ฉบับร่าง

Draft Version- Executive Summary
Subject to changes and approval
by the Government of Thailand

The Environmental Impact Assessment Report for the Project, Undertaking, or Operation that May Seriously Impact Natural Resources, Environmental Quality, Health, Sanitation, Life Quality of People in a Community

Executive Summary

The Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport, Ban Chang District, Rayong Province

ชื่อโครงการ : โครงการก่อสร้างทางวิ่งและทางขับที่ 2 สนามบินนานาชาติอู่ตะเภา อำเภอบ้านฉาง จังหวัดระยอง

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Chapter 1

Introduction

1.1 Background and significance of the Project

U-Tapao International Airport is located in Phala Subdistrict, Ban Chang District, Rayong Province. U-Tapao lies approximately 35 kilometers east of Rayong and 30 kilometers south of Pattaya. It has an approximate area of 12,689 rai, operated by the Royal Thai Navy. Construction began in 1961. In need of a naval airport, the Royal Thai Navy conducted a survey of the area and approved the construction of a new airport. The Royal Thai Armed Forces approved the construction of the airport in the area of U-Tapao Village, Rayong Province. The new airport was planned to have a runway length of 1,200 meters. In 1962, due to expansion of communism in South Vietnam and Laos, the US government saw the need to build more large airports in Thailand. The Thai government and the United States, therefore, had a joint project. In 1965, the Cabinet voted for the United States government to renovate U-Tapao Airport to transport combat units to various strategic points within the country. Later, Field Marshal Thanom Kittikachorn, the commander-in-chief at that time, ordered the Navy to use this airport for government work and be responsible for maintaining the airport under the name "U-tapao Airport"

In 1976, the United States Army withdrew its troops from Thailand, including those at U-Tapao Airport. To promote national development, the Cabinet therefore approved U-tapao Airport to be an international commercial airport and a reserve airport of Don Mueang Airport. The Notification of the Ministerial Regulation No. 68 (B.E. 2519) is therefore effective under the Customs Act B.E. 2469, stipulating that U-tapao Airport, Rayong Province, is a customs airport. The reason at the Exhibit to the Notification states that because the government deems it appropriate to designate U-tapao Airport, Rayong Province, as a commercial airport for international aircraft to take off and land and can import and export goods, U-tapao Airport has been designated as a customs airport. This was published in the Government Gazette, Special Issue, Volume 93, Chapter 90, on 9 July 1976 (B.E. 2519).

Subsequently, the Cabinet passed a resolution on 21 February 1989, approving the Royal Thai Navy to operate U-Tapao Airport together with the Department of Commercial Aviation. The Navy shall operate in finance and accounting, buildings and supplies, security, aviation communications, air traffic control, and air navigation. On the other hand, the Department of

Commercial Aviation is the operator of the flight procedure, airport development work, and consultation as proposed by the Ministry of Defence.

The Ministry of Defence issued an order (special) no. 30/30 re: designation of U-tapao Airport Management Committee. On 31 October 1996, the Royal Thai Navy approved the establishment of the U-tapao Airport Division (temporary) to prepare the personnel during the request for approval to establish U-tapao Airport as a state enterprise organization. However, it took a long time to establish U-tapao Airport as a state enterprise. The Navy therefore approved the restructuring from the U-tapao Airport Division to "U-tapao Airport Authority" to manage U-tapao Airport. Income and spending were recorded as money outside the budget in the form of deposits. Since then, U-tapao Airport is therefore known as one of the regional airports in the eastern region of Thailand.

Due to the political unrest in 2005, Suvarnabhumi Airport was closed by protesters. In 2011, Thailand was severely affected by the Great Flood. As a result, the Thai Government deemed it is necessary to have the third international airport of Bangkok, following Don Mueang Airport and Suvarnabhumi Airport, to be a reserve airport during the emergency of air transportation of the country. The Thai Government, led by the National Council for Peace and Order, issued an order of the Head of the NCPO at a meeting on 29 July 2014, requiring the Ministry of Transport to coordinate with the Ministry of Defense (Royal Thai Navy) to jointly consider the approach to development U-tapao Airport to be Bangkok's third major commercial airport. On 12 September 2014, the government issued a policy statement to the National Legislative Assembly on the development of air transport infrastructure. Airports shall be improved to accommodate air traffic efficiently. This initiative also aimed at promoting aviation industrial estate, aircraft maintenance, and increased capacity for air transport toward the international standard. Regional airports, including U-tapao Airport, will improve the service availability of Suvarnabhumi Airport and Don Mueang Airport.

To comply with the policy presented to the National Legislative Assembly, the Ministry of Transport and the Royal Thai Navy, therefore, had a meeting and agreed to develop U-tapao Airport as Bangkok's third international airport under the management of the Royal Thai Navy. This development serves two missions, security and commerce, in a balance manner to achieve optimum benefits under the "One Airport Two Missions" concept. The Ministry of Transport, represented by the Minister of Transport, and the Royal Thai Navy, represented by the Naval Commander, cosigned a Memorandum of Cooperation (MOC) on the development of U-tapao Airport into Bangkok's third major commercial airport. The objective is to synergize the development of the area, business planning, and infrastructure development to increase the capacity of U-tapao Airport to be Bangkok's third commercial airport.

The Government's policy to improve the capacity of U-tapao Airport to accommodate a minimum of 60 million passengers/year. It is, therefore, necessary to expand U-tapao Airport, which currently has one runway with the capacity to accommodate 3 million passengers/year. Construction of the second runway and other elements are the main parts of U-tapao International Airport and the Eastern Airport City Development Project.

The development of U-tapao International Airport (Extension) involves the construction of the second runway with the length of 3,505 meters. The scope of this development is applicable to the project or undertaking that may seriously impact a community No. 8 Project, Undertaking or Operation of "**Air Transportation System with the Construction or Expansion of Airport, temporary runway of aircraft according to the law on air transport**" with "**the runway length of 3,000 meters or more**". This principle is in accordance with the Notification of the Ministry of Natural Resources and Environment re: determining the project, undertaking, or operation that may seriously impact natural resources, environmental quality, health, sanitation, life quality of people in a community, which requires the environmental impact assessment report and the principles, method, and condition for preparing the environmental impact assessment report (No. 2) dated 28 November 2019 (announced in the Government Gazette on 16 January 2019 (B.E. 2563)). It is hereinafter referred to as "the Project" for U-tapao International Airport Development, which involves the extension of U-tapao International Airport with the construction of the second runway and other necessary elements for air transportation systems.

1.2 Action plan of U-tapao International Airport development

Construction of the second runway involves the extension area of the airport, where the EHIA report is required. The Project covers two parts: 1) air transportation system elements (border in orange and area in blue), and 2) commercial gateway (border in orange and area in yellow). When the construction is complete, the air transportation system elements (blue dotted border) will combine with the border in orange and area in blue. The development will cover the expected number of flights and passenger forecast in 2048 (the ultimate phase). Gray areas are not included in this EHIA Report, but the development area has been designated to provide an overview of the entire U-Tapao Airport development. The details above are illustrated in **Figure 1.2-1.**

U-tapao Airport development in the eastern airport city promotion involves several organizations, such as private investors, EEC Policy Committee Office (EECPCO), Royal Thai Navy (RTN), Thai Airways Public Company Limited, and Civil Aviation Authority of Thailand (CAAT). Private entities can also rent space for public utilities of the airport. The action plan for U-tapao International Airport development is shown in shown in **Table 1.2-1.**

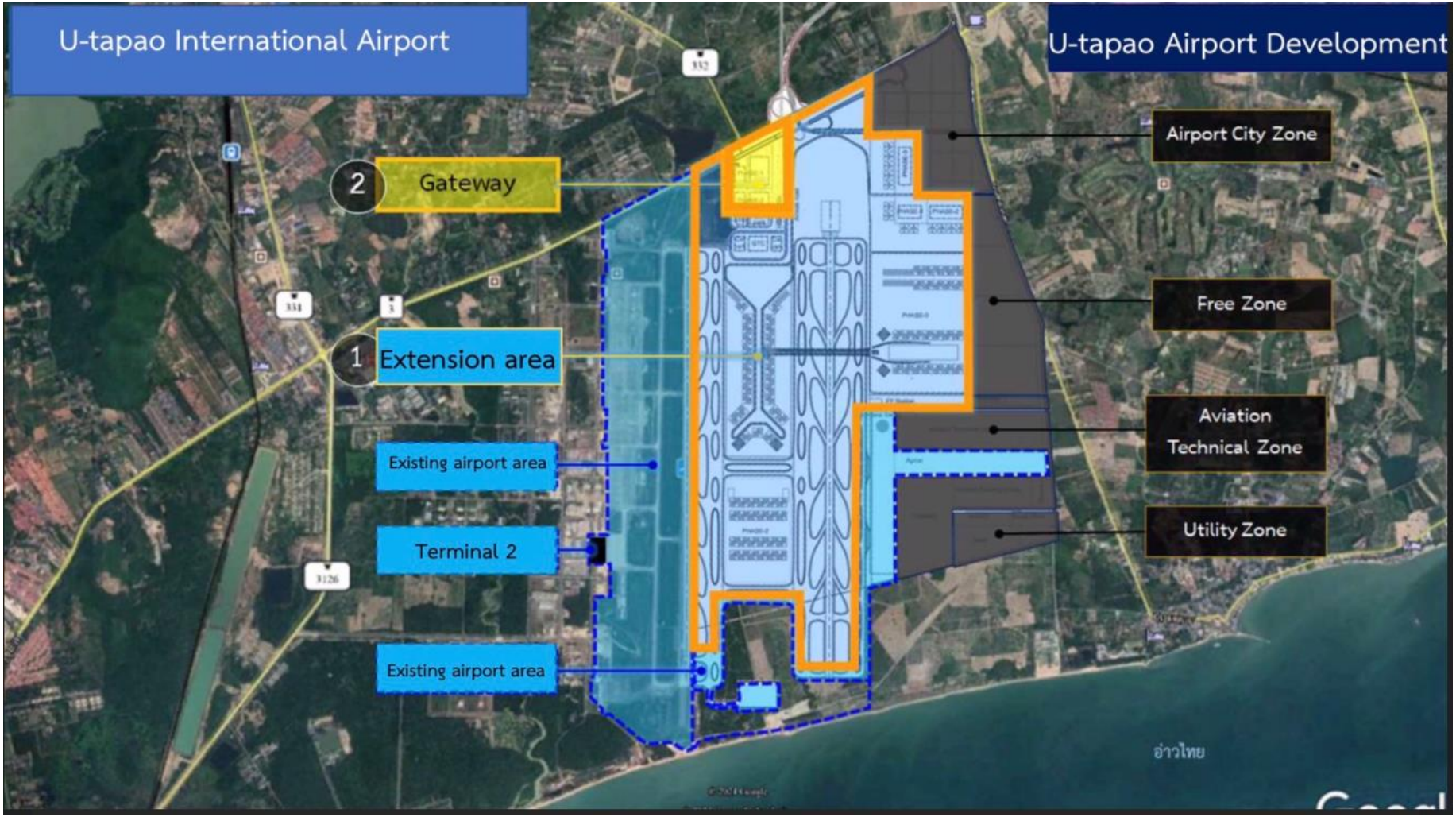
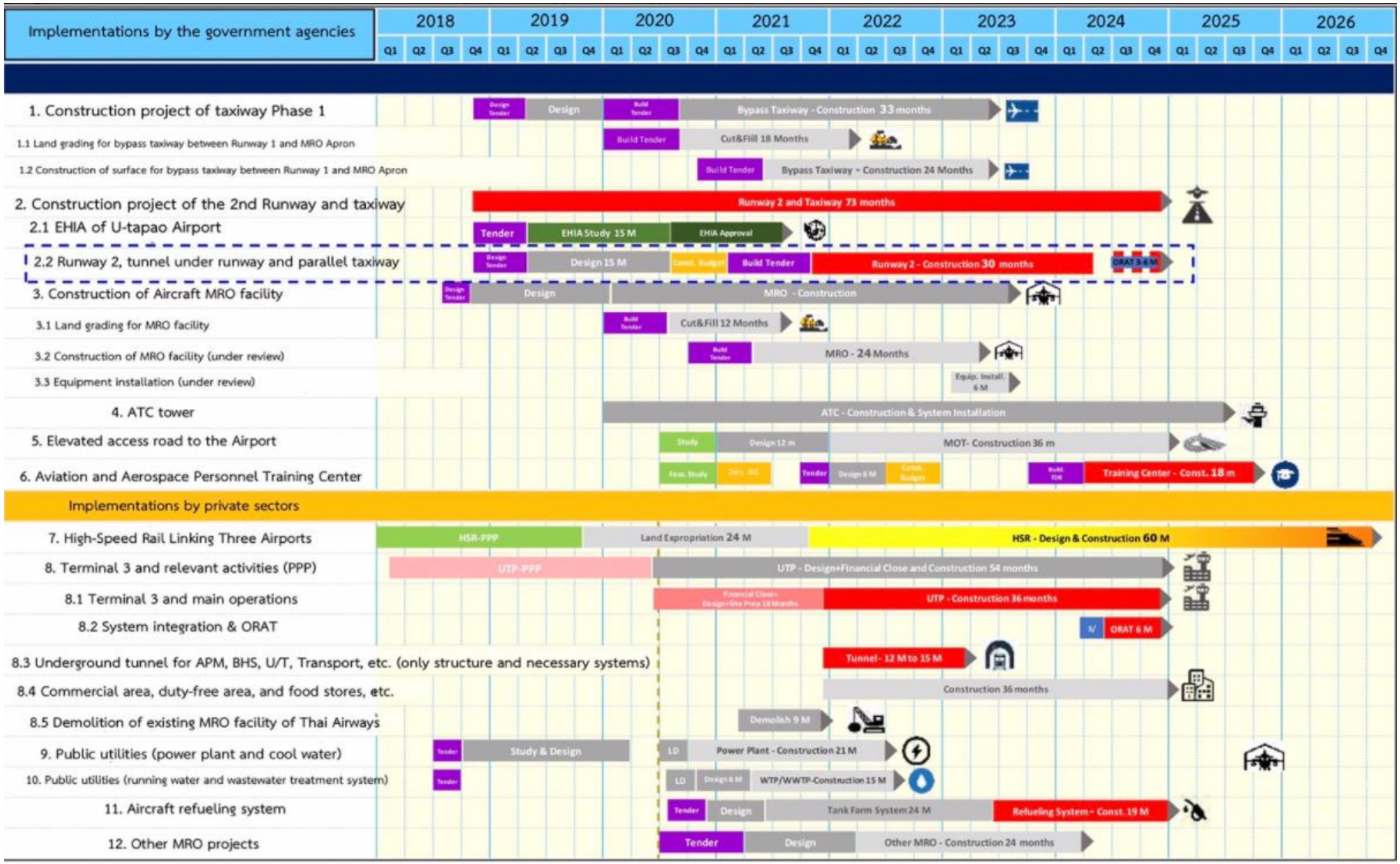


Figure 1.2-1 Scope of the area of U-tapao International Airport in this study and scope of this EHIA Report (border in orange)

Table 1.2-1 Action plan for U-tapao International Airport development and Eastern Airport City



Source: EEC Policy Committee Office, 2020

1.3 Objectives of the report

The objectives of the EHIA Report for the Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport, Ban Chang District, Rayong Province, are as follows:

1) To distinguish and predict positive and negative environmental impact caused by the Project compared to the scenario without the development

2) To mitigate negative environmental impact from the project planning in order to determine appropriate mitigation measures, the budget, and practicality rather than solving the problems when they subsequently occur

3) To use the data of environmental factors to plan and implement the Project according to the development plan of U-tapao International Airport in an environment friendly and sustainable manner to the community

4) To determine monitoring measures for environmental impact

1.4 Area and guidelines of environmental impact assessment

Currently, U-tapao International Airport is operated and managed by U-tapao Airport Authority (under RTN). Ensuring that the operations and practices of the public airport covers the entire airport will facilitate issuance of the license for public airport operation without separating the operations of Runway 1 from Runway 2. The measures determined in the EHIA Report will be included as the appendix of the license.

The area of this Project is in the development area of U-tapao International Airport (extension), which is also in the premises of U-tapao International Airport. It covers the area of 12,689 rai (the border in green), as per the state order No. Ror Yor 0493. The Project area itself is about 4,415 rai (the border in orange), as shown in **Figure 1.2-1**, most of which, or 4,233 rai, is in the Eastern Airport City development area, while the rest of the area, 183 rai, is in the military area for security of the airport and national security.

When the construction of Runway 2 is complete, the Airport will be operated as a public airport, covering the entire area of the airport. More precisely, both Runway 1 and Runway 2 will be operated simultaneously. Therefore, the scope of this Project is extended for another 6 km on the east and the west and 10 km on the north and the south, starting from the fence line of U-tapao International Airport (border in green). The extended scope is meant to cover sensitive receptors and surrounding communities in 10 subdistricts in 4 districts of 2 provinces, as shown in **Figure 1.4-1.**

Upon approval of this Report, RTN and EECPCO will gather the measures and compares with eligibility conditions to apply for the operation license of public airports. CAAT will review and use its discretion whether to issue the license of U-tapao International Airport.

