent differ in both cases.

With the precision approach, it is possible to approach and land when visibility is poor due to bad weather. The landing width and entry area required to maintain aircraft safety are larger than with the nonprecision approach, so there is a major impact on the surroundings due to the limited surface area.

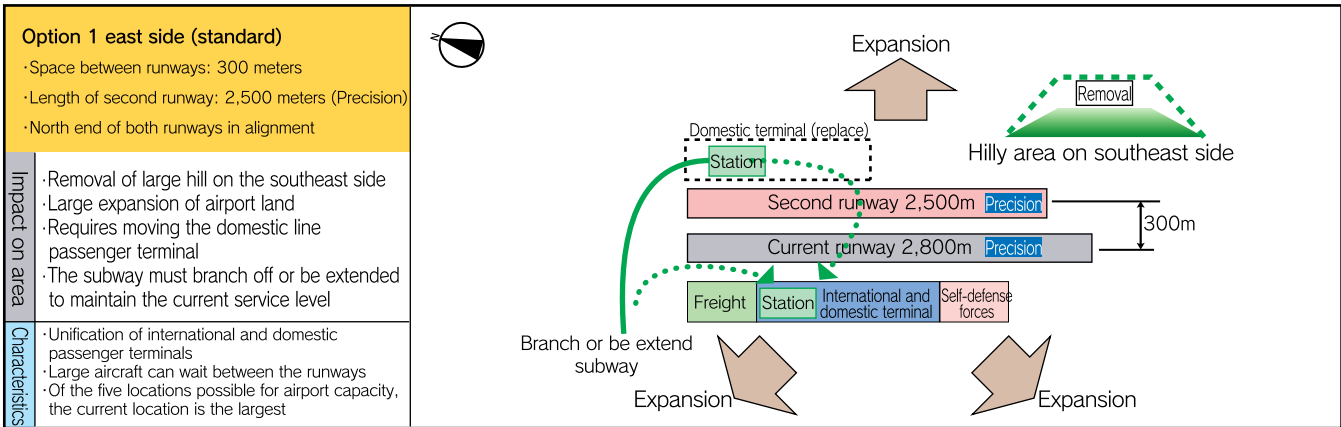


## 2. Consideration of possible measures to deal with future demand

### Considerations for the airfield layout

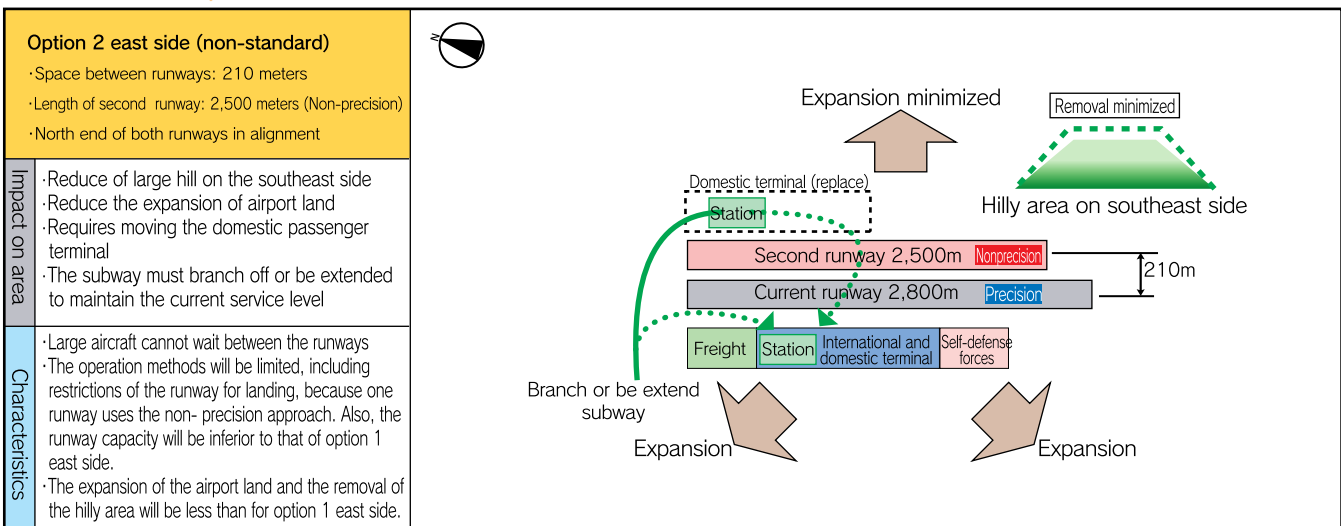
Based on the conditions for examining the options for a second runway, we considered the airfield layout.

#### Second runway east of the existing runway



To minimize the impact on the surrounding area

- Reduce the space between runways from 300 meters to 210
- Approach procedure / From precision approach to non-precision approach

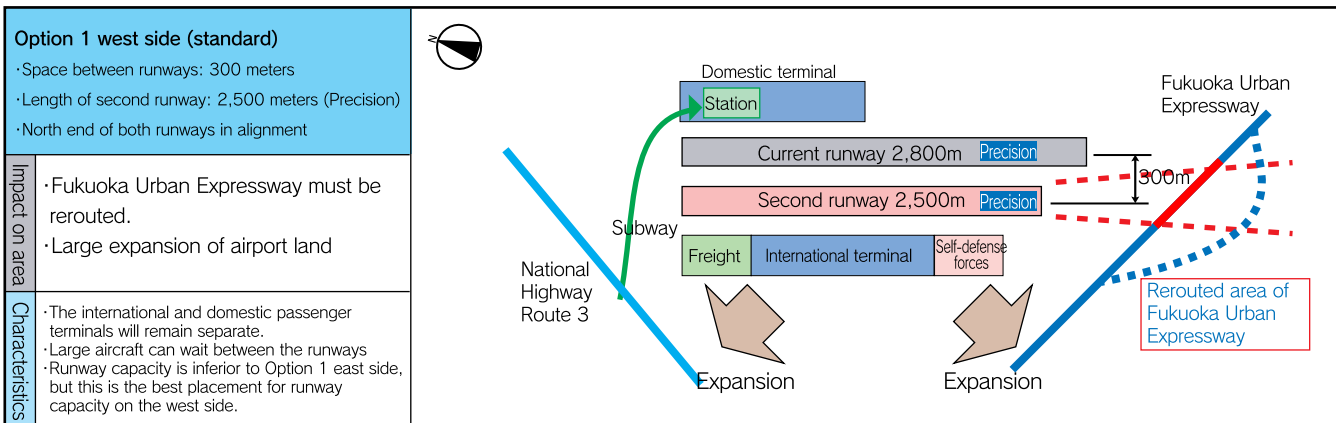


These are examinations of the standard placement, in which a 2,500-meter precision approach runway will be placed 300 meters apart from the existing runway either to the east or to the west, or placement to minimize the impact on the surrounding area, which is a problem with the previous placement.

In addition, we will examine in detail in the future the length of the new runway (2,000 to 2,500 meters) and its placement from the perspective of minimizing the impact on the surrounding area, reducing construction costs, and runway capacity.