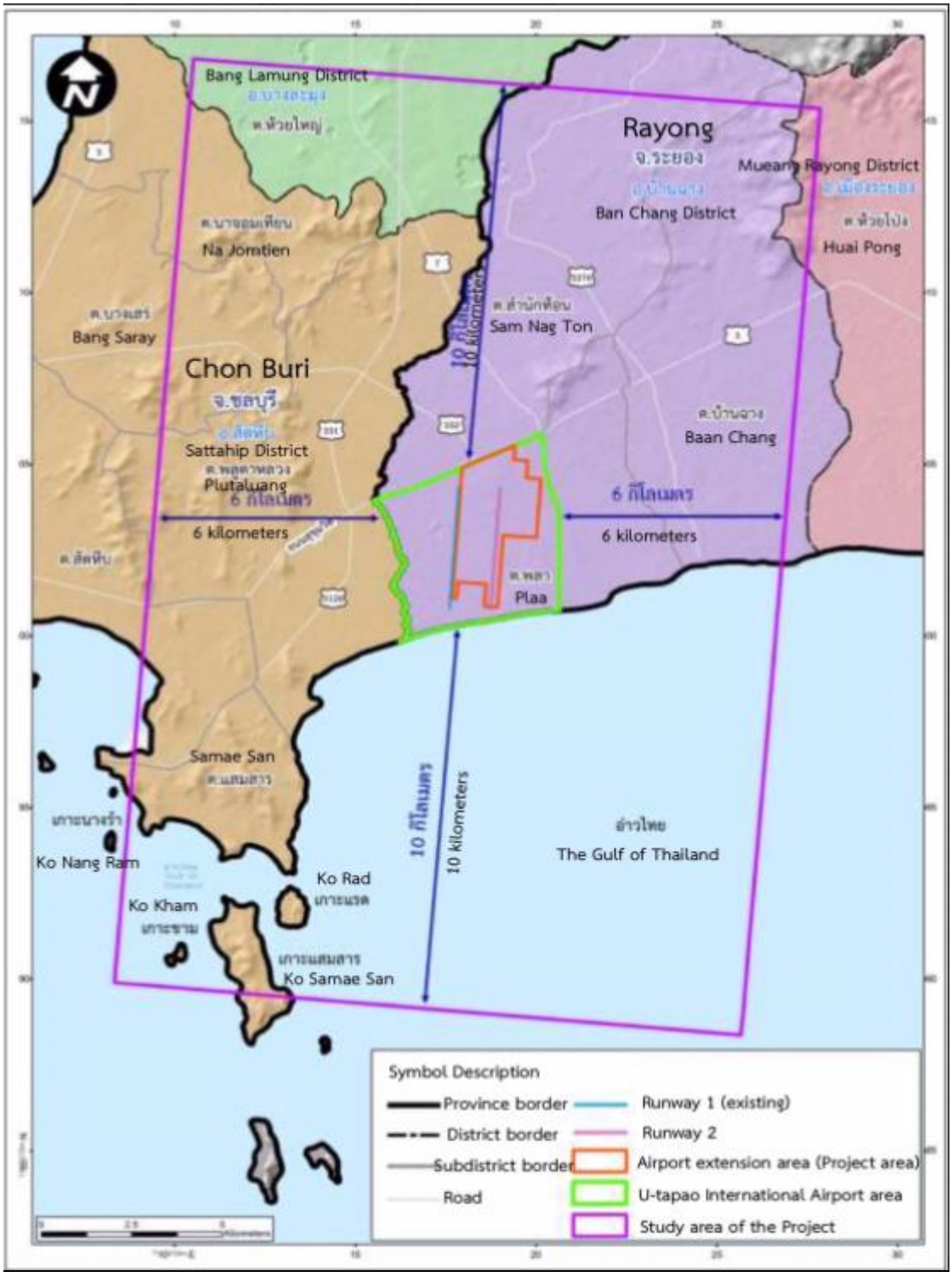


Figure 1.4-1 The area of the environmental impact assessment in this Project

1.5 Guidelines for the environmental impact assessment

The study and preparation of the EHIA Report for Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport are based on the following guidelines and regulations.

1) Notification of the Ministry of Natural Resources and Environment re: determining the project, undertaking, or operation that may seriously impact natural resources, environmental quality, health, sanitation, life quality of people in a community, which requires the environmental impact assessment report and the principles, method, and condition for preparing the environmental impact assessment report B.E. 2561 and (No. 2) B.E. 2562

2) Guidelines for Environmental Impact Assessment for Transportation Projects (Guideline for Environmental Impact Assessment for Airport Projects) by Office of Natural Resources and Environmental Policy and Planning (ONEP) (B.E. 2549)

3) Guidelines for Health Impact Assessment in Environmental Impact Assessment Report of Thailand as of December 2009 (B.E. 2552) by ONEP and the amended version (B.E. 2556)

4) Guidelines for Public Participation in the Procedure of Providing an Environmental Impact Assessment Report (B.E. 2562)

5) Laws, requirements, and regulations of relevant government agencies

1.6 Procedures and scope of the environmental impact assessment

The procedures of the study and preparation of the EHIA Report are presented in **Figure 1.6-1.** It should be noted that U-tapao International Airport has been under supervision of the Royal Thai Navy since its initial construction in 1961 because RTN needed an airport for the naval forces as mentioned earlier in Item 1.1. At that time, there was neither a study nor an EHIA report.

The procedures of the EHIA of the Project start from the review of the Project description, relevant secondary data, determining the scope of the study, the existing environmental condition, the impact assessment, determining the measures, to preparation of the EHIA Report. During the study and preparation of the Report, public consultations with general stakeholders and relevant sectors were conducted concurrently from the beginning of the study to the preparation of the EHIA Report. Public opinions were included in the final report to be present to ONEP and the Expert Review Committee of Environmental Impact Assessment Report (Expert Committee) , before presenting to the National Environment Board (NEB) and the Cabinet review.

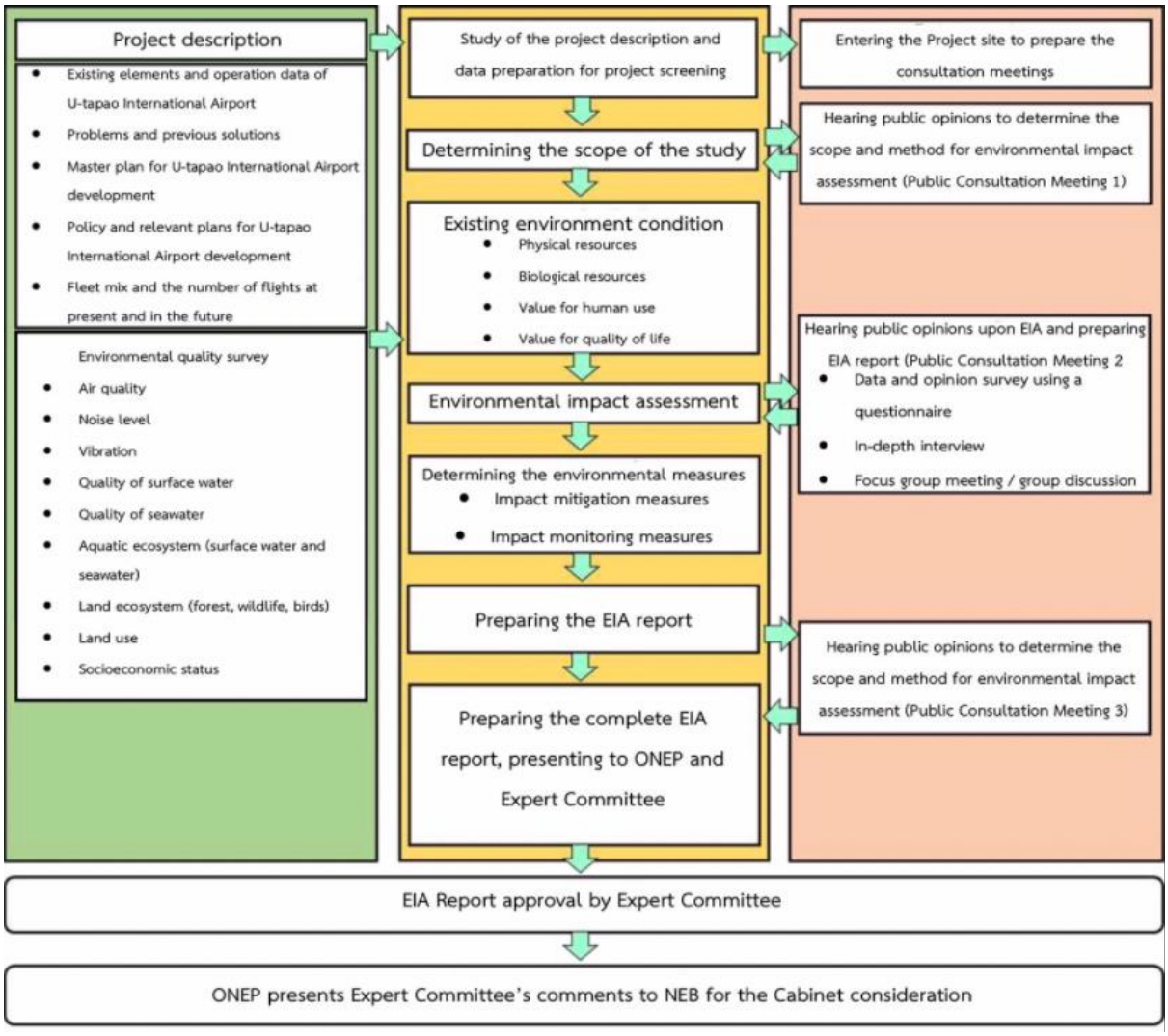


Figure 1.6-1 Procedures and scope of the environmental impact assessment

1.6.1 Determining the scope of the study

The Project Owners have considered the impact indicated in the screening process to predict the magnitude of the impact on natural and environmental resources, health, and health factors of local people, and also indicated the impact to predict the possibility to cause positive and negative impact on natural and environmental resources, values, and determined health factors of people living near the Project area. The study covered 4 aspects of environmental features, namely physical resources, biological resources, value for human use, and value for quality of life. The study covered 23 subtopics of environmental issues elaborated below.

1) Physical resources included noise, vibration, air quality, topography, geology, and seismology, soil resources, surface water hydrology, quality of surface water, quality of ground water, and quality of seawater.

2) Biological resources included land ecosystem and aquatic ecosystem

3) Value for human use included waste and wastewater management, land use, transportation, public utilities and infrastructure (water, electricity, and communication), and water drainage and flood prevention

4) Value for quality of life included socioeconomic status, relocation and compensation for properties, personal health and public health, occupational health and safety, tourist attractions and scenery, and archaeological and historic sites

1.7 Content in the Environmental Impact Assessment Report

The Environmental Impact Assessment Report for the Project, Undertaking, or Operation that May Seriously Impact Natural Resources, Environmental Quality, Health, Sanitation, Life Quality of People in a Community (Final Report) for the Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport, Ban Chang District, Rayong Province, consists of 7 chapters as listed below.

Chapter 1 Introduction

Chapter 2 Project Descriptions

Chapter 3 Existing Environmental Condition

Chapter 4 Public Participation and Public Relations of the Project

Chapter 5 Summary of Environmental Impact and Relevant Measures (Environmental Impact Assessment, Health Impact Assessment, Environmental Action Plan, Environmental Impact Mitigation Measures, and Environmental Impact Monitoring Measures)

Chapter 2

Project Descriptions

The Royal Thai Navy (RTN) and EEC Policy Committee Office aimed to develop U-apao International Airport as an air transport hub that can accommodate a maximum of 70 million passengers a year in 2048. This figure reflects the aggressive scenario for the activities beyond the capacity of Suvarnabhumi Airport (BKK) and Don Mueang Airport (DMK). To enable U-tapao International Airport to have such a capacity, it is important to develop U-tapao International Airport (extension), which involves the construction of the second runway with a length of 3,505 meters. The extension area of the airport covers two parts: 1) air transportation system elements and 2) commercial gateway. When the construction is complete, the air transportation system elements will cover the existing airport area and the extension area, which also cover the operation phase that has taken into account the operation activities in 2048 (the ultimate phase). They gray area is not included in this EHIA Report. It is shown only to illustrate the overall development of the airport as explained in **Chapter 1: Item 1.2 Action plan of U-tapao International Airport Development**. The scope of the study and the EHIA Report concern the development of the second runway, the tunnel under the runway, and the parallel taxiway, Terminal 3, SAT, apron, U-tapao Train Station, commercial gateway, supporting area, and cargo in the extension area.

Assigned by the Government, the EEC Policy Committee, by the meeting dated 4 October 2018, determined the distance between the runways of 1,140 meters in the action plan for U-tapao International Airport development, which is the appropriate distance with minimum impact. The summary of details is presented in **Figure 2.1-1.**

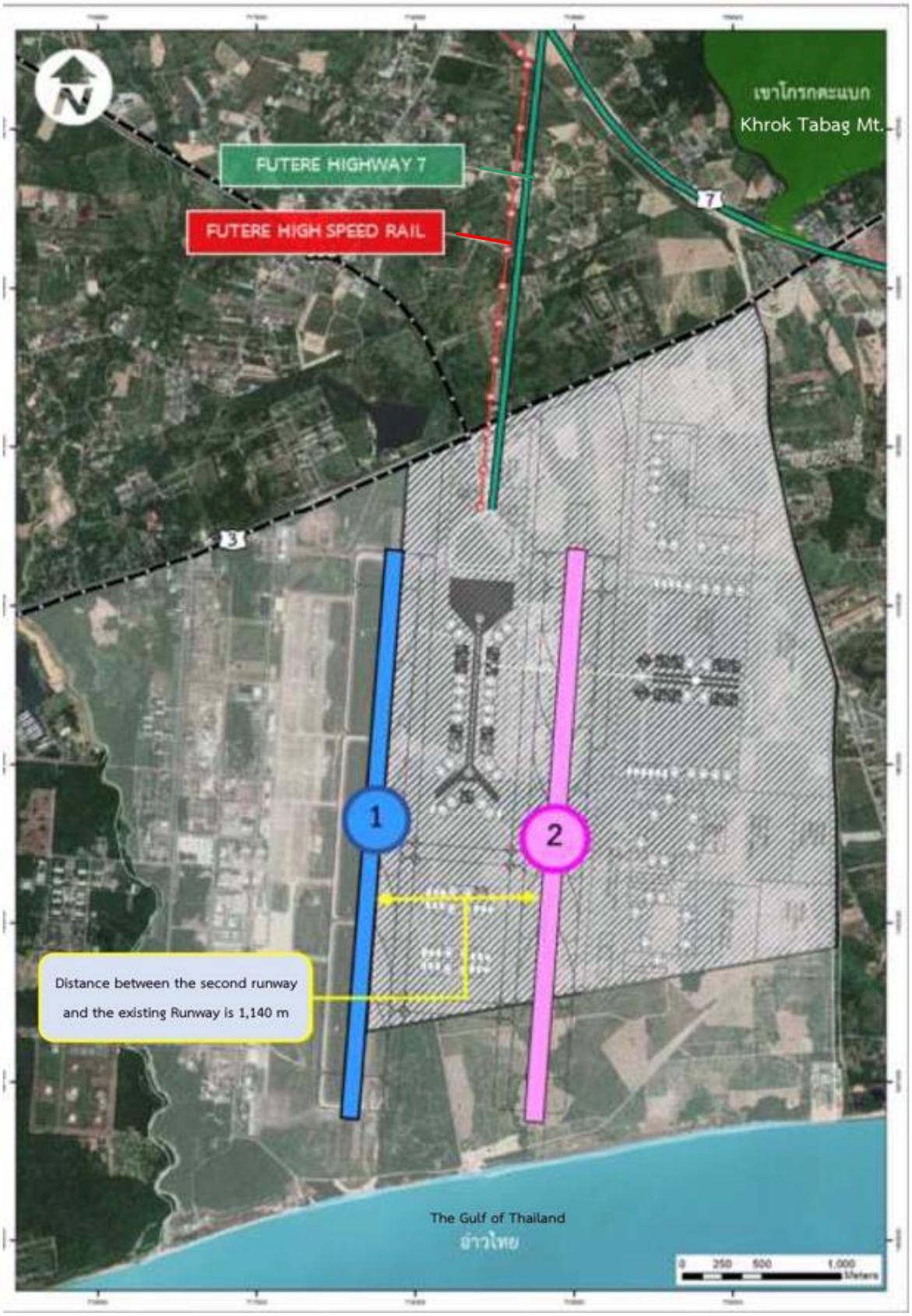


Figure 2.1-1 Distance between the second runway and the existing Runway is 1,140 m

2.1 Guideline for U-tapao International Airport development (extension)

The development of the airport extension area is under responsibility of RTN and EECPCO. As assigned to the EECPCO, the scope of this development is under the joint investment for U-tapao Airport and Eastern Airport City Development Project. Primary agencies and private players in the development include the following organizations.

- RTN is responsible for construction of the second runway and taxiway, as well as TG MRO.
- EECPCO manages land in the industrial promotion zone with the size of 6,500 rai. In this management, EECPCO acts on behalf of the Treasury Department as stipulated in Eastern Economic Corridor Act Section 53. In addition, EECPCO has the obligations in the joint investment contract for U-tapao Airport and Eastern Airport City Development as a party in the contract for the government side.
- U-tapao International Aviation Co., Ltd. (UTA), as a private joint investor in the Airport Development and Eastern Airport City Development Project, is responsible for the construction of buildings for U-tapao International Airport (extension) and airport city, and will be the manager of U-tapao International Airport under the license for operating the public airport. For all these responsibilities UTA acts on behalf of U-tapao Airport Authority, RTN.
- When the new terminal (Terminal 3) is complete, before U-tapao International Airport starts offering services, RTN will transfer the license for operating the public airport so that UTA can use the whole area of U-tapao International Airport. The transfer includes commercial flight activities from Terminal 2 (and Terminal 1 if there is any at the time) to Terminal 3. RTN will allow for joint use between military flights and civilian flights as mutually signed by RTN and UTA in the Joint use Agreement (JUA). The flight operations shall comply with the air navigation law.
- Aeronautical Radio of Thailand (Co., Ltd.) develops the new ATC tower and provides air navigation services.
- Private companies providing public utilities services include power and cool water supplier (B. Grimm Power Public Company Limited), running water and wastewater treatment systems (Eastern Water Resources Development and Management Public Company Limited or East Water), and aircraft refueling service supplier.
- Thai Airways Public Company Limited operates the MRO facility at U-tapao Airport.
- CAAT is responsible for training aviation personnel.