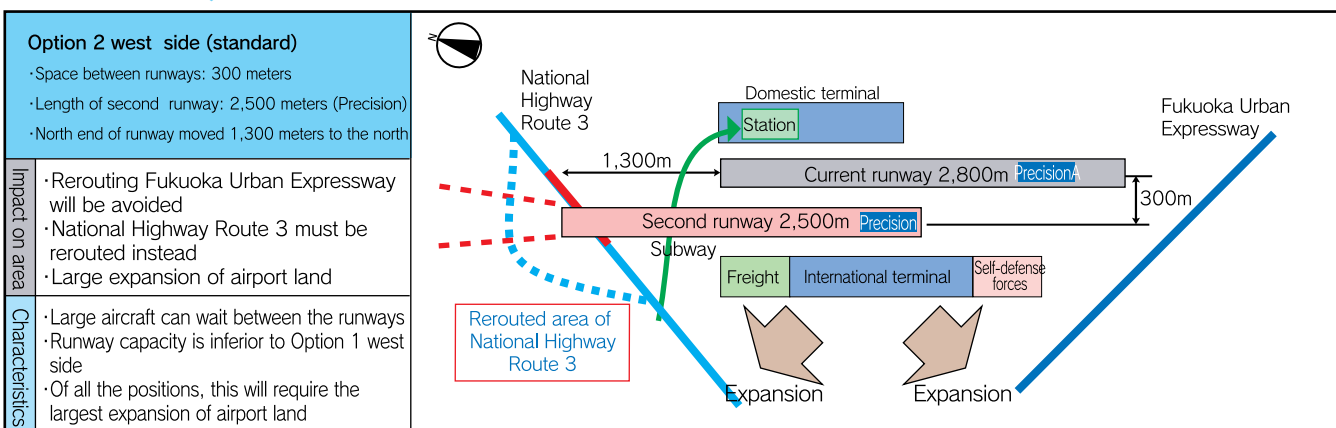
※The calculation of the runway capacity will require an examination in conformity with actual operation, taking into consideration trends for future aircraft materials and the complexity of controlling multiple runways.

## Second runway west of the existing runway



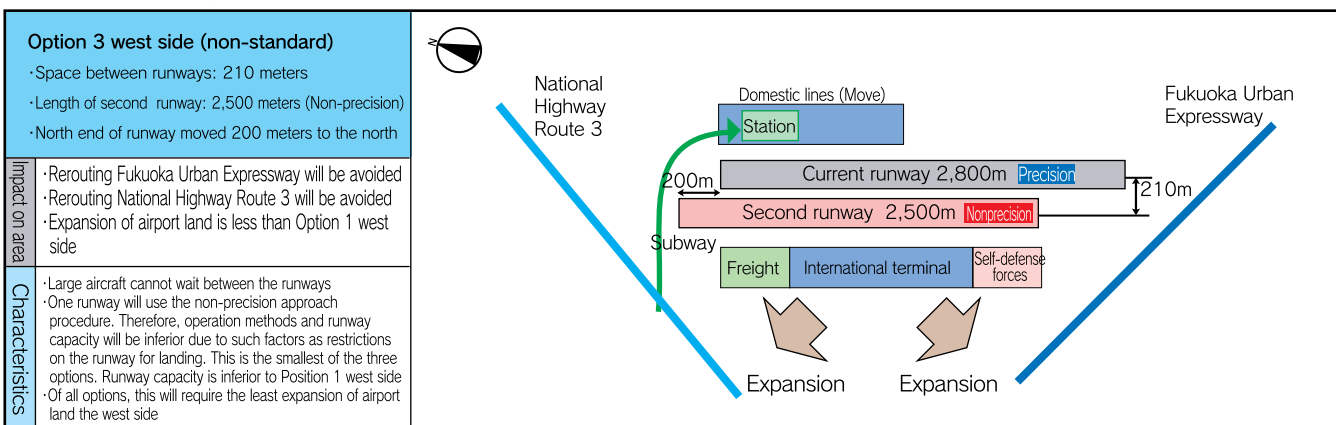
To avoid the Fukuoka Urban Expressway

- Move to the northern end of the runway 1,300 meters further north.



To avoid the Fukuoka Urban Expressway and National Highway Route 3

- Space between runways: 300 meters to 210 meters
- Entry procedure: Precision to Non-precision
- Northern end of runway: Move 200 meters north instead of 1,300 meters north

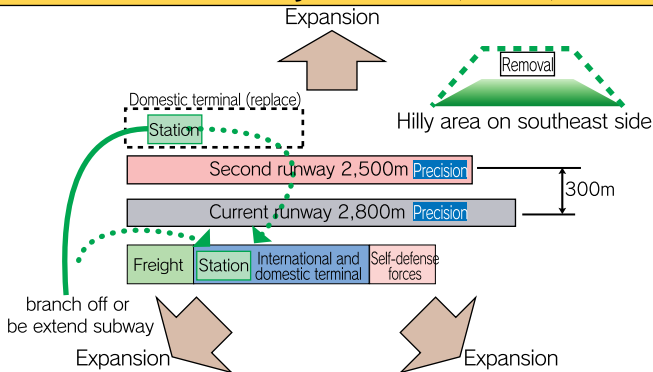


Of all the possibilities, we select the option 1 east side (standard), the option 1 west side (standard), and option 3 west side (non-standard), which minimize the impact on the surrounding area, as representative examples to examine. On the next page, we show the characteristics of each.

# I wonder...what are the characteristics of the representative examples of second runway?



## The characteristics of the optimum positioning for the new runway

Categories			Second runway east side(300m)
Airfield layout			
characteristics			<ul style="list-style-type: none"><li>·Developing a 2,500 meters second runway with precision approach, 300 meters to the east of the existing runway, with their north end in alignment.</li><li>·The hilly area to the southeast interferes with the obstacle clearance surface.</li><li>·Airport expansion to the east and west required.</li><li>·Moving the terminal for domestic passengers is required. It will have to be integrated with the west side terminal for international passengers. The subway will have to branch off or be extended.</li></ul>
Passengers Convenience	Terminal location	Passenger terminal	Integrating the domestic and international terminals improves convenience.
	Convenience of access	Time required by subway from Hakata Station	Same as now
		Time required from Fukuoka interchange	Same as now
Obstacle clearance surface	Approach surface for new runway		Removal is required because it interferes with the hilly area to the southeast.
	Moved surface for new runway		Moving is required because it interferes with homes and business offices.
	Airport horizontal surface		About the same as now.
	Extended approach surface for new runway		About the same as now.
Surrounding area	Aircraft noise		Will grow worse.
	Impact on existing facilities nearby		The amount of airport land expansion for this position will be greater than the other two positions. The subway will have to be divided or extended to maintain the current service level.
	Expansion of aircraft land		About 90 hectares (About 40 hectares to the east and 50 hectares to the west)
Annual runway capacity			Aircraft land movement is simple, and this location has the highest runway capacity of the three locations.
Construction	Rough calculation of construction costs		About ¥750 billion. (This includes basic runway construction, terminal construction, land acquisition, compensatory construction costs, and subway construction costs.)
	Construction period (It is necessary to consider the survey period separately, including environmental assessments, land acquisition, and the survey for cultural assets buried underground.)		About 14 years.
	Difficulty of work		<ul style="list-style-type: none"><li>·The restricted surface interferes with the hilly area to the southeast, so removal is necessary.</li><li>·The domestic terminal must be moved to the west, and the subway will have to be divided or extended.</li><li>·A large amount of land must be acquired to the east and west of the airport.</li></ul>

※The rough calculation of construction costs is for those construction costs involved in developing a second runway. A proposal to develop a second runway will require separate expenditures for environmental measures. The average expenditures for environmental measures from 2002 to 2006 were ¥6 billion annually. The rental fees for land and buildings were ¥8.4 billion annually. Refer to page 2 for details. It also must be taken into consideration that the expenditures for environmental measures will cost more than at present if a new runway is developed.