To develop the above elements, according to the master plan of the feasibility study project for U-tapao Airport and Eastern Airport City Development Project and the surrounding area in Rayong Province 2018, the development is divided into 3 phases. Details are presented in **Figure 2.1-1** and **Table 2.1-1.**

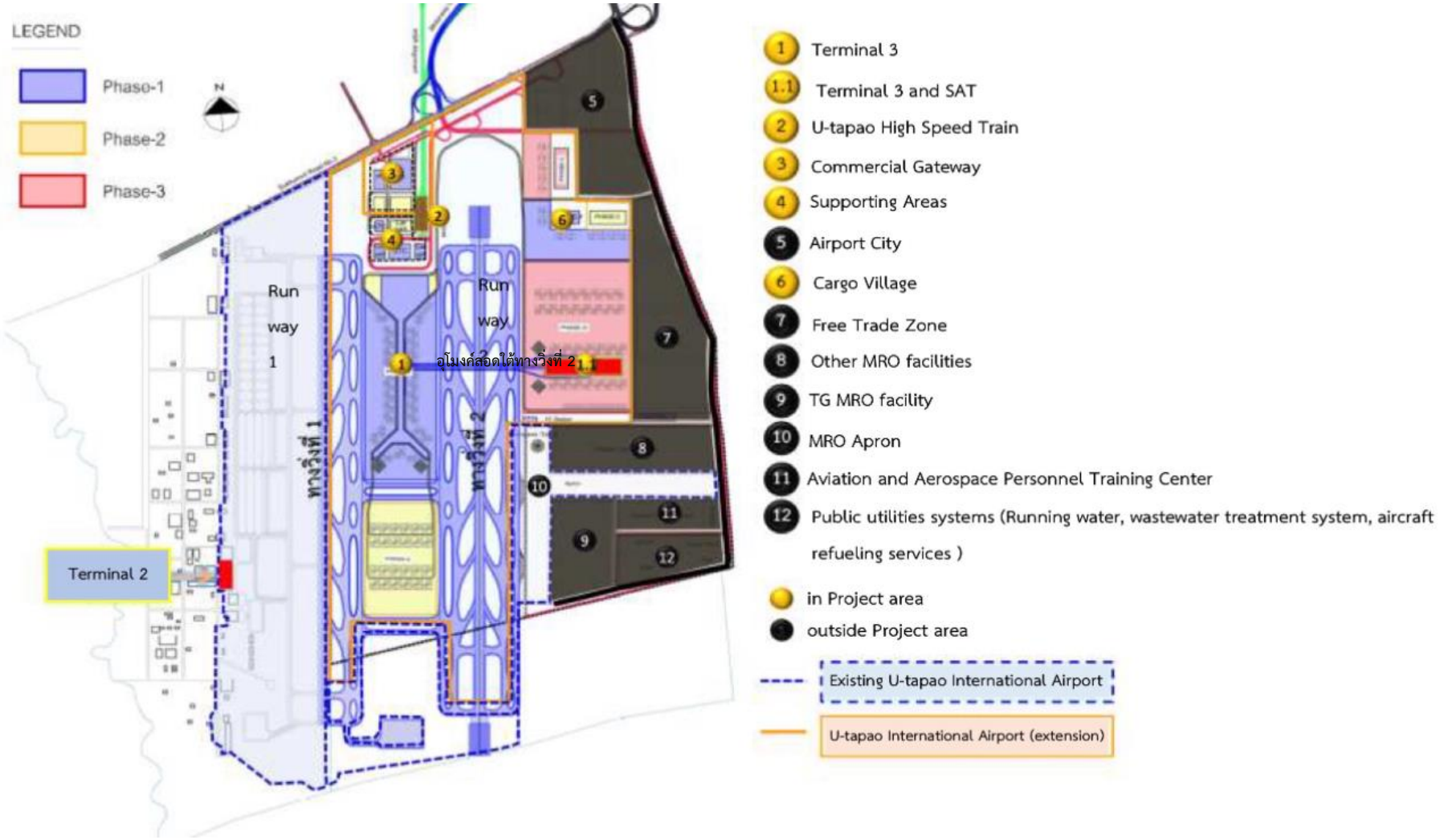
Table 2.1-1 Activities that will occur in extension area of U-tapao International Airport and surrounding area

No	Description	Activity location	Phase 1 (2028) from 2021-2023	Phase 2 (2038) from 2030-2033	Phase 3 (2048) from 2040-2043
1	The second runway and taxiway	in Project area	2nd runway (W = 60 m, L = 3,505 m) and parallel taxiway of 1st and 2nd runways	-	-
2	Terminal 3 and SAT	in Project area	Terminal 3 (accommodating 14* million passengers/ year)	Terminal 3 (extension area with increased capacity to 38* million passengers/ year)	SAT with increased capacity to 70* million passengers/ year)
3	U-tapao High Speed Train Station	in Project area	U-tapao High Speed Train Station and underground tunnel	-	-
4	Commercial Gateway and supporting areas	in Project area	joint investment by private sector	joint investment by private sector	joint investment by private sector
5	Airport City	outside Project area	joint investment by private sector	joint investment by private sector	joint investment by private sector
6	Cargo Terminal and Cargo Village	in Project area	0.194 million tons/ year	0.591 million tons/ year	1.108 million tons/ year
7	Free Trade Zone	outside Project area	Cargo and Free Trade Zone Phase 1	Cargo and Free Trade Zone Phase 2	Cargo and Free Trade Zone Phase 3
8	Other MRO facilities	outside Project area	MRO Phase 1	MRO Phase 2	MRO Phase 3
9	TG MRO facility	outside Project area	TG MRO facility Phase 1 and surface of taxiway	TG MRO facility Phase 2	-

Table 2.1-1 Activities that will occur in extension area of U-tapao International Airport and surrounding area

No	Description	Activity location	Phase 1 (2028) from 2021-2023	Phase 2 (2038) from 2030-2033	Phase 3 (2048) from 2040-2043
10	MRO Apron	outside Project area	MRO Apron	-	-
11	Aviation and Aerospace Personnel Training Center	outside Project area	Aviation and Aerospace Personnel Training Center Phase 1	Aviation and Aerospace Personnel Training Center Phase 2	-
12	Public utilities systems				
	Electricity	outside Project area	Combined cycle power plant 80 MW (EIA underway) Solar power plant 15 MW Power storage 50 MWh		-
	Running water	outside Project area	10,000 cubic meters/ day	10,000 cubic meters/ day	-
	Wastewater treatment system	outside Project area	8,000 cubic meters/ day	8,000 cubic meters/ day	
	Aircraft refueling services	outside Project area	15 million liters	10 million liters	-

Source : Master plan of the feasibility study project for U-tapao Airport and Eastern Airport City Development Project and the surrounding area in Rayong Province 2018



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2563 with reference to guideline **in** Master plan of the feasibility study project for U-tapao Airport and Eastern Airport City Development Project and the surrounding area in Rayong Province 2018

Figure 2.1-1 Scope of the Project area and overall activities to occur at the extension area of U-tapao International Airport and surrounding area

The scope of the study and this EHIA Report involve the development of the second runway, tunnel under the runway, and taxiway, Terminal 3, SAT, apron, U-tapao Train Station, commercial gateway, supporting area, and cargo in the extension area of the airport as shown in **Figure 2.1-1** and **Table 2.1-1**. These elements contribute to the capacity to accommodate 70 million passengers/ year in 2048. More details are discussed below.

2.1.1 The second runway and taxiway

The construction of the second runway and taxiway will take approximately 36 months. The second runway lies east of the first runway with a distance between both runways of 1,140 meters. The length of the runway from both heads (runway head 18 and runway head 36) is 3,505 meters (code F). The width of the runway is 60 meters and each shoulder 15 meter. The second runway lies in parallel with the second taxiway (6 lanes in total, 2 on the left, 2 on the right, and 2 on the right of the first runway. The code F runway has a width of 23 meters.

2.1.2 Terminal 3 and SAT

Terminal 3 will be constructed and operated by joint investment with private sector in the U-tapao Airport and Eastern Airport City Development Project. The Government plans to deliver the area, expecting to take about 18 months starting from execution of the joint investment agreement with private sector. The agreement execution shall take place concurrently with financing and preparing the construction to be completed within 3 days starting from the area delivery date. The design concept of Terminal 3 will accommodate both arrival and departure passengers. The flow direction of passengers in the terminal shall be consistent with the movement behavior of passengers to achieve the full service and low-cost airlines. Basically, the terminal will be 4-storied building with underground floor to connect the air transport and high-speed railway transport.

2.1.3 Commercial Gateway

The Commercial Gateway (number 3 in **Figure 2.1-1**) will be operated by joint investment by private sector in developing U-tapao International Airport. It will be a part of U-tapao International Airport and Eastern Airport City Development Project located at the front of the airport to attract locals and visitors to use the facilities.

2.1.4 Cargo Terminal and Cargo Village

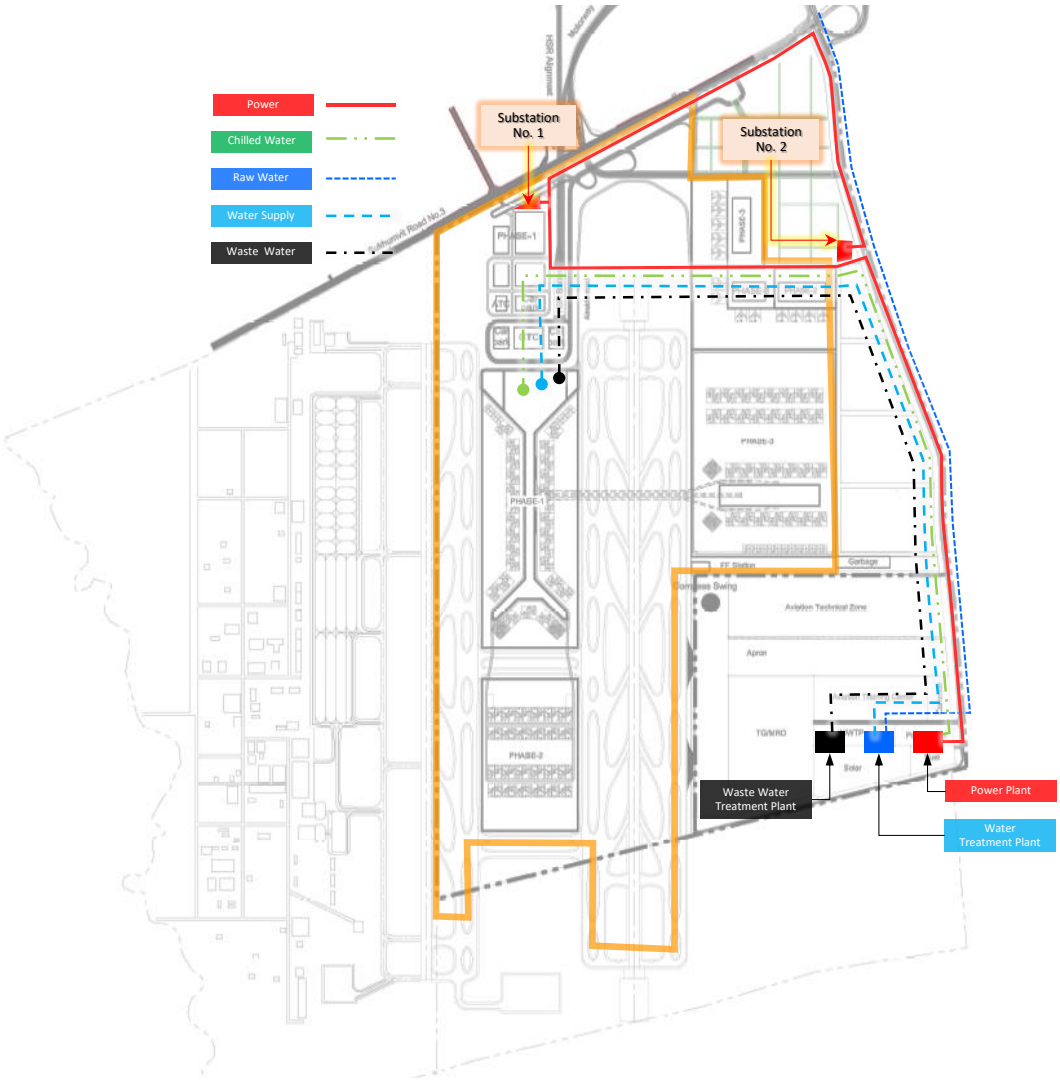
The Cargo Terminal and Cargo Village (number 6 in **Figure 2.1-1**) will be operated by joint investment with private sector in developing U-tapao International Airport. It can accommodate cargo approximately 600,000 tons/ year or more. This area includes warehouses and cargo apron. Most of the cargo is likely to be transported through the undercarriage of passenger aircraft.

Therefore, the design may include a tunnel road under the second runway or in the airside so that cargo trucks do not have to drive through the runways.

2.2 Public utilities U-tapao International Airport development in the study area

2.2.1 Electricity, Running Water, and Wastewater Treatment System

U-tapao International Airport extension Project will receive power, running water, and wastewater treatment services from the central utilities located outside the Project area. There is an idea to use the road east of U-tapao International Airport as the main utility corridor (outside the Project area) for piping systems, including power lines, running water pipes, and wastewater collecting pipes. Pipes will be installed underground to serve in the Project area, including Terminal 3, supporting area, commercial gateway, and cargo, as shown in **Figure 2.2-1**. The existing air navigation area will continue to use the existing public utilities separately from the extension area.



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

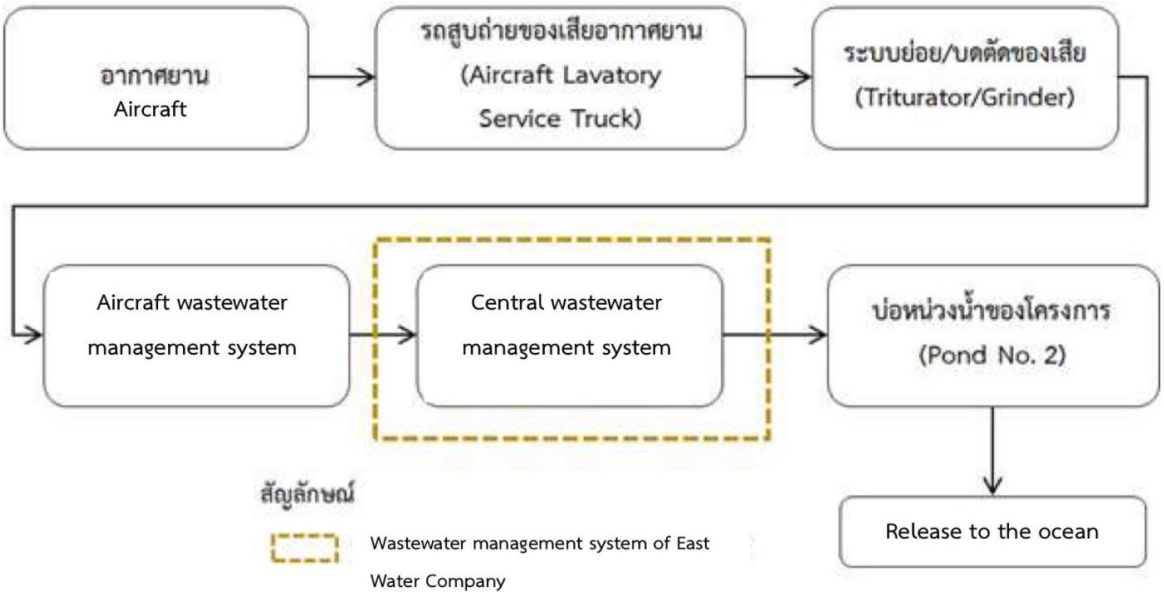
Figure 2.2-1 Basic concepts for piping systems for utilities in the Project area

2.2.2 Aircraft Refueling System

The Project will provide the JET A-1 aircraft refueling service using refueling trucks and hydrant pipes underground supplying to the aprons. JET A-1 aircraft fuel is supplied from fuel tanks and hydrant pump station outside the Project area, with the total area size of 19 rai.

2.2.3 Aircraft Wastewater Treatment System

Wastewater from aircraft is generated by cleaning and excretion of passengers on the plan. It will be treated when the aircraft is parked at the apron. A lavatory service truck will collect waste from the aircraft. The aircraft waste will be treated with the triturator and aircraft wastewater treatment system to ensure that the wastewater quality passes the standard attached in the Notification of the IEAT No.76/2560 on General Standard for Wastewater Discharge into the Central Wastewater Treatment System in Industrial Estates before draining to the central wastewater treatment system. The central wastewater treatment system is managed by East Water to ensure that the waste water properties pass the standard of Notification of the Ministry of Natural Resources and Environment re: Determining Industrial Effluent Standards for Industrial Plants and Industrial Estates dated 29 March 2009 before discharging to the holding pond of the Project (Pond No. 2) and subsequently to the sea. More details are presented in **Figure 2.2-2**.



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

Figure 2.2-2 Aircraft wastewater management plan of the Project

2.2.4 Main roads in the Project and access roads to U-tapao International Airport

U-tapao International Airport is mainly accessible to passengers via Sukhumvit Road and Motorway No. 7. Details are discussed below.

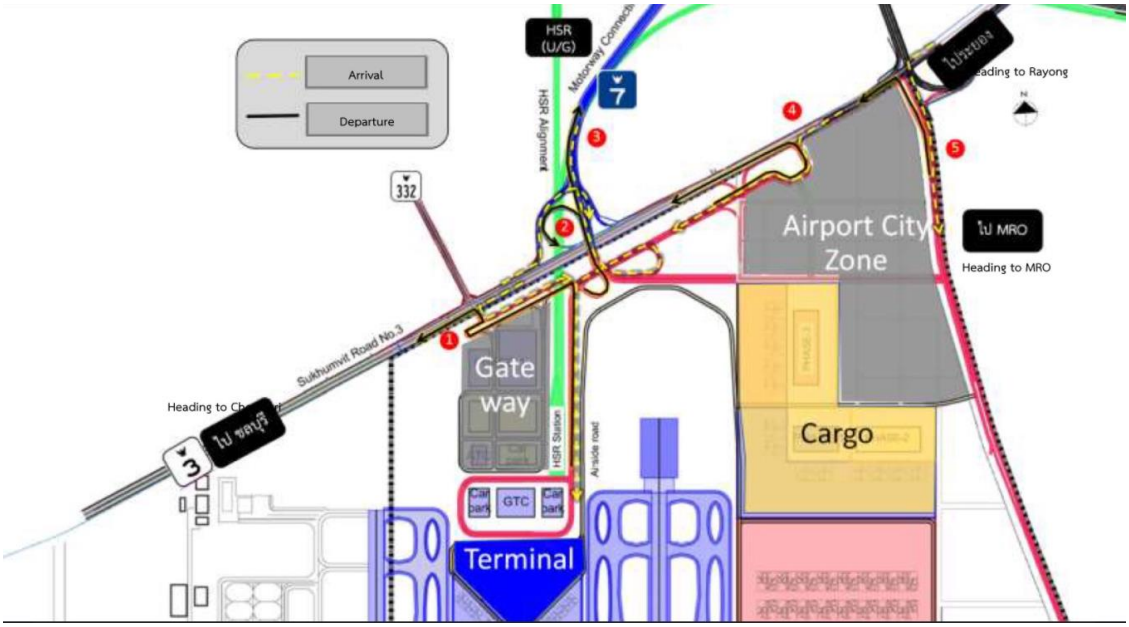
Motorway No. 7

Department of Highways (DH) is responsible for constructing Motorway No. 7 in the extension phase to connect U-tapao Airport at No. 3 in **Figure 2.2-3.** This road accommodates both arrivals and departures of U-tapao Airport. DH is in charge of the design and construction on the sections outside U-tapao Airport. The private sector as the contractual party is responsible for the design and construction for the road sections in the airport.

Sukhumvit Road

The access from and to Sukhumvit Road is designated at 3 points connecting Terminal 3 at No. 1, 2, and 4 in **Figure 2.2-3**. This airport access elevated road will facilitate passengers from the Road No. 332 or Chon Buri travel to the airport easily via Sukhumvit Road. Arrival passengers can exit the airport and use the elevated road to travel to Rayong. The design details are under review by DH. Basically, the airport access elevated road will have 4 traffic lanes.

In addition, the Project has designated the entrance and exit on the east side (No. 5 in **Figure 2.2-3**) to access the Airport City Zone, duty free zone, cargo zone, MRO facility, aviation personnel training center, and public utilities to separate the traffic from passengers using the new terminal. In front of the Airport City Zone, another access road will be constructed as an alternative for airport users. The road on the east with at least 4 lanes will be the main access. The road section is 60 meters long for public utilities and traffic area. The link between this road and Sukhumvit road is integrated by U-tapao Airport and Eastern Airport City Development Project appointed by the Sub-committee to implement the by U-tapao Airport and Eastern Airport City Development Project. The defense minister issued the order No. 001/2563 appointing the integration team for by U-tapao Airport and Eastern Airport City Development Project so that the project can determine the plan, scope, and guideline for constructions together in the Project area for effectiveness and achievement of the target. The integration team consists of representatives from EECPCO and relevant agencies, DH, and local representatives.