## 2. Consideration of possible measures to deal with future demand

Second runway west side(300m)	Second runway west side (210m)
<ul style="list-style-type: none"> <li>Developing a 2,500 meters second runway with precision approach, 300 meters to the west of the existing runway, with their north end in alignment.</li> <li>The restricted surface will interfere with the urban expressway.</li> <li>Requires an expansion of land to the west of the airport.</li> </ul>	<ul style="list-style-type: none"> <li>Developing a 2,500 meters second runway with precision approach, 210 meters to the west of the existing runway, positioning 200 meters north.</li> <li>Fukuoka Urban expressway and National Highway Route 3 will not interfere with the runway.</li> <li>This runway requires a small expansion of land to the west of the airport.</li> </ul>
The domestic and international terminals will be separate, as is the case today.	The domestic and international terminals will be separate, as is the case today.
Same as now	Same as now
Same as now	Same as now
There will be interference with Fukuoka Urban Expressway, requiring rerouting. There will also be interference with homes and offices, and they must move.	There will be interference with homes and offices, and they must move.
About the same as now.	About the same as now.
About the same as now.	Not fixed, because precision approach will not be used
Will grow worse.	Will grow worse.
Less land for expansion is required in comparison to the east side position. Fukuoka Urban Expressway must be rerouted.	Less land for expansion is required for this position than the other two positions.
About 60 hectares on the west side.	About 30 hectares on the west side.
The runway capacity will be smaller than the east side position because the passenger terminals will be separated into east and west, complicating aircraft ground movement.	The new runway will use non-precision approach, resulting in operational restrictions in bad weather. The passenger terminals will be separated into east and west positions, and large aircraft will not be able to wait between runways. This will complicate aircraft ground movement. As a result, the runway capacity for this position is the lowest of the three positions.
About ¥500 billion. (This includes basic runway construction, terminal construction, land acquisition, and compensatory construction costs, such as rerouting the municipal expressway.)	About ¥250 billion. (This includes basic runway construction, terminal construction, land acquisition, and compensatory construction costs.)
About 10 years.	About 8 years.
<ul style="list-style-type: none"> <li>Fukuoka Urban Expressway will interfere with the restricted surface, necessitating rerouting.</li> <li>A large amount of land to the west of the airport must be acquired, but the amount is still less than that for the east side position.</li> </ul>	<ul style="list-style-type: none"> <li>Land to the west of the airport must be acquired, but the amount is the least of the three positions.</li> </ul>

Such issues as the length of the new runway (2,000 to 2,500 meters) and its location will be examined in detail later from the perspectives of reducing the impact on the surrounding area, reducing construction costs, as well as the options for runway capacity.

## 2. Consideration of possible measures to deal with future demand

### (3) Relocation of Fukuoka Airport

#### The characteristics of the measure and preconditions for screening potential zones

This would eliminate several problems and challenges facing the existing airport, including aircraft noise, land rental, restriction for midnight flights, and building height restrictions. Also, the effective use of the existing airport site after relocation could create new urban functions and an integrated urban areas.

The following are preconditions for relocation.

- Each runway length of 3,000 meters.
- Two runways to provide sufficient capacity and flexible operations in emergencies.
- Two runways locate 300 meters apart for precision approach.

Future considerations could cause a change in these preconditions.

Preconditions			The right draft shows the layout of the facilities based on the preconditions
Facilities	Factors	Specification	
Runways	Total	Two parallel runways (close parallel)	
	Layout	3,000meters each	
	Separation	300meters each	
Taxiways	Facility Size	Construction of double parallel taxiway and aprons	
Aprons			
Passenger facilities			
Roads - Parking lots			
Freight handling facilities		Adequate scale or space	
Aviation safety facilities			
Others			

#### Selection procedure for candidate zones

##### Examining the potential zones for a new airport

##### (1) Selecting the potential areas

Areas under consideration; In Fukuoka metropolitan area, within 30 kilometers from Hakata Station.

##### (2) Screening the grid squares to be considered

1st stage	Topography	Conditions for the surrounding area
	Extent of land undulation (within 150 meters)	
	Water depth (Average water depth less than 25meters)	

Percentage of land area in the urbanization promotion areas; less than 1%  
Percentage of land area with buildings; Less than 5%

Screening the potential zones using a grid square of one square kilometer

##### 2nd stage

A grid square in which an airport reference point is possible to locate. In addition, maritime or coastal areas, one in which an obstacle clearance surface (one side of a horizontal surface and both sides of an approach surface) can be clear (limited to an average water depth of less than 20 meters)

Screening the grid square

##### (3) Screening the potential zones

##### Screening the potential zones

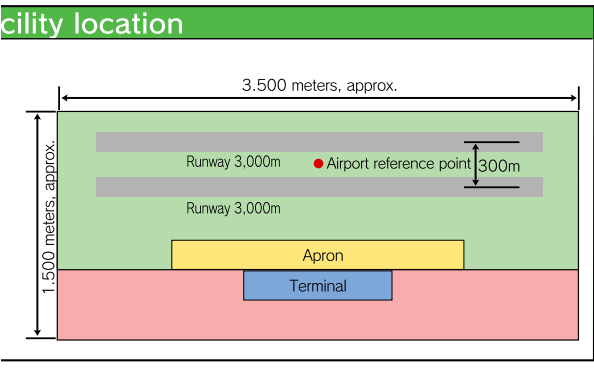
Setting the potential zones to be considered

##### Screening the potential zones

##### Factors for screening

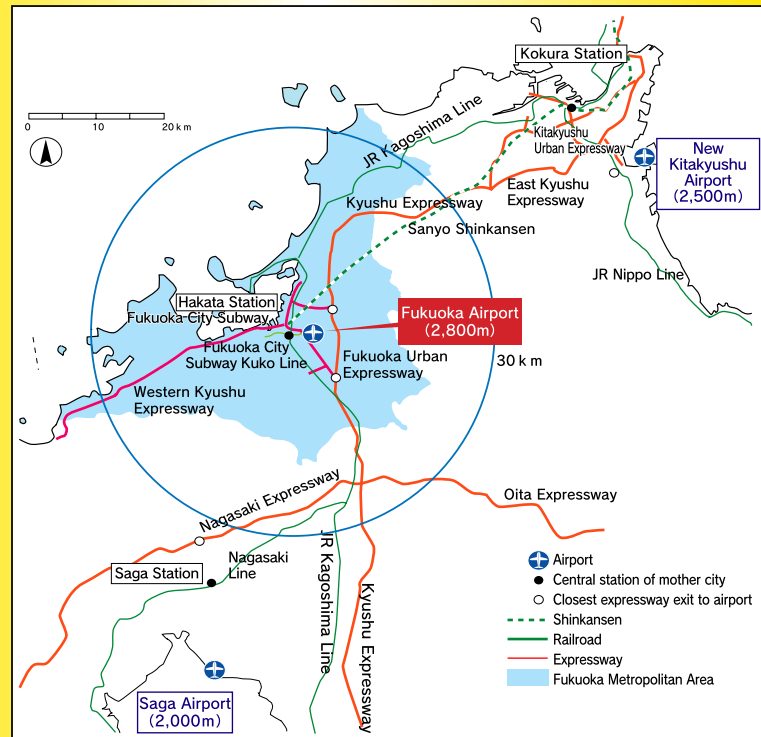
The potential zones screened by factors such as weather, obstacle clearance surface, airspace for operation, environment, and aircraft noise.

Potential zones screened



### The range for the potential areas considered

The criteria for potential areas is that the site be within the Fukuoka metropolitan area and less than 30 kilometers from Hakata Station. To be considered are regarding the distribution of air travel passengers and travel time from the center of Fukuoka City.



### Result of grid square screening

#### 1st stage

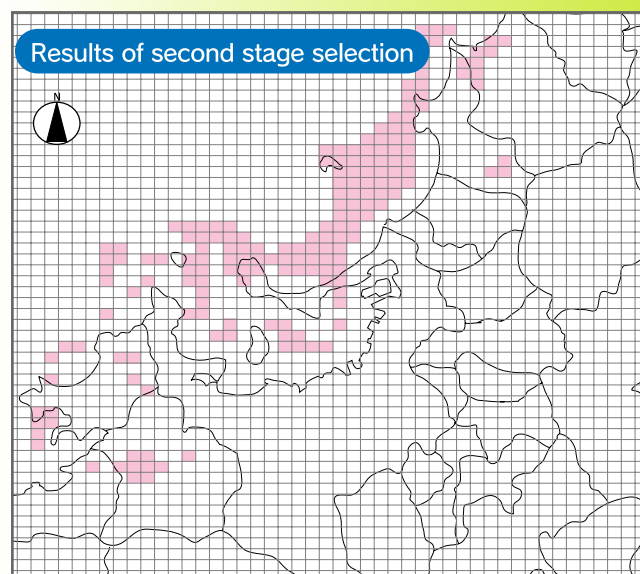
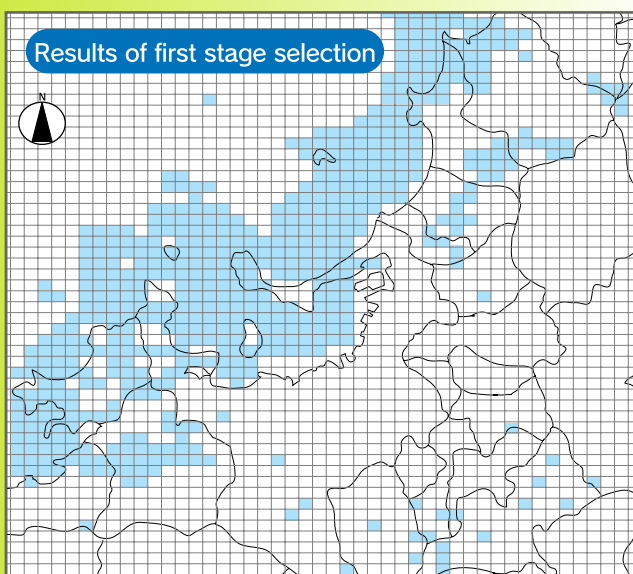
The selections of the grid squares for consideration must meet four conditions ①A land undulation of less than 150 meters, ②An average water depth of less than 25 meters, ③A land area percentage in an urbanization promotion area of less than 1%, ④A land area percentage with buildings of less than 5%.

#### 2nd stage

We screened grid squares in which an airport reference point is possible to locate.

In addition, in maritime or coastal areas, it is also important to select land for the airport site in which the average water depth is less than 20 meters, and, during this stage, a grid square in which one side of a horizontal surface and both sides of an approach surface can be established.

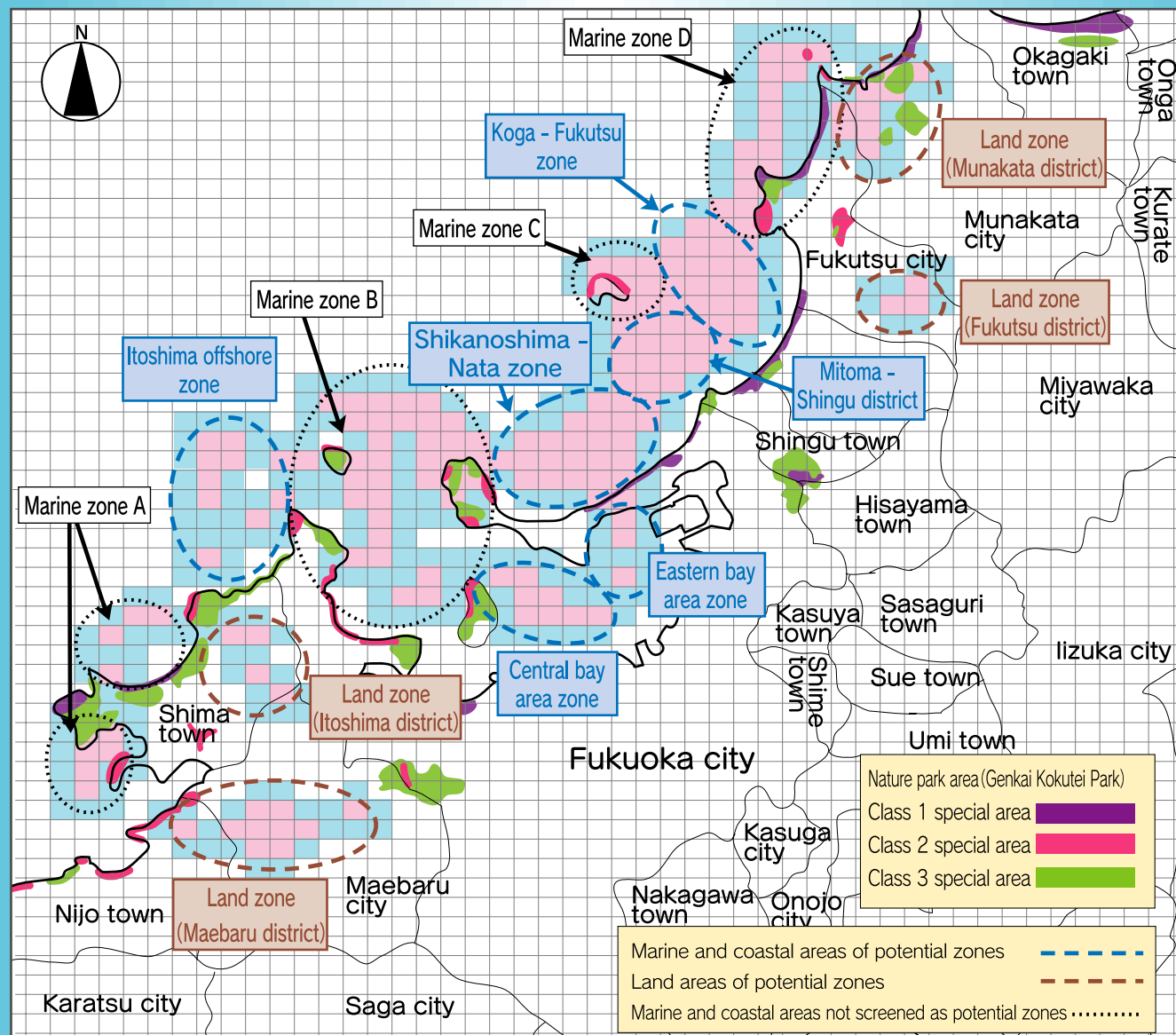
Those grid squares on the shipping lanes were not considered.



## 2. Consideration of possible measures to deal with future demand

### Setting the potential zones considered

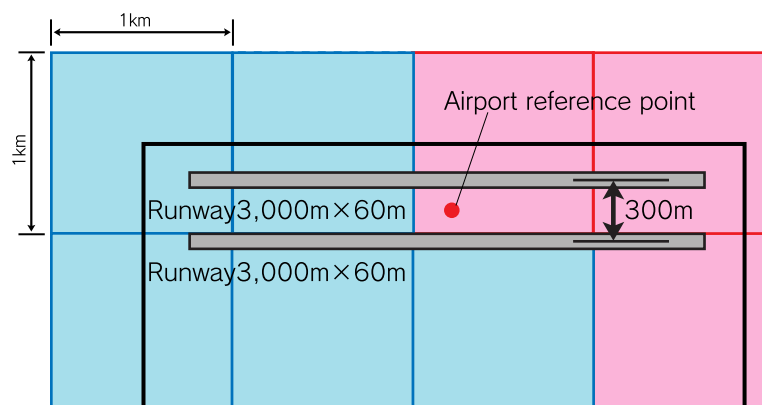
Of the grid squares selected for consideration, Marine Areas A, B, C, and D have been removed from consideration because there was an unavoidable interference with national parks (special areas), and the appropriate operating airspace could not be secured due to surrounding mountains and other reasons. We focused our attention on other maritime and land areas (areas with reefs and beaches), and selected 10 areas for consideration.