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

Figure 2.2-3 Related road networks

2.2.5 U-tapao High-speed Train Station

The High-Speed Rail Linking Three Airports Project (Don Mueang – Suvarnabhumi – U-tapao) is operated by a joint venture. The EHIA has been conducted and EHIA Report prepared and approved in 2019. The route along the project consists of 9 high-speed train stations, including Don Mueang Station, Bang Sue Station, Makkasan Station, Suvarnabhumi Station, Cha Choeng Sao Station, Chon Buri Station, Si Racha Station, Pattaya Station, and U-tapao Station. U-tapao Station is located at the underground floor of Terminal 3 of U-tapao International Airport. The building utilities include the power system, mechanical system, fire protection system, running water and sanitation system to accommodate train and air passengers. There are four central platforms, and the station building is connected to U-tapao International Airport.

2.2.6 Water drainage and flood prevention system

The project has designed a rainwater drainage system to drain water from runways and taxiways. This system prevents external water from entering the airport area and to control the amount of water. Rainwater that falls in the second runway and taxiway areas will converge in a holding pond, which can hold the water for one hour, considering the 10-year recurrence period. Drainage of excess water is carried out once the rainstorm has passed. The highest sea level is +1.1 MAMSL. The project has designed 2 holding ponds. Pond 1 has a maximum storage volume of 124,820 cubic meters. The second pond has a maximum storage volume of 195,257.41 cubic meters. The total storage capacity of holding pond 1 and holding pond 2 will be 320,077.41 cubic meters, which is sufficient for the excess water generated throughout the Project.

In addition, the project will build a pumping station at the holding pond No. 1 to pump out excess rain that has been stored. Four pumps with a capacity of 2 cubic meters/ second each will be installed (three pumps operating and one reserve). The total operating capacity of three pumps will be 6 cubic meters/ second. There will be a staff to control the water pumping 24 hours a day and maintain the machines to be ready all the time. Pumping water from the area of U-tapao International Airport has criteria for pumping water: the time of tidal seawater, coordination with the Meteorological Department to check the rainfall data, the forecast rainfall to estimate the amount of water.

2.2.7 Waste and waste management systems

The private company that operates U-tapao International Airport must manage solid waste generated from buildings and activities and collect them to the waste transfer station located in the airport for sorting. The waste shall be then disposed of properly in accordance with sanitary principles by a supplier licensed by a relevant government agency or prescribed by law. The waste management plan is shown in **Figure 2.2-4.** There will be unit directly responsible for supervising and monitoring the operations of the contractor for waste management within U-tapao International Airport and to control the waste management to be more effective. The private company that operates U-tapao International Airport must specify in the contractor employment agreement regarding the measures for waste management to cover the part of the contract party and other waste management suppliers. Also, waste management shall be audited randomly on a monthly basis.

2.2.8 Fire protection system

A fire protection system is provided for the pressurized water supply to support the operation of the rescue and fire station. (The level of fire protection is designated as the airport category (Category 10). The above-ground water tank has a minimum capacity of 300 cubic meters to be sufficient for use. The fire pump is installed in accordance with NFPA20 standard (minimum pressure of the nozzle at 5.5 bar). The fire protection system consists of fire water pump, pressurized water pump, water tanks, water pumping station, water supply system, and relevant utilities. Pumping stations and water tanks will be located close to the airport's rescue unit to be easy for operations and maintenance.

The total system flow rate is approximately 3,000 gallons per minute, consisting of three sets of diesel engine pumps and one set of pressurized water pump to have a desired pressure.

The water supply system is networked. There are sprinklers installed near the apron for easy access to fire trucks. The distance of each head is about 90-150 meters.

Figure 2.2-4 Waste management plan in U-tapao International Airport

2.2.9 Fire and rescue station

The fire and rescue station is designated to the east of the airport and will be halfway between the runways according to ICAO requirements, which is based on the length of access time

to the incident site in the area around the two runways. In the future, Code F aircraft will be operated at U-tapao International Airport. Therefore, the airport should be equipped with device capable of supporting firefighting and rescue levels in accordance with Level 10 of ICAO requirements.

The project's fire and rescue station will be additionally erected. It will be located on the east side of the Project area near the midpoint of the taxiway P. The actual distance a fire truck travels depends on the speed of the fire truck. Appropriate fire truck route design must comply with the Civil Aviation Authority's Airport Standard No. 14.

2.2.10 Network communication and security systems

The Airport Information Center will have internet connections from at least two internet service providers (ISP). The Dense Wavelength Division Multiplexing (DWDM) is a three-way fiber-optic connection with a speed of at least 1000 Gbps within the network to transmit and receive the data from the core of network from each section for a minimum connection of 100 Gbps. It also connects to the system function as Firewall Hight Performance to prevent attacks from both inside and outside the network effectively.

2.2.11 Air traffic control tower

To ensure safe the takeoff and landing of aircraft in U-tapao International Airport and in the areas of aircraft operation, new air traffic control tower and other operating towers will be constructed. Aeronautical Radio of Thailand Company Limited will be the airspace operator for U-tapao International Airport. Currently, the Company is waiting for approval to implement the new ATC tower, which will be located between the first and the second runways. The new air traffic control tower will control air traffic on both the first and the second runway. The Joint Investment Agreement for U-tapao Airport Development Project requires the government side represented by Aeronautical Radio of Thailand Company Limited to operate the Project. EECPCO, Aeronautical Radio of Thailand Company Limited, and the private company who is the contractual party will make further decisions about the Project implementation details. The existing ATC tower will be used for national security purposes without violating the requirements of the CAAT.

2.3 Other supporting components outside the Project area

In preparation of this EHIA Report, only the construction of components in the project area, covering U-tapao International Airport (extension) is considered. Other components outside the Project area involve the construction of the public utilities and the Airport City, such as commercial centers, hotels, and convention centers. These components are outside the Project area and not part of the air transport system, and therefore, not included in the environmental impact assessment in this EHIA Report. The components outside the Project area shall be study for the feasibility for construction and other actions as required by relevant laws. However, if they are applicable for the

EHIA report, the private sector as part of the joint investor or the public utility operation must prepare the EHIA report as an application process for the construction permit.

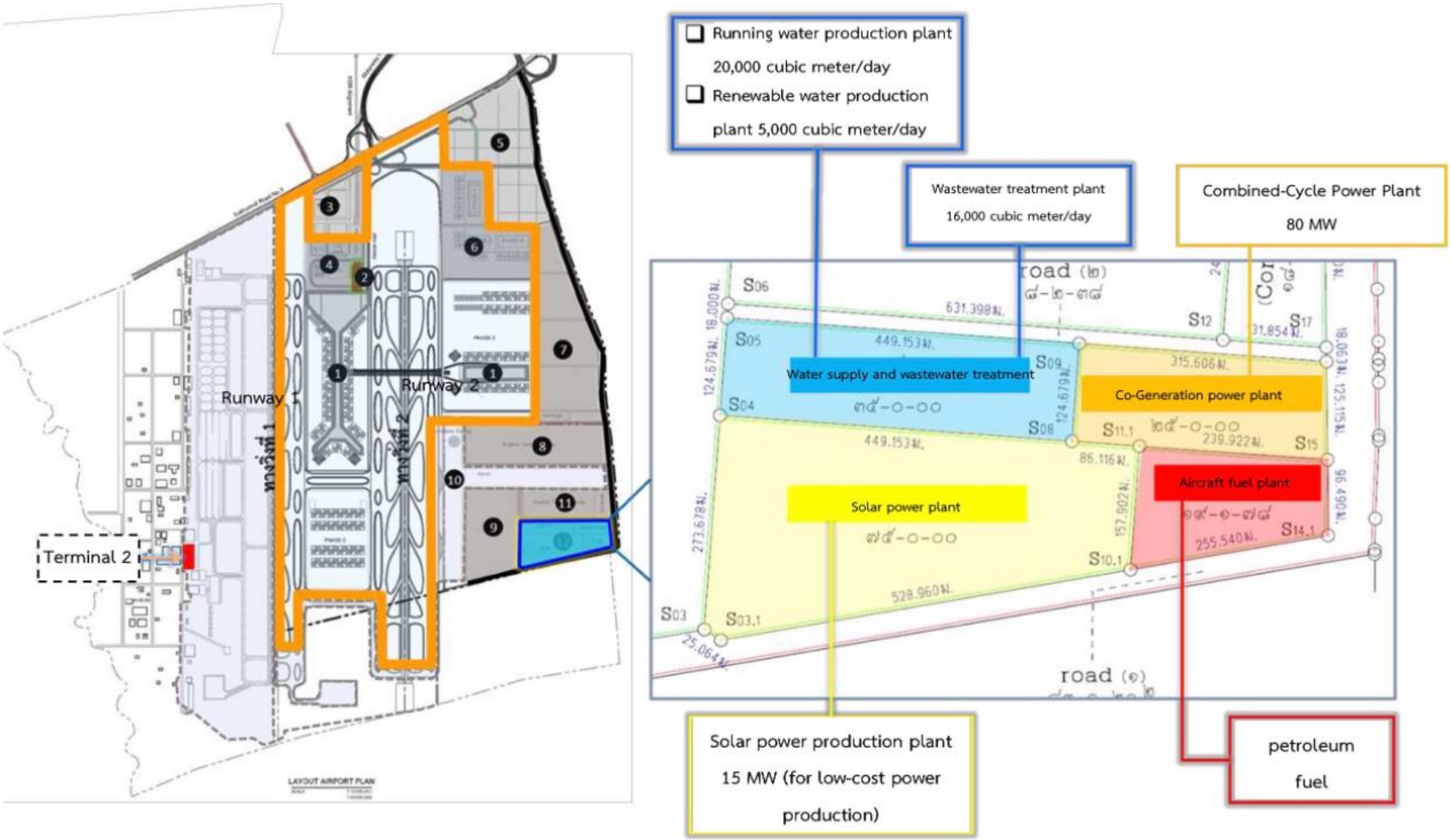
2.3.1 Public utilities systems

Public utilities are operated by EECPCO. A private supplier will rent land to develop public utilities to accommodate the U-tapao Airport and Eastern Airport City Development Project. The public utilities include electricity, chilled water, running water production system, wastewater treatment system, and aircraft refueling system.

The overall public utilities to accommodate EEC development are operated by RTN and EECPCO by renting out land to a private supplier according to the EEC Act B.E. 2561 Section 53. EEC public utilities include electricity and chilled water production systems, running water production system, wastewater treatment system, and aircraft refueling system. The public utilities area covers 154 rai (as shown in **Figure 2.3-1**). It is located outside the Project area (No. 12: power generating system, running water production system, and wastewater treatment system), as shown in **Figure 2.1-1.** More details are discussed below.

2.3.1.1 Power generating system

The power plant meets the N-1 safety standard. The electrical system can supply electricity continuously. In the event that the one main device in the electrical system is disconnected from the electrical system, EECPCO has recruited a private supplier to provide the service, with B. Grimm Power Public Company Limited as the winning bidder as the service provider. The power plan has a maximum production capacity of 160 MVA and the gross power of 140.60 MW. Based on the forecast of U-tapao International Airport expansion and commerce in the Master Plan (Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province 2018), it was found that Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048) will need the power supply of 66.12, 27.17, and 22.69 MVA, respectively. In general, U-tapao International Airport in 2048 will need a total power supply of 115.98 MVA or 98.58 MW. Its production still has the remaining power to supply to RTN by 36.3 MW.



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

Figure 2.3-1 Utilities layout for electricity, running water, wastewater, and aircraft refueling systems

2.3.1.2 Running water production system

The running water production plant is located in the supporting area of U-tapao Airport (outside of the extension area). The manufacturer of running water is Eastern Water Resources Development and Management Public Company Limited (East Water). The water source used by East Water to produce running water is allocated from the Royal Irrigation Office 9, the Royal Irrigation Department. Three reservoirs in the Project area are to be used, including Dok Krai Reservoir, Nong Pla Lai Reservoir, and Prasae Reservoir. The water is also shared with the water sources developed by East Water, namely Thap Ma Reservoir. The total water volume is 390 million cubic meters (**Table 2.3-1**), which is sufficient for the designed production capacity without disturbing the public water consumption. The joint venture with a private sector (U-tapao International Aviation Co., Ltd.) will install the central piping system to supply the water into the area.

Table 2.3-1 Sources of raw water supply to the Project and additional water source developmer plan

Water sources	Location	Capacity (million m^3)	Allocated water (million m^3)
1. Water sources allocated from the Royal Irrigation Office 9, the Royal Irrigation Department			
- Nong Pla Lai Reservoir	Pluak Daeng Subdistrict, Pluak Daeng District, Rayong Province	164	120
- Dok Krai Reservoir	Phana Nikhom Subdistrict, Nikhom Phatthana District, Rayong Province	79	116*
- Nam Prasae Reservoir	Chum Saeng Subdistrict, Wang Chan District, Rayong Province	248	40 (raw water piping system of Prasae – Khlong Yai by Royal Irrigation Department)
			70 (raw water piping system of Prasae – Nong Pla Lai of the Company)
- Nong Kho Reservoir	Nong Kham Subdistrict, Si Racha, Chon Buri Province	21	16.7
Total			**362.7**
2. Natural water sources			

Table 2.3-1 Sources of raw water supply to the Project and additional water source developmer plan

Water sources	Location	Capacity (million m^3)	Allocated water (million m^3)
1. Water sources allocated from the Royal Irrigation Office 9, the Royal Irrigation Department			
Bang Pakong River	Khlong Khuean Subdistrict, Khlong Khuean District, Cha Choeng Sao	-	27**
Total			**27**
Total water volume (1) + (2)			**390**

Remark : * means the volume is more than the reservoir capacity because the inflow from the northern basic is more than the reservoir capacity.

** means the average water volume pumped from Bang Pakong River according to the pump capacity, which is pumped only in the rainy season

Source : East Water Company, 2019

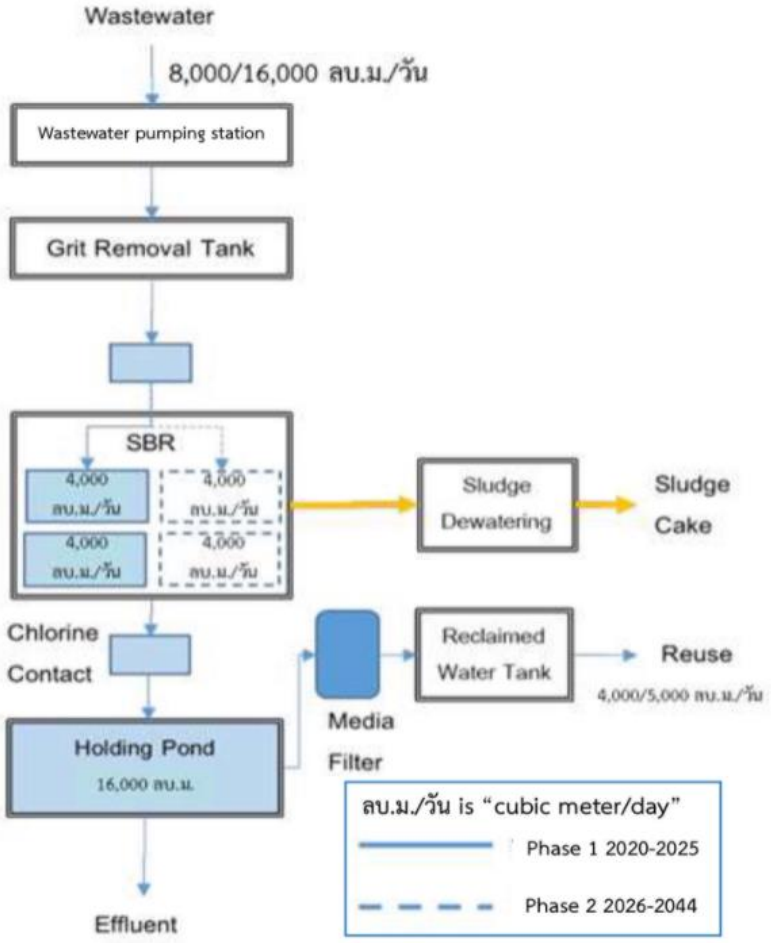
The running water production of Phase 1 and Phase 2 is a total of 20,000 cubic meters per day, which is more than the forecast of water demand as per U-tapao International Airport expansion and commerce in the Master Plan (Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province 2018). In the forecast, in 2028, 2038, and 2048 will be 8,610 cubic meters/ day, 13,046 cubic meters/ day, and 19,333 cubic meters/ day, respectively.

2.3.1.3 Central wastewater treatment system

The central wastewater treatment plant is located in the U-tapao Airport supporting area outside the International Airport extension area. The wastewater treatment system is operated by East Water. The volume of wastewater generated from the terminal with a maximum passenger capacity of 70 million passengers/ year is approximately 3,836 cubic meters/ day (accounting for 51% of the total wastewater volume). The wastewater volume forecast is based on U-tapao International Airport expansion and commerce in the Master Plan (Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province 2018). The volume of wastewater generated is estimated from 80 - 90 percent of the volume of water used. The volume of wastewater generated includes the use within each building and commercial areas. The total volume of wastewater in 2028, 2038, and 2048 will be 3,185 cubic meters/ day, 5,625 cubic meters/ day, and 9,212 cubic meters/ day, respectively. East Water designed the wastewater treatment system with the capacity of 16,000 cubic meters/ day, which can sufficiently accommodate the wastewater generated.

The wastewater treatment is the Sequencing Batch Reactor (SBR) equipped with an aeration tank and sedimentation tank in the same unit. The hydraulic flow direction is adjusted to be shorter to suit the function of SBR. Therefore, it is compact, convenient, and cost-effective. When the wastewater enters the treatment system, the quality of treated wastewater is controlled to pass the standard of effluent in the Notification of the Ministry of Natural Resources and Environment.