### Grid

Red grid squares indicate areas in which it is possible to establish an airport reference point (Point centered on the runways)

Blue grid squares indicate areas in which the land area for the airport is about 1.5 kilometers by about 3.5 kilometers, when an airport reference point has been established.



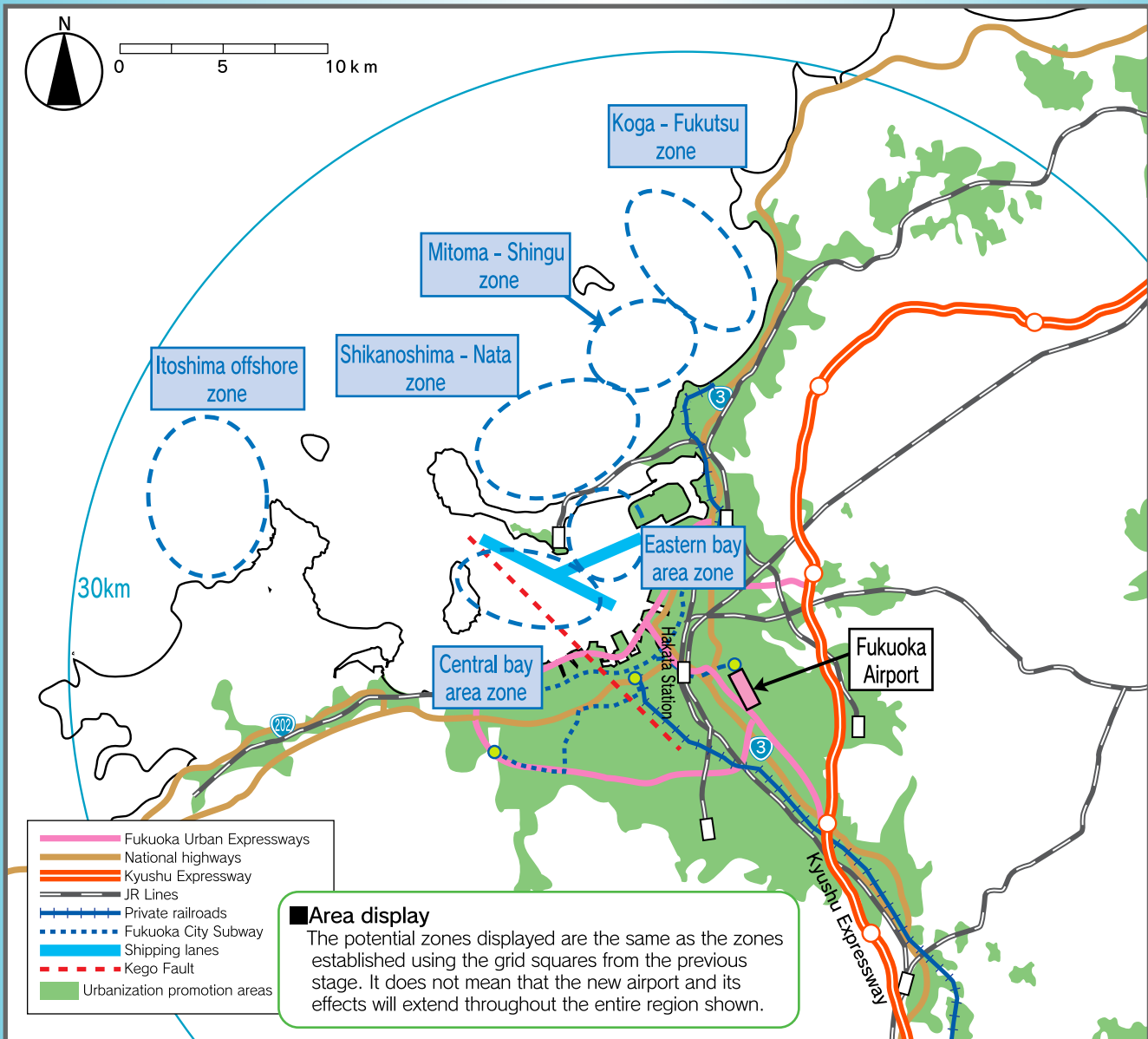


### Screened potential zones

The 10 zones under consideration were examined for their possibility of runway location by the following conditions. Potential zones were then screened.

#### ■ The basic conditions for potential zones

- ① Wind coverage (the ratio for the allowable crosswind component that is less than 20 knots) exceeding 95% can be obtained
  - ② The required obstacle clearance surfaces and appropriate airspace can be obtained
  - ③ The airport land does not interfere with the land of the Genkai Kokutei Park, and the obstacle clearance surfaces do not require modification of the park's land surface.
  - ④ The aircraft noise does not extend to the urban districts
- The land zones (Munakata, Fukutsu, Maebaru, and Itoshima) were not screened because they did not satisfy such conditions as airspace and aircraft noise.



### Explanation

#### ■ Obtaining wind coverage

Aircraft land and take offs heading into the wind. If crosswinds exceed a specified level, then the aircraft cannot land and take off. The percentage of winds that do not exceed the specified level (the allowable crosswind component) is called wind coverage. The runways must be placed in a direction with large wind coverage. The lowest wind coverage permitted for an airport is at least 95% of the allowable crosswind component, according to ICAO Annex 14.

#### ■ Obtaining restricted surfaces and access and departure corridors

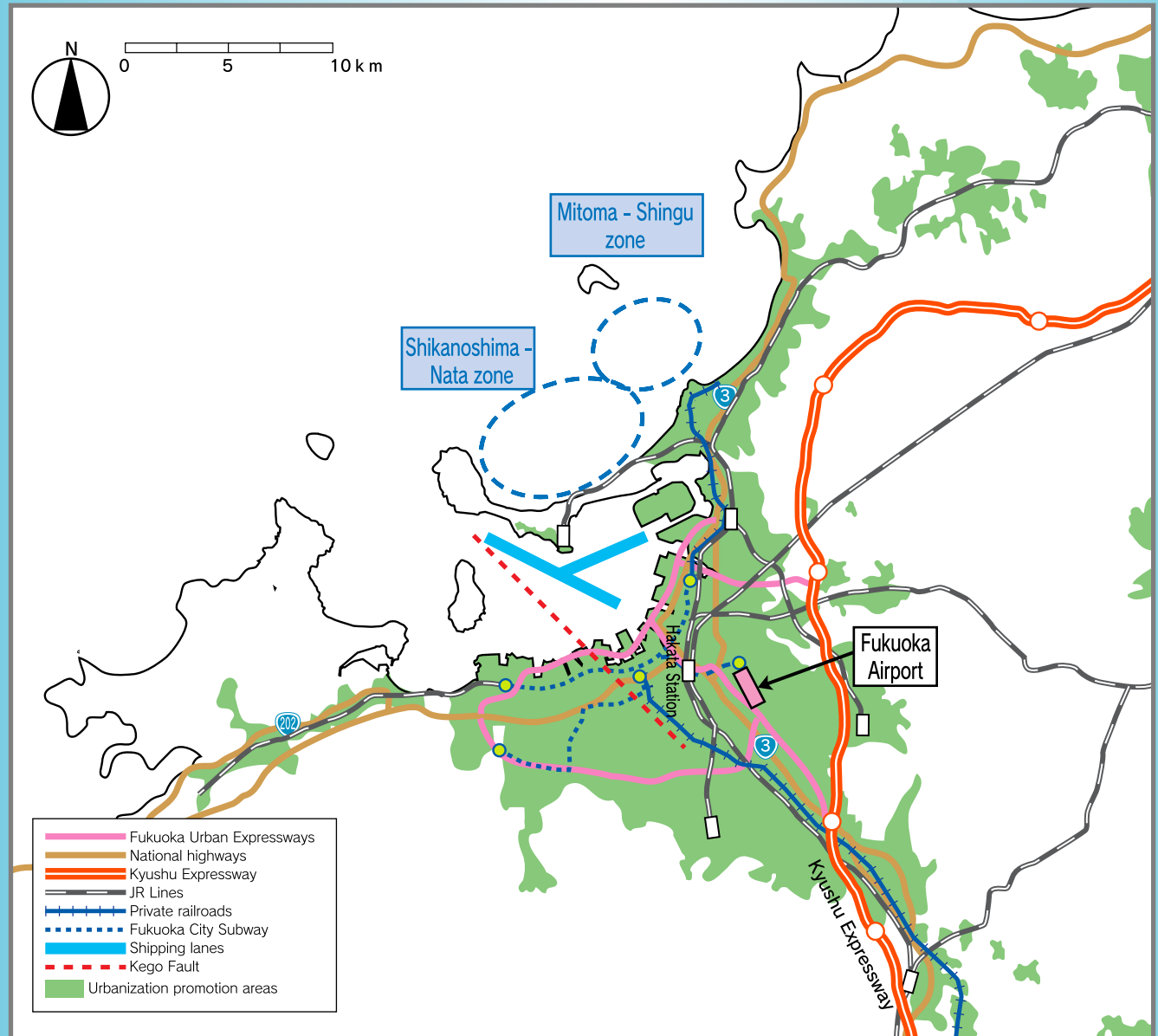
Restricted surfaces and appropriate access and departure corridors must be obtained to ensure safe aircraft operation. For restricted surfaces, the conditions for an approach surface and a moving surface is that a horizontal surface be obtained for at least one of the two sides. Also, the conditions included obtaining an approach corridor envisioning precision approach procedures, and a safe departure corridor.

## 2. Consideration of possible measures to deal with future demand

### The examination of six potential zones

Here we look at the current issues involving the six marine zones screened.

- Central bay area zone: Obtaining the required obstacle clearance surface would require placing the airport site directly on Kego fault.
- Eastern bay area zone: Steps to reduce aircraft noise in the urbanized area would affect the facilities of Port of Hakata.
- Koga-Fukutsu zone and Itoshima offshore zone: Located in deep water areas and far from the center of the city.
- At present, we think that two zones are possible to locate the new airport site, Mitoma-Shingu zone and Shikanoshima-Nata zone shown in the map below.



### Explanation

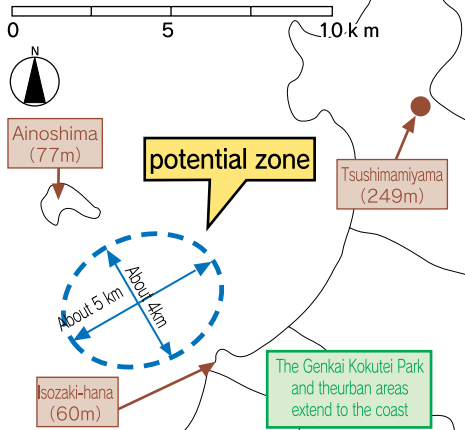
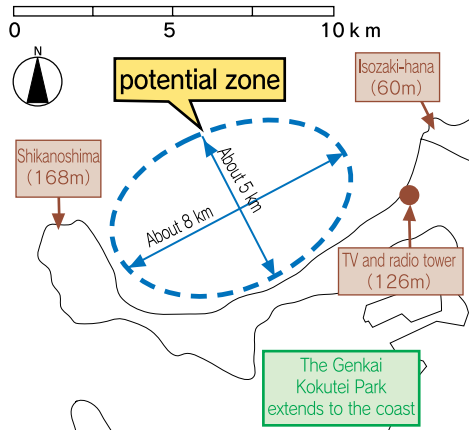
#### ■ Kego fault

Kego fault is a confirmed active fault. It runs from near Chikushino City to the northwest, cutting across Hakata Bay. This fault is considered one of the prefecture's primary active fault in the Fukuoka City Disaster Prevention Plan. Also, Also, a long-term evaluation conducted of the fault, issued on March 19, 2007, by the Earthquake Survey Committee of the national government's earthquake survey and research promotion headquarters, reports that the likelihood of a magnitude 7 earthquake occurring within the next 30 years at this location is a maximum of 6%. In Japan this location ranks 10th out of 110 locations on active fault lines, in terms of the likelihood of an occurrence of an earthquake.

## What are the characteristics of Mitoma-Shingu zone and Shikanoshima-Nata zone?



### Area characteristics

Potential zone  Category			Mitoma-Shingu zone		Shikanoshima-Nata zone	
						
The natural and urban envirnment			The geographical characteristics of the coastal areas include reefs and beaches. The Genkai Kokutei Park and the urban areas extend to the coast. Ainoshima is in at the northern part of this area, Isozaki-hana is to the south, and Tsushimamiyama is to the east.		The geography of the coastal areas is characterized by beaches, and Genkai Kokutei Park surrounds the zone. Shikanoshima is in the western part of the area, and Isozaki-hana and a TV and radio tower are to the east.	
Water depth	Average depth of thered grid squares in the area		About 18 meters deep			
Distance	From Hakata Station to the edge of the zone		About 15 to 20 kilometers		About 10 to 15 kilometers	
Obstacle clearance surface	Approach surface		Can be obtained			
	Movingsurface		Can be obtained			
	Horizontal surface		Could interfere with Isozaki-hana and Ainoshima, depending on the runways' direction (Obtaining one side possible)		Could interfere with TV and radio tower and Shikanoshima, depending on the runways' direction (Obtaining one side possible)	
Surrounding communities	Legal restrictions	Interference with Kokutei Park	If runways positioned close to the land area, the airport site could interfere with the surrounding area.			
	Impact on surrounding areas	Relocating facilities in the area	Runways are possible to be positioned so that facilities do not have to be moved.			
Natural environment	Factors for consideration		Natural coastline, edible seaweed beds, fishing beds, valuable organisms, natural views, etc.			
Runway capacity			No restriction on time use makes the runway capacity greater than that of developing a second runway in the existing airport.			
Construction	Airport land area		About 530 hectares			
	Rough estimate of costs		Roughly 1,000 billion yen (Including quays, landfill, runways and other facilities, terminals, terminals, access facilities, fishing industry compensation)		Roughly 1,100 billion yen (Including quays, landfill, runways and other facilities, terminals, terminals, access facilities, fishing industry compensation)	
	Construction period		About 13 years (not including the period for fishing industry compensation and environmental assessment)			
	Considerations for construction		Procedures for building quays to protect against high waves in winter, winter protection measures, and measures against spray caused by strong winds			

※Rough estimate of costs

The rough estimate of costs is the predicted amount that will need to be spent on locating the airport in a shallow area near land. This is subject to change as the examination progresses toward Step 4, the final step.

## Toward Step 4

■A detailed examination of the area for a new airport will be conducted in Step 4, taking into consideration all opinions offered regarding this step,

### ■Specific airport location

Considerations will be made as to the runway direction (taking wind coverage into account), aircraft noise, and the effect on the seashore contours and the surrounding area. We will indicate a specific location for the airport site.