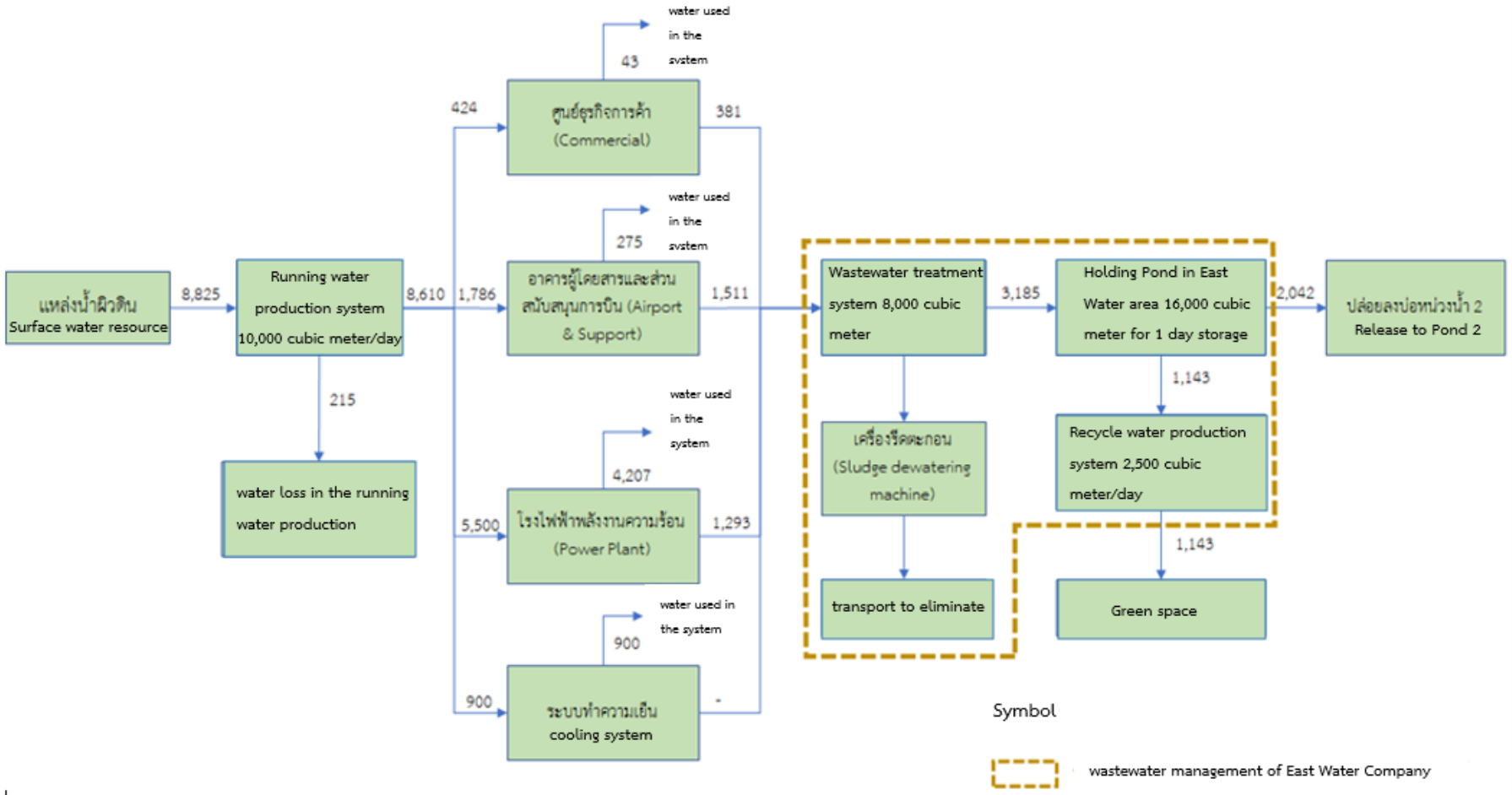
The working mechanism of the system is divided into 2 phases. Phase 1 has the capacity of 8,000 cubic meters/day and Phase 2 another 8,009 cubic meters/ day, totaling 16,000 cubic meters/ day. The working mechanism of the SBR system is illustrated in **Figure 2.3-2.**



Source : East Water Co., Ltd., 2019

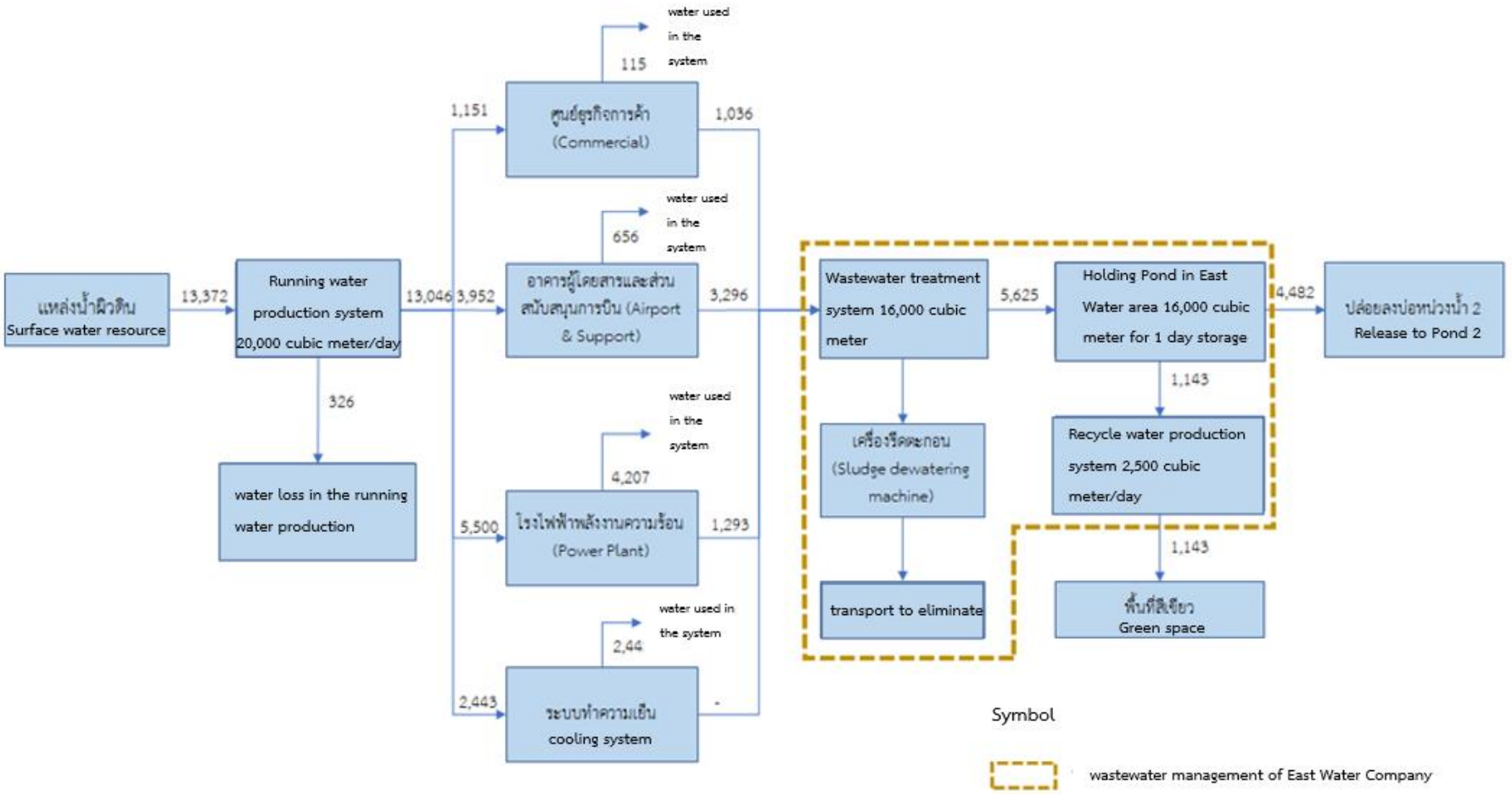
Figure 2.3-2 Working mechanism of the Sequencing Batch Reactor (SBR)

Some part of the effluent will be reused to reduce the volume of draining effluent to the final holding pond of the Project. The reusing effluent will be mainly used in the green space in the supporting area or the Airport City. The plan of water mass balance in Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048) is based on the water demand from the Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province 2018, as shown in **Figure 2.3-3** - **Figure 2.3-5.**



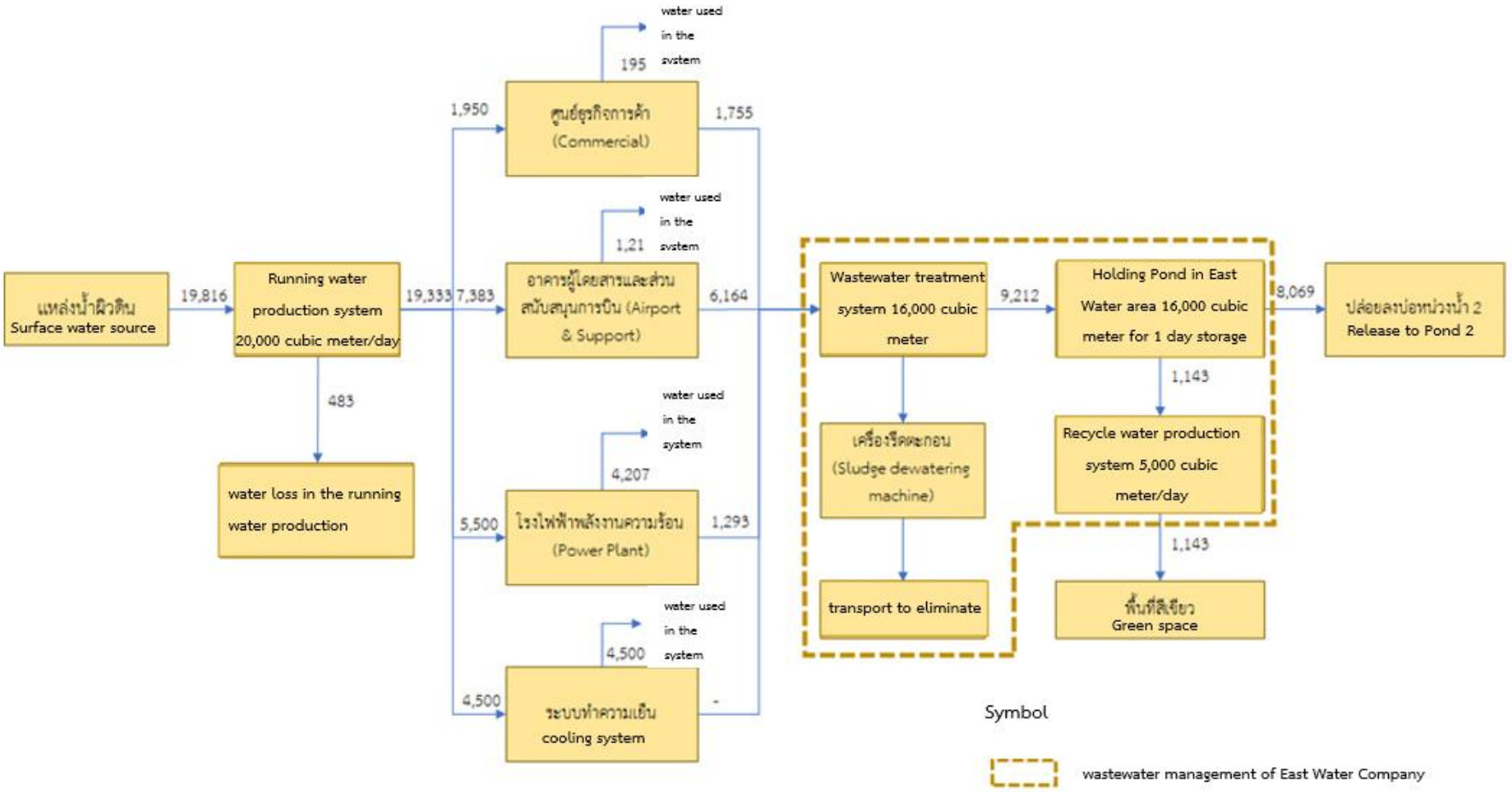
Source : EEC Policy Committee Office, 2021

Figure 2.3-3 Water mass balance plan in the area of U-tapao International Airport Phase 1



Source : EEC Policy Committee Office, 2021

Figure 2.3-4 Water mass balance plan in the area of U-tapao International Airport Phase 2



Source : EEC Policy Committee Office, 2021

Figure 2.3-5 Water mass balance plan in the area of U-tapao International Airport Phase 3

East Water requires the wastewater from every activity in the Project area to be treated and pass the quality of effluent from industrial estates before releasing to the central wastewater treatment system of East Water. The central wastewater treatment has a capacity of 16,000 cubic meters/ day. The quality indicators of effluent before releasing to the sea are shown in **Table 2.3-2.**

Table 2.3-2 Quality of wastewater before entering the central wastewater treatment and quality of treated wastewater before draining to the sea

No.	Item	Unit	Wastewater entering the system*	Effluent before draining to the sea**
1	pH value		5.5-9.0	5.5-9.0
2	Temperature	°C	<45	<40
3	Color	ADMI	600	300
4	Odor	-	Not objectionable	
5	Total dissolved solid (TDS)	mg/l	<3,000	<3,000
6	Total suspended solid (TSS)	mg/l	<200	<50
7	BOD	mg/l	<500	<20
8	COD	mg/l	<750	<120
9	Sulfide	mg/l	<1	<1
10	Cyanide	mg/l	<0.2	<0.2
11	Fat Oil & Grease	mg/l	<10	<5
12	Formaldehyde	mg/l	<1	<1
13	Phenols	mg/l	<1	<1
14	Free Chlorine	mg/l	<1	<1
15	Pesticide		None	None
16	TKN	mg/l	<100	<100
17	Fluoride	mg/l	<5	-
18	Surfactant	mg/l	<30	-
19	Heavy Metal			
	Zinc	mg/l	5	5
	- Chromium hexavalent (Cr^{6+})	mg/l	0.25	0.25
	- Chromium trivalent (Cr^{3+})	mg/l	0.75	0.75
	Arsenic	mg/l	0.25	0.25
	Copper	mg/l	2	2
	Mercury	mg/l	0.005	0.005
	Cadmium	mg/l	0.03	0.03
	Barium	mg/l	1	1
	Selenium	mg/l	0.02	0.02

Table 2.3-2 Quality of wastewater before entering the central wastewater treatment and quality of treated wastewater before draining to the sea

No.	Item	Unit	Wastewater entering the system*	Effluent before draining to the sea**
	Lead	mg/l	0.2	0.2
	Nickle	mg/l	1	1
	Manganese	mg/l	5	5
	Silver	mg/l	1	-
	Total Iron	mg/l	10	-

Remark : * Table attached to Notification of the Industrial Estate Authority of Thailand No.76/2560 (2017) re: General Standard for Wastewater Discharge into the Central Wastewater Treatment System in Industrial Estates

** Refer to Notification of Ministry of Natural Resources and Environment re: Industrial Effluent Standards for Industrial Plants and Industrial Estates dated 29 March 2016

Source : East Water Co., Ltd., 2019

2.3.1.4 Aircraft Refueling System

EEC Policy Committee Office has prepared 19 rai of land with the aircraft refueling system for construction of fuel tanks. The aircraft refueling system is under the recruitment process for the operator. The forecast of flight volume in high traffic day at different development phase and the area size for the fuel tanks was estimated from the total demand for fuel in the airport. The details are presented in **Table 2.3-3.**

Table 2.3-3 Area size needed for fuel tanks

Fuel tanks for the airport	Unit	Phase 1 2028	Phase 2 2038	Phase 3 2048
Air traffic during rush hour (passenger flights and cargo flights)	trips	209	480	744
Proportion of departure flights on traffic congested days		50%	50%	50%
Amount of fuel required per flight	Liters/flight	20,000	30,000	40,000
Estimated refueling volume per day	m^3	2,090	7,200	14,880
Fuel storage time	day	10	10	10
Total amount of stored fuel required	**m^3**	**20,900**	**72,000**	**148,800**
The ratio of land size to building area		0.48	0.48	0.48
Area size needed	**hectare**	**1**	**3.5**	**7.1**

Source : The Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province (December 2018)

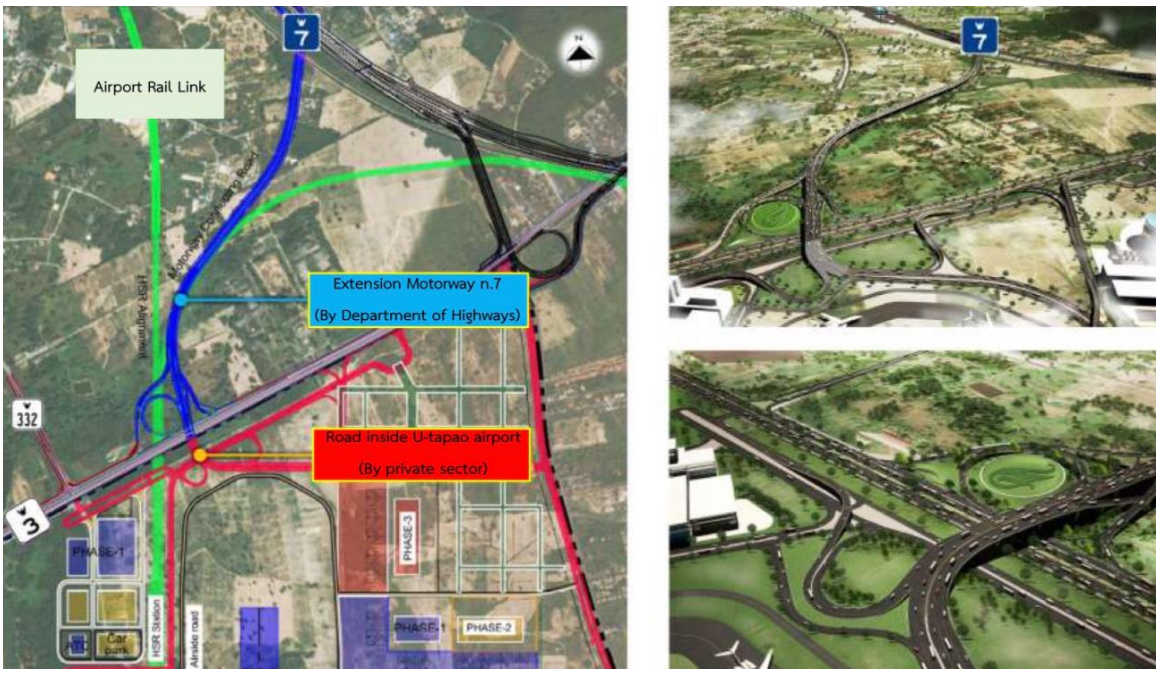
2.3.1.5 Waste transfer station

The waste transfer station will be a new construction outside the Project area. It is located on the east side of U-tapao International Airport with an area of approximately 16,000 square meters. The waste transfer station consists of transfer building, maintenance building. office building, weighing building, garage and vehicle wash area, waste sorting facilities, access roads and buffer areas, and a wastewater treatment system. The private party will procure a waste collector for disposal outside the Project area. The waste volume is estimated from the ultimate phase of the airport with the maximum capacity of 70 million passengers/ year. It is based on the expansion of U-tapao International Airport and commerce in the Master Plan (The Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province 2018). Waste volume depends on the number of people and use of each building. The total waste volume in 2028, 2037, and 2048 will be 21.71, 55.13, and 101 tons/ day, respectively.

2.3.1.6 Transportation networks around the Project

The road networks around the Project area consists of Motorway 7 (Bangkok – Ban Chang – Pattaya – Map Ta Phut), Highway No. 3, Highway No. 331, Highway No. 332, and Highway No. 3126. The concept for connecting the traffic between the Project and road networks is divided into 2 directions.