### ■Wind coverage

The wind coverage at Fukuoka Airport from March 2003 to February 2005 was about 99.8%. A more detailed study of wind coverage must be conducted to examine the direction of the runways.

### 3. Consideration of the viewpoints for evaluating the alternatives

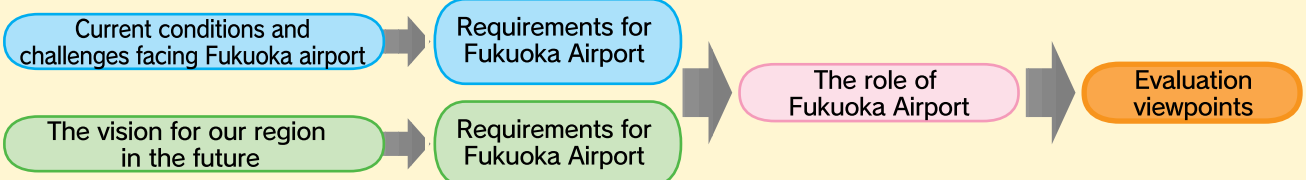
**There are plenty of proposals, but how will one be selected?**



#### Viewpoints for evaluating the alternatives

- The following examination flow chart is the basis for setting the evaluation viewpoints. Examination is conducted by studying the role of Fukuoka Airport, derived from the current conditions and challenges facing Fukuoka Airport, and the vision of the region for the future as studied in PI step 1 and 2.

#### Evaluation viewpoints / flow chart



- First, we arranged the key points for the issues regarding the current conditions and challenges facing Fukuoka Airport, and the requirements for Fukuoka Airport, as examined in PI Step 2.

#### Current conditions and challenges facing Fukuoka Airport ,and the requirements for Fukuoka airport to solve them

##### Current conditions and challenges facing Fukuoka Airport (Step 1)

##### ①The passengers (shippers)

- Emphasis on travel time and operating frequency
- Desired times of use are concentrated in the morning and the evening
- High degree of satisfaction based on access

##### Requirements for Fukuoka Airport (Step 2)

- Maintaining and expanding non-stop destinations
- Response to growing frequency on routes
- Obtaining diversified ground access
- Lower airfares

##### ②The regional

- Growing with the citizens in the area
- Contributing to the regional economy and the life of the citizens
- Impact on the urban structure and urban environment

- Enhancement of the economy of Fukuoka and Kyushu
- Efforts for environmental measures, including aircraft noise
- Efforts for aviation safety

##### ③The air transport network

- Interregional flow using the domestic aviation network
- Flow with East Asia using the international aviation network

- Further enhancing the international and domestic network

##### ④The airport facility

- Restrictions on capabilities during peak hours
- Fluctuation in air travel demand by day and season
- Airport use restricted from 7:00 a.m. to 10:00 p.m.

- Further enhancing the international and domestic network



- Next, we arranged the key points for the demands on Fukuoka Airport as derived from the vision of the region in the future, for which Fukuoka and Kyushu is striving.

#### The vision of the region for the future and the requirements for Fukuoka Airport to it

##### Vision of the region in the future (Step 2)

##### Requirements on Fukuoka Airport (Step 2)

#### ① Globalization

A region coexisting with the international community, centered on the growing East Asia region

- Response to the passengers' and shippers' demands from / to East Asia
- Strengthening the network of air, land, and sea transport

#### ② An aging society with fewer children

A region with a diversity of opportunity capable of attracting many different people from other parts of Japan and overseas

- Strengthening the function of Fukuoka as an area for domestic and international exchange
- Helping to increase technological, cultural, and academic interaction

#### ③ Regional devolution

A self-sufficient, competitive region that utilizes local characteristics

- Enhancing air transport service that support Fukuoka's competitiveness
- Strengthening the network between regions

#### ④ Diversified values

A region with the interaction of different kinds of people, that provides a sense of comfort and abundance

- Responding to air transport logistics in concert with other transportation modes.
- Responding to diversified user needs

#### ⑤ IT

A region that is an information center both for Japan and abroad, and uses IT to create exceptional knowledge

- Responding to distribution in concert with other transportation facilities
- Responding to the interaction of technology and personnel regarding information

#### ⑥ Formation of social capital

A region with global competitiveness due to its formation of strategic social capital

- Increasing efficiency and further reducing operating costs
- Appropriate capital investment focused fully on its effectiveness

#### ⑦ Environmental emphasis

A sustainable region with a virtuous circle of urban development and environmental considerations

- Reducing the airport's environmental impact on the surrounding area
- Helping the interaction of technology and personnel regarding information technology.

The colors of the lettering correspond to the roles of the Fukuoka Airport explained on the following page.

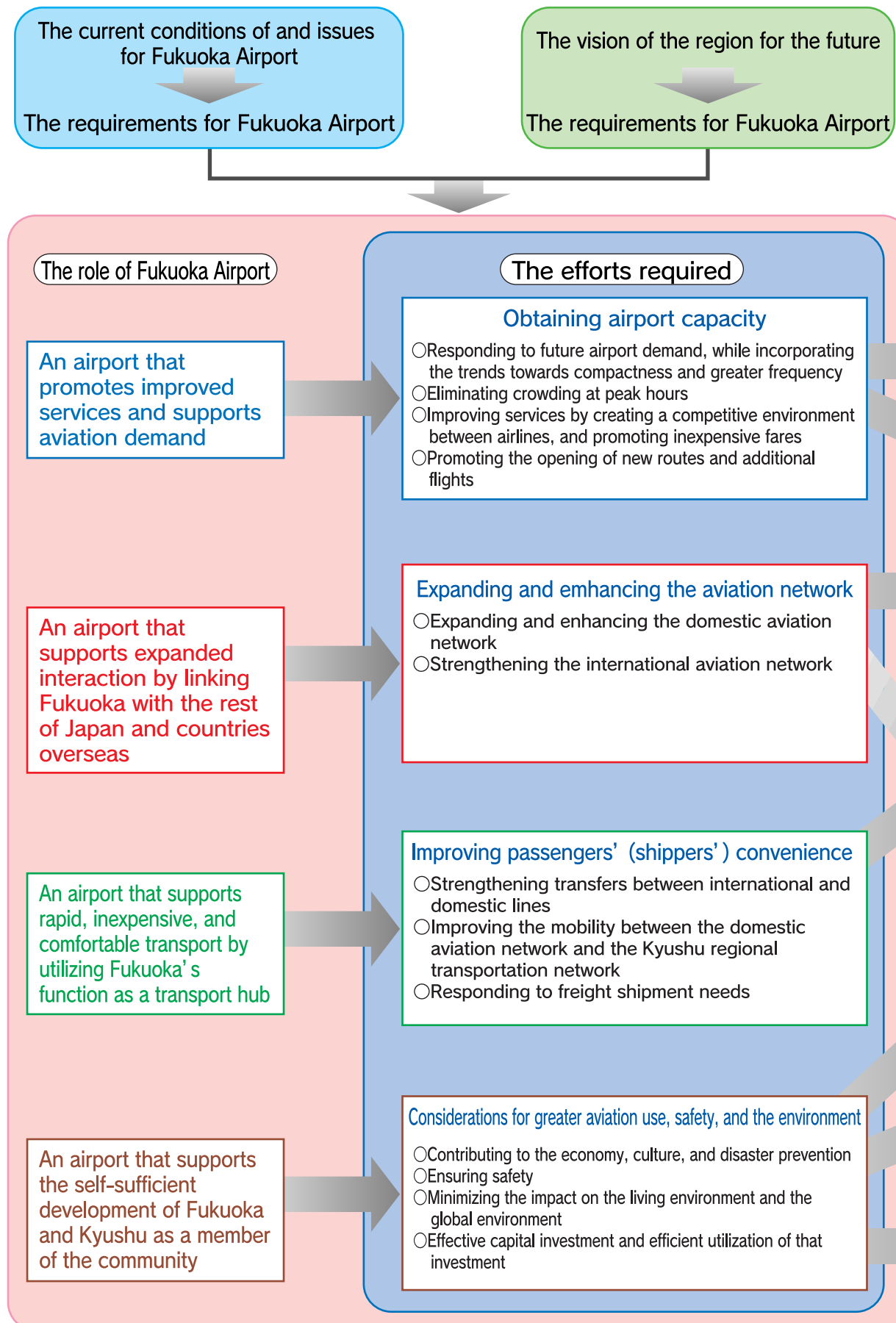
**We can determine the role of Fukuoka Airport by examining these demands.**



### 3. Consideration of the viewpoints for evaluating the alternatives

#### Examining viewpoints for evaluating the alternatives

- We set five basic viewpoints to evaluate and compare the alternatives to solve the problems. This examination was conducted by studying the role of Fukuoka Airport, which was derived from the airport's current conditions and challenges it will face in the future, as well as the future of the region. We incorporated the opinions received regarding our evaluation in PI Steps 1 and 2.



## Provisional content to be examined in Step 4

- We will establish evaluation factors to qualitatively and quantitatively examine and compare policies for the future, incorporating the options we received regarding the evaluation perspectives shown here.
- We will conduct an examination as shown below regarding the sweeping measures regarding the development of a second runway to the existing airport or the relocation.
  - In regard to the proposal for developing a second runway to the existing airport, we will examine the specific capabilities for runway capacity in light of airport operating procedures. In addition, we will examine the length and location of a new runway.
  - In regard to a relocation, we will establish a specific runway position in the candidate area in light of the wind coverage and the impact on the surrounding region.
- We will make a comparative evaluation after assessing the advantages and disadvantages of the measures for the future, in light of the examination results and the opinions received, and indicate a future direction.

### Work through Step 3

### The following are planned to be carried out in Step 4

#### Points of evaluation

##### Improving the pressure on the supply and demand balance

Can the proposal contribute to the improvement of the pressure on the supply and demand balance?

For example

- meeting the demand

##### Passengers' (shippers') convenience

Can the proposal grasp the centrality of Fukuoka Airport in the domestic and international aviation network for the future, and contribute to the convenience of the user?

For example

- Expanding and enhancing air routes
- Convenience of access

##### Environment and Safety

What effect will the implementation of the proposal have on the living environment and natural environment from the perspective of safety?

For example

- Impact on the natural environment
- Securing safety

##### Development of the city and the region

In the event the proposal is implemented, what effect could it have on promoting urban and regional development?

For example

- Impact on urban development
- The effect on Fukuoka and Kyushu

##### Enterprise efficiency

Will there be a sufficient effect for the users in view of the costs required to implement the plan?

For example

- The period for the manifestation of the effects

Establishing evaluation factors

Comparing and evaluating proposals (examining advantages and disadvantages)

Proposed direction

- Examining the runway length and location
- Considering a specific location for a new airport Others

What are the factors to compare the alternative solutions?



Can it contribute to interaction in the economy, culture, and other sectors?

Can the current level of convenience be maintained?

Will there be an increase in the number of flights?

Can it meet the future demand?



## PI Report Step 3: Summary

### ●Examination of possible measures to meet future air travel demand

#### 1)Distributing the demand of Fukuoka Airport to neighboring airports

This measure is not viable because restrictions will create a major burden on both passengers and the region, and it will be difficult to achieve in the current aviation deregulation. Promoting the demand at the neighboring airports is not a viable comprehensive option because its effect on alleviating the tight supply and demand imbalance will be minimal.

#### 2)Developing a second runway to the existing airport

This measure has many factors that must be considered, including the effect on the surrounding area and runway capacity. Many possible variations of this measure can be considered, including runway length and space between runways. Therefore, we cited examples of the standard runway position and runway positioning that would minimize the impacts on the surrounding area, and listed their characteristics.

- The standard location of a second runway developed east side of the existing runway, 300 meters apart
- The standard location of a second runway developed west side of the existing runway, 300 meters apart
- The minimal distance location of a second runway developed west side of the existing runway, 210 meters apart

#### 3)Relocation of Fukuoka Airport

Ten locations were considered as potential zones for relocation, considering the distance from the center of the city and topographical conditions. We selected six areas based on such factors as weather, air space, natural environment, and aircraft noise.

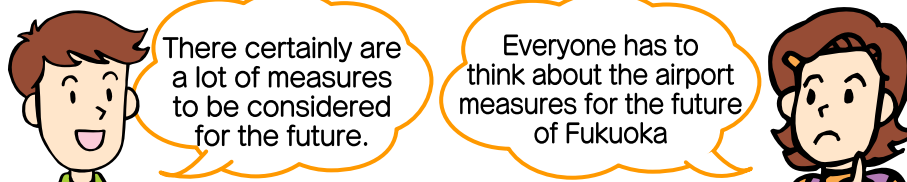
On these, we listed the characteristics of the most promising sites: Mitoma-Shingu area and Shikanoshima-Nata area.

### ●Viewpoints for evaluating the alternatives for the future air travel demand

We established the following five viewpoints for comparing alternatives for the future based on the roles of Fukuoka Airport as derived from current conditions at the airport and the challenges it will face in the future, as well as the vision of the region for the future.

1. Improving the pressure on the supply and demand balance
2. Passengers' (shippers') convenience
3. Environment and Safety
4. Development of the city and the region
5. Enterprise efficiency

In PI Step 4, we plan on further examining the measures of developing a second runway, of relocation, and plan establishing evaluation factors. Then we will compare the advantages and disadvantages of the alternatives, and show the draft for the future airport.



**We are looking forward to hearing your opinion!**

Please visit our website

### Announcements concerning PI Report Step 4

#### Evaluation process



In Step 4, the next step, we will conduct a comparative evaluation of the measures and examine a proposed direction.



FUKUOKA KUKO CHOSA RENRAKU CHOSEI KAIGI (Fukuoka Airport Study Commission)  
<http://www.fukuokakuko-chosa.org/>

Kyushu Regional Planning Bureau, Ministry of Land,  
Infrastructure and Transport (Airport PT Office)  
2-5-33 Otemon, Chuo-ku, Fukuoka 810-0074  
Tel: 092-752-8601 Fax: 092-724-2480  
<http://www.pa.qsr.mlit.go.jp>

Osaka Civil Aviation Bureau, Ministry of Land,  
Infrastructure and Transport (Airport Planning and  
Adjustment Section)  
4-1-76 Otemae, Chuo-ku, Osaka 540-8559  
Tel: 06-6949-6469 Fax: 06-6949-6218  
<http://www.ocab.mlit.go.jp>

Fukuoka Prefecture (Airport Planning Division,  
Airport Planning Bureau)  
7-7 Higashi-Koen, Hakata-ku, Fukuoka 812-8577  
Tel: 092-643-3216 Fax: 092-643-3217  
<http://www.pref.fukuoka.lg.jp>

Fukuoka City  
(Administrative Planning Bureau,  
section responsible for future airport measures)  
1-8-1 Tenjin, Chuo-ku, Fukuoka 810-8620  
Tel: 092-711-4102 Fax: 092-733-5582  
<http://www.city.fukuoka.jp>



We welcome comments about the  
Comprehensive Study of Fukuoka Airport Public Involvement  
(PI) Report Step 3

Comments can be emailed to

kukochosa@fukuokakuko-chosa.org
---------------------------------

Please send your nationality and address (city name), age and  
occupation along with your comments. Thank you.