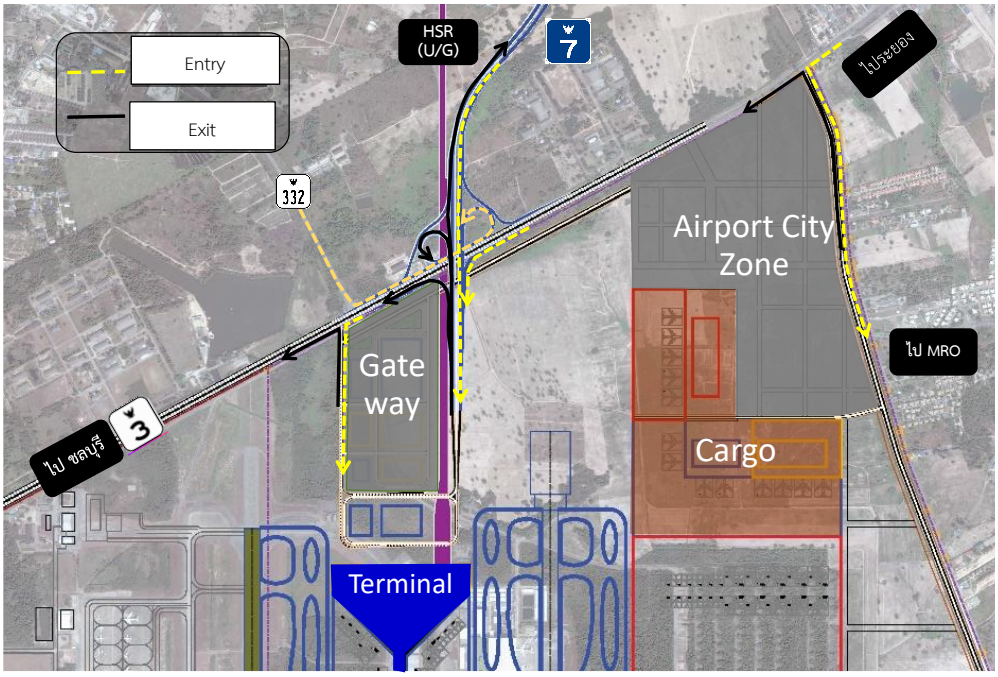
1) Motorway 7 extension road connecting U-tapao Airport involves additional construction of Motorway 7 to link U-tapao Airport directly as shown in **Figure 2.3-6**. DH will design and construct the section outside the airport, and the private party is responsible for the extension road in the airport.



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

Figure 2.3-6 Motorway No. 7 Extension linking U-tapao International Airport

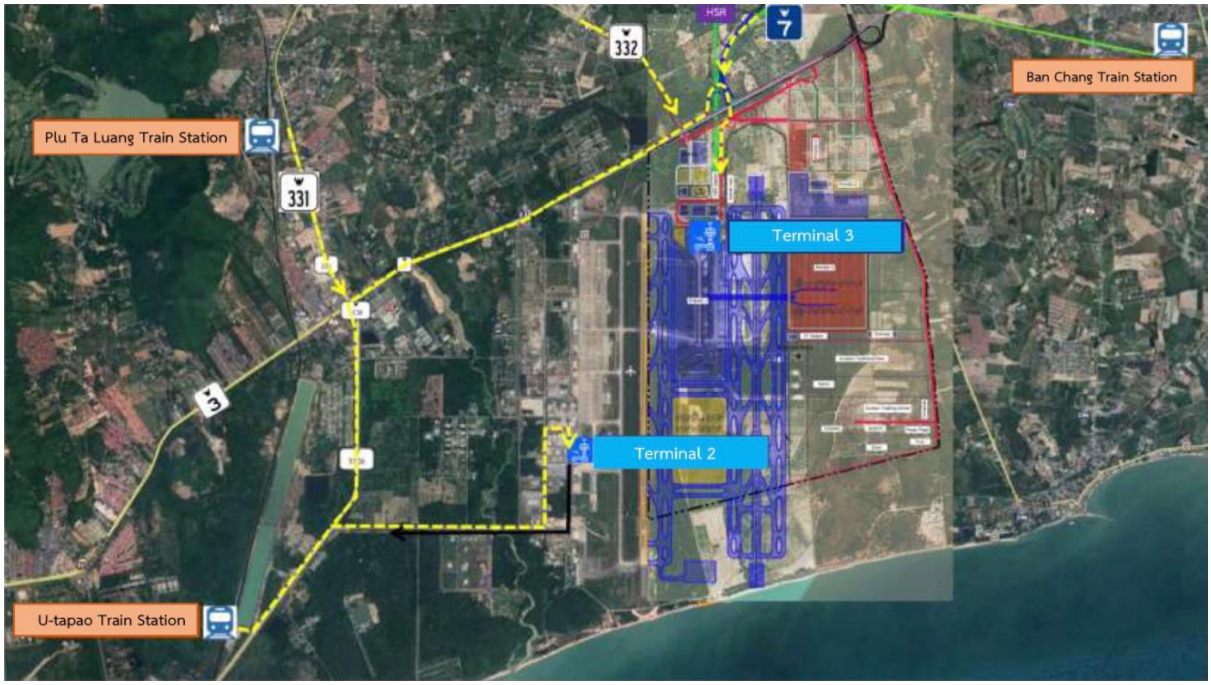
2) Connecting the network to the Project from the north involves transportation from Pattaya, Chon Buri, and other regions. The concept is to connect the traffic using mainly Highway No. 3 (Sukhumvit Road) and Motorway No. 7. When the airport is open for service, passengers can use the elevated road to enter the new terminal (Terminal 3) directly. This will not cause more traffic problems between local people and airport passengers. Local people can get to the Project via Highway No. 332 through Sukhumvit, and the elevated road to Terminal 3. More details are shown in **Figure 2.3-7.**



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

Figure 2.3-7 The concept of linking access to the Project from the north

3) Connecting the traffic to the Project from the south involves transportation from the south, including Sattahip and Chuk Samet Port. The idea is to use Highway No. 3126. There is a main road to carry passengers to the existing terminal (Terminal 2). When Terminal 3 is in service in the future, the entrance to the Project via Highway No. 3 (Sukhumvit Road) will depend on the elevated road entering the Terminal directly. Details are presented in **Figure 2.3-8**



Source : Consultant Employment to support EECPCO in supervising the agreement of U-tapao Airport and Eastern Airport City Development Project B.E. 2564

Figure 2.3-8 The concept of linking access to the Project from the south

2.4 Air navigation safety zone

When there are 2 runways, the air navigation safety zone should cover 2 runways to prevent dangers from structures or trees with the height that may harm the aircraft, especially during low visibility periods. The air navigation safety zone is compulsory for every ICAO member country. The air navigation safety zone must pass the standards stipulated in the Chicago Convention Annex 14 - Aerodromes

The second runway is 1,140 meters east of the first runway. The air navigation safety zones of the first and second runways can be considered by comparing the original air navigation safety zone as of 1995 and the draft air navigation safety zone when operating 2 runways. The details are presented in **Figure 2.4-1.**

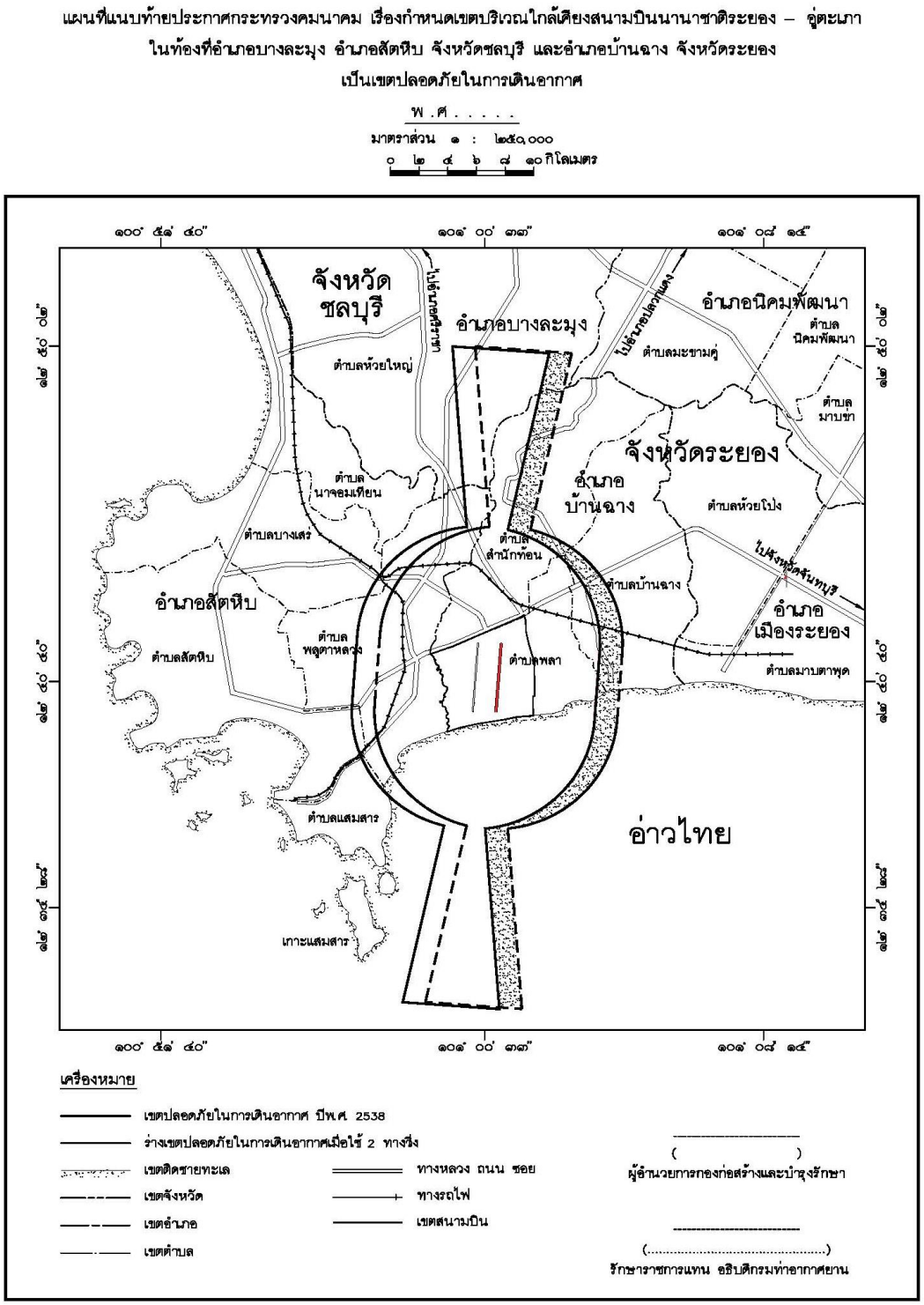
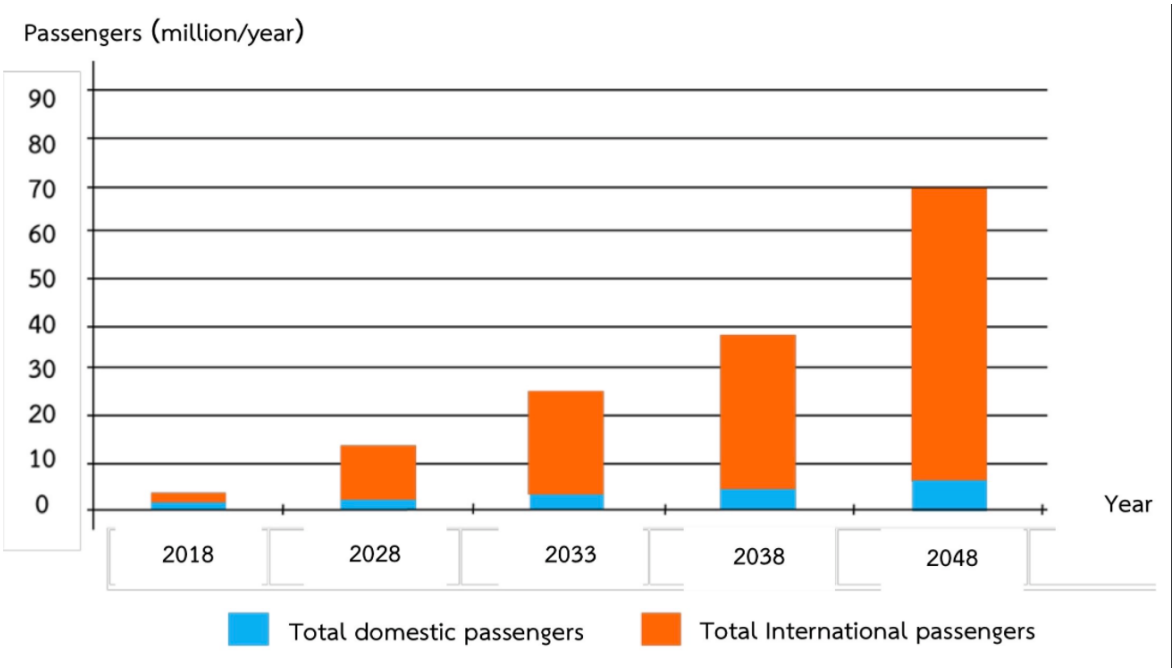


Figure 2.4-1 Comparison of the draft air navigation safety zone

2.5 Forecast of air traffic

Referring to the Master Plan of U-tapao International Airport (December 2018 2561), the passenger volume forecast for the aggressive scenario revealed that the volume in 2028, 2038, and 2049 will be 14, 38, and 70 million passengers/ year, respectively, as shown in **Figure 2.5-1.**



Source : Adapted from the Final Report of Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province (December 2018)

Figure 2.5-1 Result of annual passenger volume forecast for U-tapao International Airport in

The details of fleet mix forecast of U-tapao International Airport to accommodate the estimated number of passengers and flight volume in 2028, 2038, and 2048 are discussed below.

2.5.1 Forecast of fleet mix

Regarding the forecast of fleet mix operating at U-tapao International Airport in the future (2028, 2038, and 2048), the Consultant has adapted from the Final Report of Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province (December 2018). Details are shown in **Table 2.5-1**. In the future, most commercial aircraft will be Code C and E, while Code D and F will be lower. According to the fleet mix forecast in the Master Plan, the ratio of Code D was rather high. For example, the forecast for 2048 shows the proportion of Code D as high as 21%. As such, the Consultant decided to increase the proportion of Code D to 1% and the rest increased to Code E, which rose from 16% to 36%. Details are shown in **Table 2.5-2**.

Table 2.5-1 Forecast fleet mix operating at U-tapao International Airport

Aircraft Movement	2028			2038			2048		
	Domestic flights	International flights	Cargo flights	Domestic flights	International flights	Cargo flights	Domestic flights	International flights	Cargo flights
Code C	100	80	50	90	60	30	80	50	20
Code D	-	5	50	10	15	50	20	20	40
Code E	-	15	-	-	25	15	-	30	30
Code F	-	-	-	-	-	5	-	-	10
Total Code	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 2.5-2 Forecast fleet mix operating at U-tapao International Airport in 2048

Aircraft Movement	Domestic flights	International flights	Cargo flights	Forecast fleet mix	Forecast fleet mix (adjusted)
Code C	122,000	76,250	3,840	62%	62%
Code D	30,500	30,500	7,680	21%	1%
Code E	-	45,750	5,760	16%	36%
Code F	-	-	1,920	1%	1%
Total Code	**152,500**	**152,500**	**19,200**	**100%**	**100%**

The aircraft code to be operated in the future will be Code D, D, E, and F, categorized by the size of aircraft wingspan and outer main gear wheel span. Details are presented in **Table 2.5-3.** The summary of fleet mix proportion in the baseline year (2018) and forecast fleet mix operating at U-tapao International Airport in the future (in 2028, 2038, and 2048) are shown in **Table 2.5-4.**

Table 2.5-3 Requirements of aircraft codes sorted by aircraft wingspan and outer main gear wheel span

Aircraft Code	Wingspan	Outer Main Gear Wheel Span	Typical Aeroplane
C	24 m but < 36 m	6 m but < 9 m	BOEING 737-700/AIRBUS A-320/EMBRAER ERJ 190-100
D	36 m but < 52 m	9 m but < 14 m	B767/AIRBUS A-310
E	52 m but < 65 m	9 m but < 14 m	B777/B787 Series/A330
F	65 m but < 80 m	14 m but < 16 m	BOEING 747-8/AIRBUS A-380-800

Source : ICAO Annex 14 Aerodrome Reference Code

Table 2.5-4 Forecast of aircraft codes operating at U-tapao International Airport in the future

Aircraft Code	Proportion of aircraft code				
	Baseline year (2018)		Forecast year		
	Summer	Summer	2028	2038	2048
Code A	0.008216	0.004728	-	-	-
Code B	0.662940	0.576758	-	-	-
Code C	56.904392	57.035702	57	58	62
Code D	1.237157	1.306366	1	1	1
Code E	38.446822	38.248619	39	38	36
Code F	2.740480	2.827834	3	3	1
Total	**100**	**100**	**100**	**100**	**100**

Source : Adapted from the Final Report of Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province (December 2018)

2.5.2 Forecast of flight volume

The aggressive forecast for the development in 2028, 2038, and 2048 will be able to service 80,600 flights/ year, 200,000 flights/ year, and 324,200 flights/ year, respectively. Details are presented in **Table 2.5-5.**

Table 2.5-5 Baseline Forecast and Aggressive Forecast of flight volume

Flight volume forecast (flights/year)	2028		2038		2048	
	Baseline	Aggressive	Baseline	Aggressive	Baseline	Aggressive
1. Both domestic and international	69,900	78,000	156,300	189,000	241,100	305,000
2. Cargo	2,400	2,600	9,000	11,000	15,000	19,200
3. Total forecast	72,300	80,600	165,300	200,000	256,100	324,200

Source : Final Report of Master Plan for Feasibility Study of U-tapao International Airport and surrounding Area Development Project, Rayong Province (December 2018)

2.6 Details of construction activities of this Project

The construction activities to occur in the Project area include 1), construction of the second runway, 2) construction of taxiway, 3) construction of tunnel under the runway, 4) construction of apron and aircraft stand, 5) construction of Terminal 3, 6) construction of warehouse, 7) construction of ATC tower, 8) construction of land transportation center, 9) construction of parking lot, 10) construction of fire building, 11) road construction, 12) construction of office and shops, 13) construction of airport supporting area, and 14) construction of high-speed train station (underground). Details are presented in **Figure 2.1-1.**

2.7 Management in the construction phase of the Project

The construction of the Project is divided into 3 phases: Phase 1, Phase 2, and Phase 3, each of which taking 36 months. The Project adjusts management based on each construction phase. During the construction, workers and supervisors will work in U-tapao International Airport. RTN and EEC Policy Committee Office agreed that the worker camp will not be built inside the airport. The contractor must find land to build worker camp outside the airport. The worker camp must pass the Thailand Engineering Standard (April, 1994). Space in U-tapao International Airport will be used for stocking construction materials and equipment, construction building, and temporary contractor site. The Project has prepared the area for activities of construction workers as discussed below.

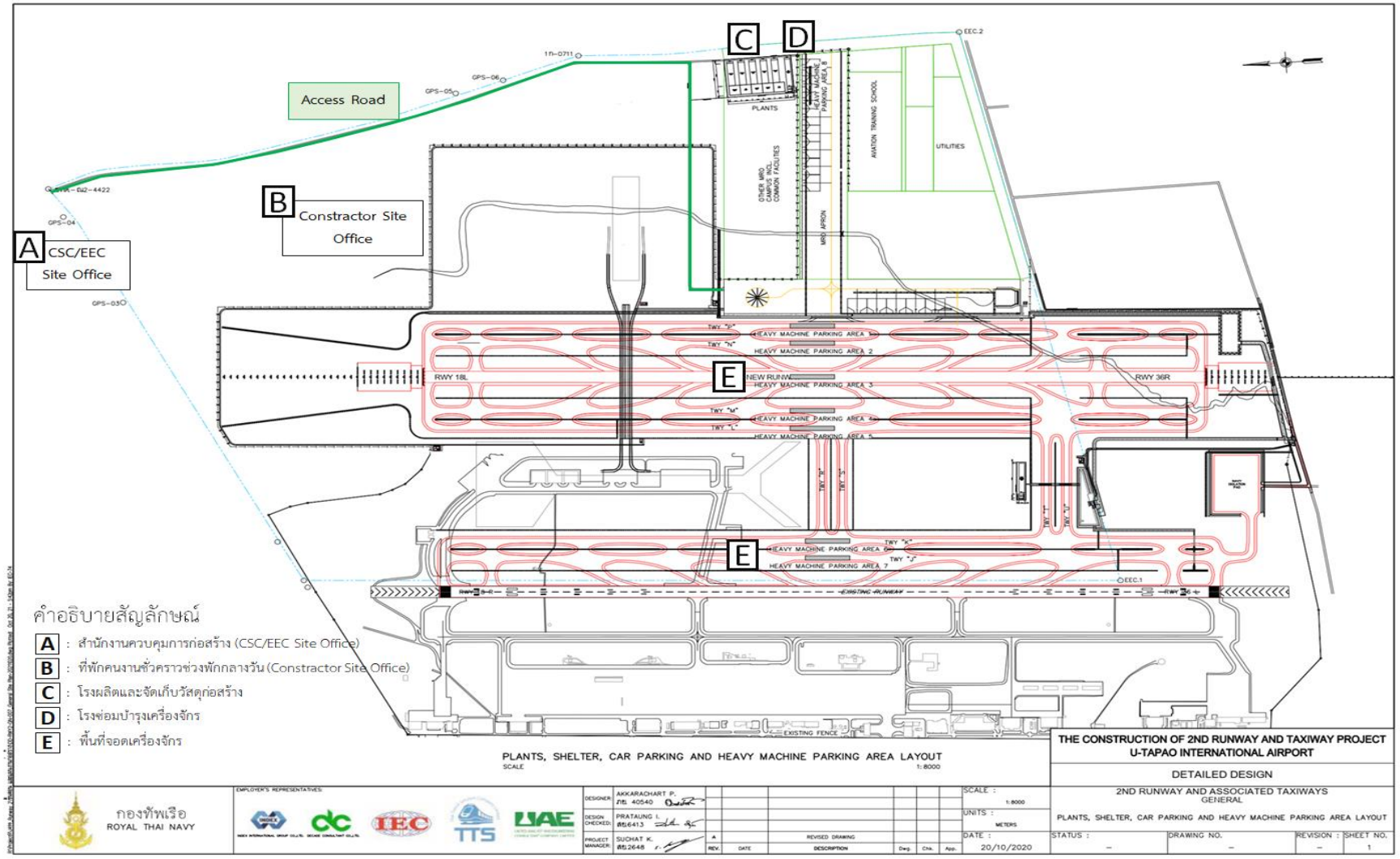
2.7.1 The number of construction workers

Construction in each phase takes 36 months. The details are as follows.

- **Phase 1** The maximum number of construction workers will be 2,654 and supervisors 236, making a total of 2,890 people.
- **Phase 2** The maximum number of construction workers will be 882 and supervisors 813, making a total of 69 people.
- **Phase 3** The maximum number of construction workers will be 1,504 and supervisors 130, making a total of 1,634 people.

2.7.2 Preparing the area for CSC/EEC site office, contractor site office (lunch break), material production factory, machinery maintenance facility, and parking spots for heavy machines in U-tapao International Airport

In Phase 1, RTN and EEC Policy Committee require the contractor to prepare the CSC/EEC site office and contractor site office (lunch break), material production plant and material storage area, and parking space of heavy machines in U-tapao International Airport. Details are shown in **Figure 2.7-1**. Environmental management at the CSC/EEC site office and the contractor site office is summarized in **Table 2.7-1.**



Source : The Consultant designed the Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport, Ban Chang District, Rayong Province 2020

Figure 2.7-1 Basic layout for CSC/EEC site office, contractor site office (lunch break), material production factory, machinery maintenance facility, and parking spots for heavy machines in U-tapao International Airport

Table 2.7-1 Environmental management at CSC/EEC site office and contractor office

Topic	Details		
	Phase 1	Phase 2	Phase 3
1. Construction duration	36 months	36 months	36 months
2. The number of construction workers and supervisors	2,890 people - 2,654 workers - 236 supervisors	882 people - 813 workers - 69 supervisors	1,634 people - 1,504 workers - 130 supervisors
3. Contractor site office and CSC/EEC site office	- 2 contractor site offices (1,327 ppl/office) - CSC/EEC site office: 1 office 236 people	- 1 contractor site office (813 people) - CSC/EEC site office: 1 office 69 people	- 1 contractor site offices (1,504 people) - CSC/EEC site office: 1 office 130 people
4. Sanitation management			
■ Water consumption in construction phase - contractor site office calculating the consumption rate of 150 liters/head/day - CSC/EEC site office calculating the consumption rate of 70 liters/head/day (Worst case when all workers are in the office at the same time)	- contractor site office 398 m^3/day (199 m^3/day/office) - CSC/EEC site office 202.3 m^3/day	- contractor site office 122.0 m^3/day - CSC/EEC site office 61.7 m^3/day	- contractor site office 225.6 m^3/day - CSC/EEC site office 114.4 m^3/day
■ Tank with 10 m^3 capacity (can store water for 3-day consumption)	- contractor site office 120 tanks (60 tanks/office) - CSC/EEC site office 61 tanks	- contractor site office 37 tanks - CSC/EEC site office 19 tanks	- contractor site office 68 tanks - CSC/EEC site office 35 tanks

Table 2.7-1 Environmental management at CSC/EEC site office and contractor office

Topic	Details		
	Phase 1	Phase 2	Phase 3
5. Wastewater management			
■ Wastewater generation volume (calculating from 80% of water consumption)	- contractor site office 318 m^3/day (159 m^3/day/ office) - CSC/EEC site office 161.8 m^3/day	- contractor site office 97.6 m^3/day - CSC/EEC site office 49.4 m^3/day	- contractor site office 180.5 m^3/day - CSC/EEC site office 91.5 m^3/day
■ Wastewater treatment system with capacity of 10 m^3	- contractor site office 32 tanks (16 tanks/ office) - CSC/EEC site office 17 tanks	- contractor site office 10 tanks - CSC/EEC site office 5 tanks	- contractor site office 19 tanks - CSC/EEC site office 10 tanks
6. Waste management			
■ Maximum waste volume - contractor site office calculating from the waste generation rate of 0.71 kg/head/day, density of 153.57 kg/m^3 - CSC/EEC site office calculating from the waste generation rate of 0.44 kg/head/day, density of 118.39 kg/m^3	- contractor site office 1,884 kg/day (942 kg/day/ office) - CSC/EEC site office 1,271.6 kg/day	- contractor site office 577 kg/day - CSC/EEC site office 388.1 kg/day	- contractor site office 1,068 kg/day - CSC/EEC site office 719.0 kg/day
■ Number of waste containers with 200-liter capacity	- contractor site office 62 tanks (32 tanks/office) - CSC/EEC site office 54 tanks	- contractor site office 20 tanks - CSC/EEC site office 18 tanks	- contractor site office 36 tanks - CSC/EEC site office 32 tanks

2.8 Construction plan of the Project

The construction plan in the Project area (extension area) includes the construction of the second runway and taxiway, the tunnel under the runway and parallel taxiway, Terminal 3, land transportation center, ATC tower, commercial gateway, cargo village, and other relevant buildings. The construction in each phase will take about 36 months.

2.9 Installation plan for permanent noise monitoring station and air quality monitoring system of the Project

The Project has planned to install Permanent Noise Monitoring Station and Air Quality Monitoring System (AQMS) to monitor and prevent the impact. The installation shall be complete before operating the second runway. Noise and air quality will be tested at the stations before operating in each station. These monitoring stations are connected to the database of flight and routes. They are essential sources of data to prevent the problems caused by the Project. More details are presented in **Table 2.9-1** and **Table 2.9-2**.

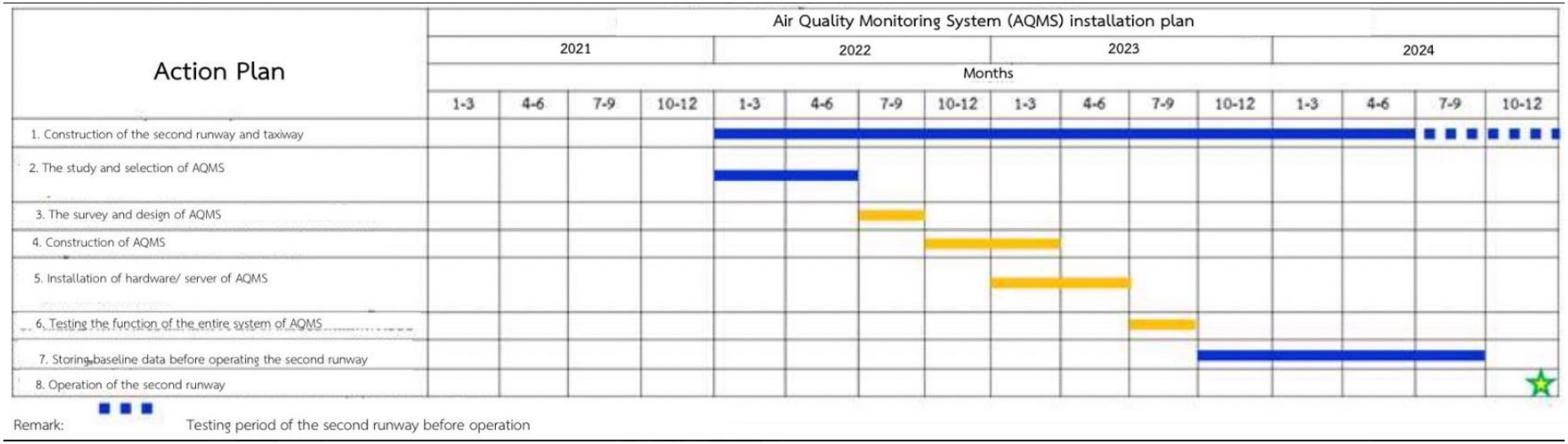
Table 2.9-1 Permanent Noise Monitoring Station installation plan

Action Plan	Permanent Noise Monitoring Station installation plan															
	2021				2022				2023				2024			
	Months															
	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12
1. Construction of the second runway and taxiway					■	■	■	■	■	■	■	■	■	■	■ ■	■ ■ ■
2. The study and selection of permanent noise monitoring stations					■	■										
3. The survey and design of permanent noise monitoring stations							■	■								
4. Construction of permanent noise monitoring stations								■	■							
5. Installation of hardware/ server of permanent noise monitoring stations									■	■	■					
6. Testing the function of the entire system of permanent noise monitoring stations											■	■				
7. Storing baseline data before operating the second runway												■	■	■	■	
8. Operation of the second runway																★

Remark: ■ ■ ■ Testing period of the second runway before operation

Source : EEC Policy Committee Office, 2021

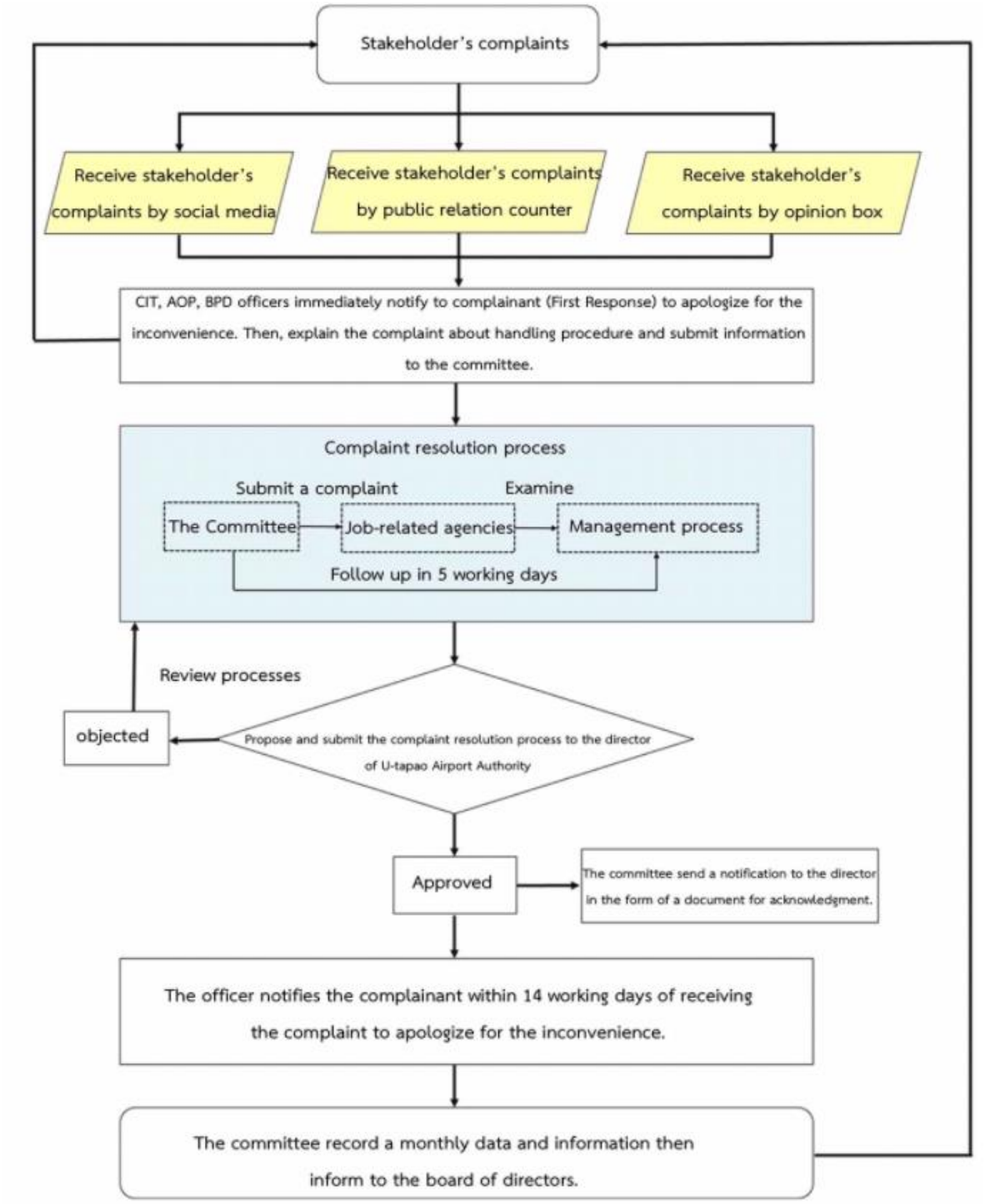
Table 2.9-2 Air Quality Monitoring System (AQMS) installation plan



Source : EEC Policy Committee Office, 2021

2.10 Complaint reception plan

Currently, U-tapao Airport Authority has the complaint reception plan and procedures as shown in **Figure 2.10-1**.



Source : U-tapao Airport Authority, 2020

Figure 2.10-1 Procedures of complaint management

However, when the second runway is operated in the future, a private third party will manage U-tapao International Airport, and the complaint reception plan will be made in greater detail.

Chapter 4

Public Participation and Public Relations

4.1 Introduction

Public participation is the process through which the general public and stakeholders can share their views, information, and opinions to seek alternatives and make appropriate decisions mutually accepted among relevant parties. It is essential for relevant parties to join this process from the start to ensure understanding, learning, and adaptation to the Project, which will benefit every party. Participation in this activity will allow for consultation and public participation in the Project study before launching it. It will contribute to data of positive and negative impact that the development may cause. Public and stakeholder participation will strengthen the decision-making process in steering the development direction toward sustainability and public acceptance.

4.2 Objectives

1) To allow the public, stakeholders, and relevant sectors to express their concerns and suggest the environmental and health impact assessment (EHIA) so that the EHIA is as inclusive as possible

2) To disclose the Project documents that explain the background, significance, process, implementation plan, basic information about factors that may cause environmental and health impact, the draft suggestions for the scope and method of the EHIA, and the draft environmental measures for the public to acknowledge and express their opinions.

To implement the process of public and stakeholder consultations in the environmental and health impact assessment, it is necessary to establish a public relations communication channel for disseminating Project information, Project participation activities, and giving opportunities to people who may be affected by the project, agencies in the government and private sector, NGOs, and general citizens who are interested in the Project to express their opinions, information, disagreement, and suggestions about the Project. The Project Owners have followed **ONEP's Guidelines for Public Participation in the Procedure of Providing an Environmental Impact Assessment Report (B.E. 2562) and the guidelines for public consultations stipulated in Section 58 of the Constitution of Thailand B.E. 2560**. The procedures are presented in **Figure 4.2-1**

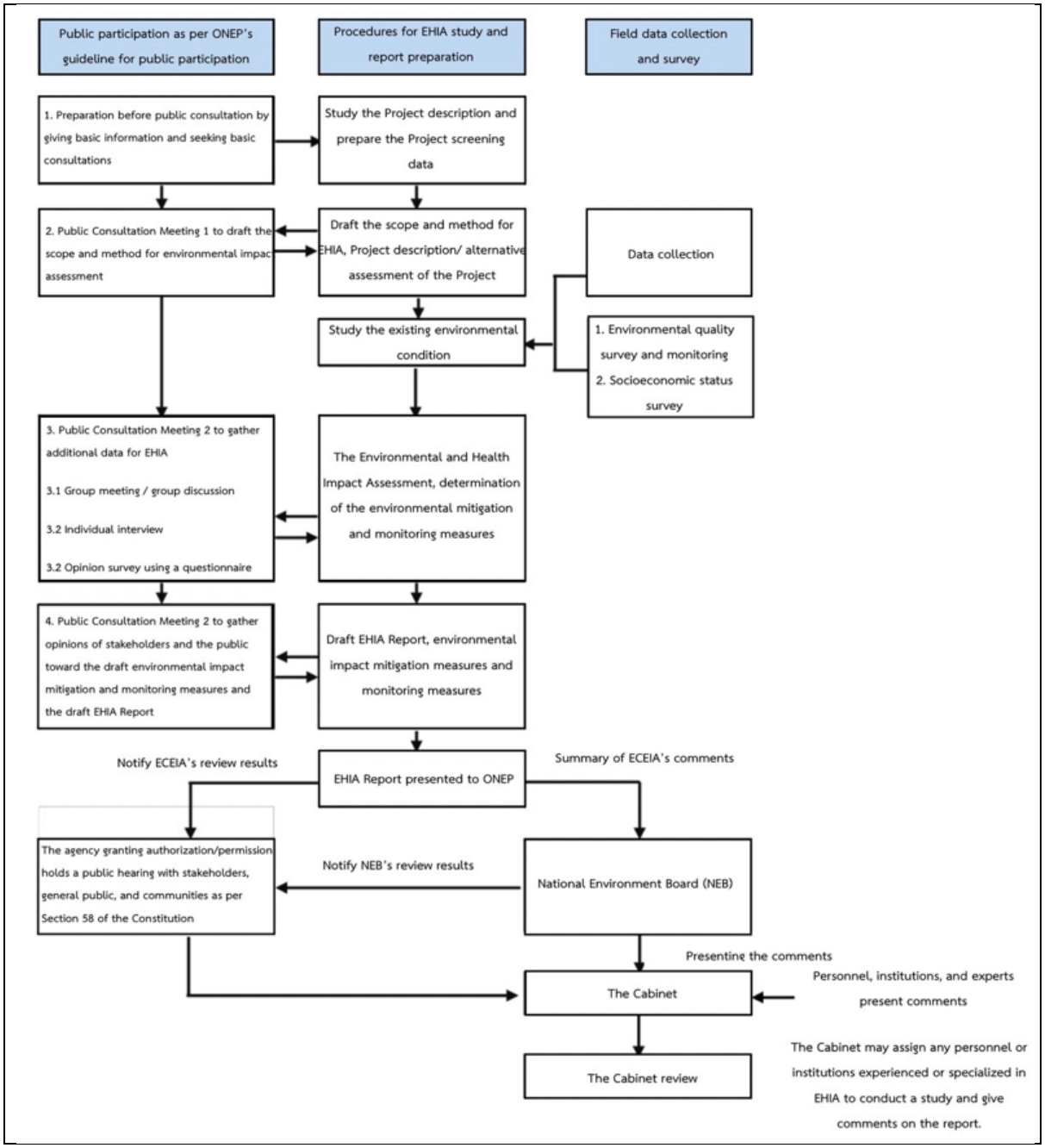


Figure 4.2-1 Procedures for public participation in the environmental and health impact assessment (EHIA) in compliance with the guidelines for public consultations stipulated in Section 58 of the Constitution of Thailand B.E. 2560

4.3 Expected Results

1) Relevant agencies and stakeholders can express their views and provide valuable suggestions for the EHIA and determination of the environmental impact mitigation measures and monitoring measures

2) Mutual learning among social sectors is established to develop the Project through public participation and public relations.

3) A positive image is created for the Royal Thai Navy and the EEC Policy Committee Office as an honest commitment to developing the Project at different phases with minimum impact on the environment, society, and public health.

4.4 The Project Study Area

The Project study area is considered based on the following areas.

1) The physical scope of the study area covers U-tapao International Airport and the surrounding area at 6 km from the airport fence line to the east and the west and 10 km to the north and the south.

2) The administrative area covers two provinces: Rayong (some parts of Ban Chang District and Rayong District) and Chon Buri (some parts of Bang Lamung District and Sattahip District). Details are presented in **Table 4.4-1**and **Figure 4.4-1.**

Table 4.4-1 Public participation area of the Project sorted by administrative areas

Province	District	Subdistrict
1) Rayong	1) Ban Chang	1) Phala (Project location)
		2) Samnak Thon
		3) Ban Chang
	2) Mueang Rayong	4) Huai Pong
2) Chon Buri	3) Bang Lamung	5) Huai Yai
	4) Sattahip	6) Na Chom Thian
		7) Bang Sarae
		8) Phlu Ta Luang
		9) Sattahip
		10) Samae San
2 provinces	**4 districts**	**10 subdistricts**

Source : United Analyst and Engineering Consultant Co., Ltd., 2021

Figure 4.4-1 Public participation area of the Project sorted by administrative areas

4.5 Stakeholder Identification

Stakeholder classification is based on the nature and extent of impact from the Project development in the construction phase and operation phase. Stakeholders were classified based on the inclusiveness principle. Stakeholders were classified into 7 groups, according to ONEP's guideline, as follows:

1) People affected
   - "Disadvantaged group" is a group being negatively affected by the project directly and indirectly
   - "Advantaged group" is a group being positively affected by the project directly and indirectly
2) People responsible for providing an environmental impact assessment report:
   - A project owner here may mean a state agency/state-owned enterprise or private sector who proceeds with the project, including joint investment between the state and private sector. The Project Owners in this report include the Royal Thai Navy and EEC Policy Committee Office.
   - A provider of an environmental impact assessment report granted permission by law. In this report, the EIA report provider is United Analyst and Engineering Consultant Co., Ltd. The Project Owners and the EIA report provider must work together at every stage of the environmental impact assessment.
3) People having duties in considering an environmental impact assessment report
   - ONEP as the secretariat to the Expert Committee to Consider Environmental Impact Assessment Reports (ECEIA) or the state agency assigned by the NEB to act on its behalf
   - ECEIA and/or NEB
   - Persons with duties in deciding to authorize/grant permission to the project, such as the Cabinet, minister, and state agency or official with a legal power to grant permission
4) Government agencies at different levels: in the central, regional, and local administrations, such as regional environmental offices, provincial offices of natural resources and environment, provincial public health office, and local administrative organizations
5) Private environmental protection entities, private sector development organizations, educational institutions, and independent academicians
   - Private environmental protection entities that are registered with the Department of Environmental Quality Promotion or community entities interested in and work

for environment or private sector development organization or different organizational groups in the areas or entering to utilize the area

- educational institutions at a university level in the study area or nearby
- independent academicians, including qualified people with specific expertise

6) Media both at the levels of local and central administrations, with the roles in presenting information and news on the project, impacts of the project, and progress in preparing the environmental impact assessment report.

7) General public who are interested in and desire to join participation

Stakeholder classification is based on a key impact from the Project: noise impact. Determination of noise impact area is based on the noise exposure forecast (NEF), which is a standard method for assessing noise impact on humans.

The area affected by aircraft noise is presented in NEF contour on the map of the airport and the surrounding area. "The Office of Natural Resources and Environmental Policy and Planning" (2007) established the criteria for assessing environmental impact from airport projects using NEF from the project. The criteria for determining NEF contour are as explained below.

(1) If an area has NEF ≥ 40, the noise impact is severe. The project owner is required to negotiate to buy land or compensate for the affected.

(2) If an area has NEF in the range of 30 – 35 and 35 – 40, the noise impact from aircraft is high, and there must be mitigation measures.

(3) If an area has NEF < 30, it is considered that there is no impact from aircraft noise.

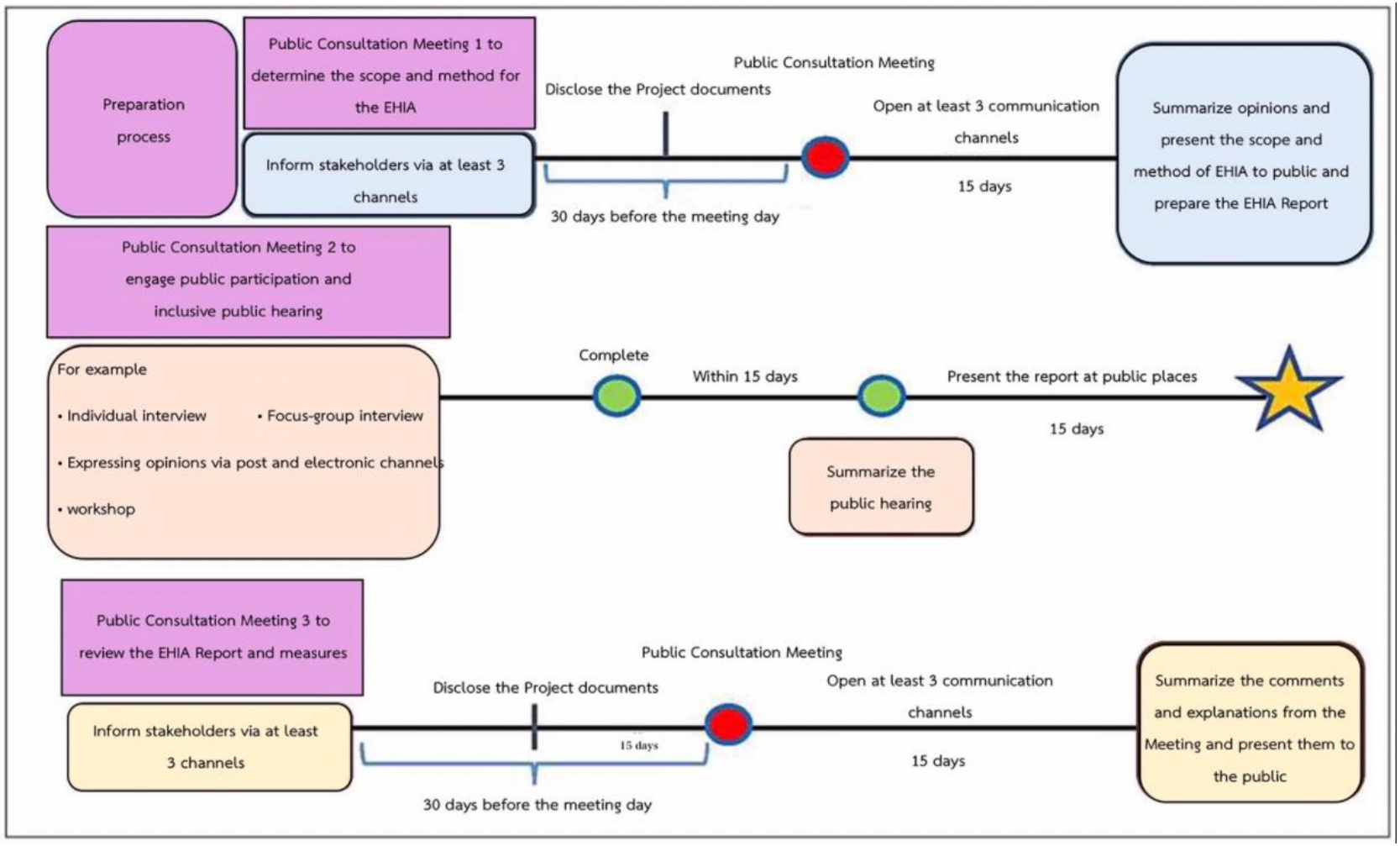
Similar to the principles for preventing and compensating noise impact from Suvarnabhumi Airport as per the Cabinet Resolution dated 29 May 2007, for NEF 30 – 40 areas, the project owner is required to give financial support for the renovation cost for buildings. For NEF ≥ 40, the project owner is required to negotiate to buy land or compensate for the affected. If the affected do not wish to sell their properties, the project owner is required to give financial support for the renovation cost for buildings to minimize the noise impact.

This study, therefore, classifies the impact based on the principles for preventing and compensating noise impact from Suvarnabhumi Airport as per the Cabinet Resolution dated 29 May 2007. Specifically, the affected are classified into 3 groups based on the mathematical model, namely NEF ≥ 40, NEF 30 – 40, and NEF < 30 until the margin of the Project study area.

4.6 Public Participation Method

To implement public participation, the Project follows ONEP's Guidelines for Public Participation in the Procedure of Providing an Environmental Impact Assessment Report (2019). The process of public participation and public consultation is described below.

The summary of the public consultation for the project, undertaking, or operation that may seriously impact natural resources, environmental quality, health, sanitation, life quality of people in a community (EHIA) is shown in **Figure 4.6-1and Table 4.6-1**



Source : Notification of ONEP on the guideline for public participation in the preparation of environmental impact assessment report B.E. 2562

Figure 4.6-1 **The diagram of the procedures for public consultations for the project required to prepare an EHIA report for determining the project, undertaking, or operation that may seriously impact natural resources, environmental quality, health, sanitation, life quality of people in a community**

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
Preparing the community by giving information to the public			
1) Prepare the community by informing the public about the Project description and rules of the public hearing. The communication method should be easily understandable, such as infographic, short videos, leaflet, and PR boards, to give them sufficient information for them to give comments.	30 May - 11 June 2019	In the early stage of the Project, it is crucial to give information about the Project to the target group who are top management of provincial and local agencies, local administrative organizations so that they are aware of and understand the Project. This process also involves a discussion about the method of public participation and asking the comments and suggestions about the Project. This informal meeting aims at giving basic information and consultation so that the plan is consistent with the study area management before further discussion in detail about the progress. The Project also prepared the community by informing the public about the Project descriptions and the rules of the public hearing by easily understandable communication methods, such as PR leaflet.	Compliant: The Project prepared the community by communicating with the public through a leaflet.
Public Consultation Meeting 1 to determine the scope and method for environmental impact assessment			
1) The Project must inform stakeholders at least 30 days before the public hearing day via at least 3 channels so that interested parties can prepare themselves.	4 June 2019 3 July 2019	This process is aimed at notifying ONEP and stakeholders at least 30 days before the public hearing days via at least 3 channels. - Notification to ONEP and stakeholders aims at informing them about the Public Consultation Meeting 1 at least 30 days in advance via 7 channels, namely 1) invitation letter 2) PR board 3) PR poster 4) website 5) local radio station 6) local newspaper and 7) PR vehicles	Compliant because - Notified 30 days before the meeting - Notified via 7 public communication channels

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
2) Project documents must be disclosed at least 15 days in advance of the day of the public hearing by specifying the background, significance, procedures and methods for project implementation, as well as presenting basic information about factors that may affect the environment, draft the scope and environmental impact assessment method. This is to allow stakeholders and the public to review. The disclosure shall be done via at least 3 communication channels, which should be the same channels as those for notifying about the Public Consultation Meeting.	19 June 2019 - 3 July 2019	The Project document was disclosed for stakeholders and the public review at least 15 days before the Meeting via 3 channels. - The Project document was delivered to ONEP and stakeholders. - Project notice or document were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). - Website: The project document can be downloaded from www. ehia-utprw2 . com along with the details about the Project document disclosure.	Compliant because - Project document disclosed 15 days in advance. - Communicated via 3 channels.
3) The Project must create a registration system to allow the public, stakeholders, and relevant agencies who wish to comment on the EHIA scope and method can register in advance.	5 June - 1 July 2019	The Project created a registration system to allow the public, stakeholders, and relevant agencies to notify their wish to join the Meeeting in advance via the following channels: 1) telephone / fax, 2) email, and 3) invitation response via post.	Compliant because there was a registration system.
4) The public consultation must be held at a suitable time to allow stakeholders and the public to express their concerns and give relevant information and suggestions for the EHIA within an appropriate time frame. The EHIA report provider must gather all comments inclusively.	Thursday 4 July 2019 08.30-12.35 hrs. (schedule based on actual meeting)	Public Consultation Meeting 1 was done to determine the EHIA scope and method on Thursday 4 July 2019 at the Grand Ballroom 1-3, Purimas Beach Hotel & Spa, Ban Chang District, Rayong Province. The purpose was to present the background, Project descriptions, EHIA scope and method, the Project alternative assessment, and to hear the opinions and suggestions of stakeholders and the public until there is no more question.	Compliant because the Meeting was held at a suitable time to allow stakeholders and the public to express their concerns on the EHIA scope and method until there was no more question.

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
5) After the Public Consultation Meeting, the Project must open channels to receive public opinions for at least 15 days. There must be at least 3 communication channels, which should be the same as those for notifying about the Public Consultation Meeting.	5-19 July 2019	The Project continued to receive public opinions for at least 15 days after the Public Consultation Meeting from 5 – 19 July 2019 via 5 channels, namely 1) post 2) telephone 3) fax and 4) email.	Compliant because the Project continued to receive public opinions for 15 consecutive days via 4 channels.
6) The EHIA report provider shall summarize the comments of stakeholders and the public, along with the explanation, present the EHIA scope and method to the public, and include the details in preparation of the EHIA report.	1-2 August 2019	The Project summarized the public consultation meeting by indicating the concerns, suggestions for the EHIA scope and method along with the explanation and presented to the public via 3 channels. - The Project document was delivered to ONEP and stakeholders. - Project notice or document were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). - Website: The project document can be downloaded from www. ehia-utprw2 . com along with the details about the Project document disclosure.	Compliant because opinions of stakeholders and the public were summarized, explained, and presented to the public and included in the preparation of the EHIA report.
Public Consultation Meeting 2 in the environmental impact assessment and preparation of the EHIA report			
● The EHIA report provider must disclose facts about the Project that is being implemented. The report must contain at least the following data. - Type, size, production capacity, the Project area, potential pollution caused by the Project, other significant data, and	20 November 2019 until the end of Public Consultation Meeting 2	Disclosed the Project facts as follows: - Formal letter - PR board (Cutout) size 3x5 m. installed at 10 places - PR poster (47 places) - Website: www.ehia-utprw2.com	Compliant because the Project facts were disclosed as required.

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
potential impact factors - Expected time to launch the project - Name of project owner or agency granting authorization/permission by law, their contact numbers and contact places to seek further information. Date, time, and place of the public consultation meeting - Posters of the above details shall be installed at the appropriate location and of an appropriate size for easy access and understanding.			
● The EHIA report provider must clearly show the Project name, objectives, targets, and topics of the public and stakeholder opinion survey. The topics to be surveyed must be consistent with the Project descriptions.	-	Details of the Project name, objectives, targets, and topics of the public and stakeholder opinion survey were shown in the PR board, the flip chart, and the Project PR document Set 2, and also during the introduction session of the meeting.	Compliant because the Project details were shown during the public consultation meeting
● In the Public Consultation Meeting, attention should be paid to data collection, education, and understanding the way of life and environment of communities in the area that may be affected by the environment from the implementation of such projects or undertakings.	-	The following data were collected and reviewed. - Data of lifestyles and the existing environment of the Project study area were reviewed before the field data collection. - The Project also collected data and studied the lifestyle and environment of the community.	Compliant because the Project has collected the data and reviewed the data as required.

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
● The EHIA report provider may use the following methods. - Individual interview - Allow the public to send their opinions via post, fax, electronic methods, or any other means that are appropriate. - Allow the public and stakeholders to receive information and express their opinions toward the state agency responsible for the Project. - Focus group interview - Workshop - Meeting with representatives of relevant groups or stakeholders	- Phase 1 from 26 November to 15 March 2020 - Phase 2* 6-13 June 2020 *There were changes in the noise monitoring results, so the opinion survey was additionally conducted to cover all aspects.	In the public consultation meeting, the following methods were used. - In-depth interview The Project conducted in-depth interviews with agencies, local administrative organizations, private organizations that are relevant and may be affected by the Project. The interviews were conducted individually or in a group with a total of 82 organizations. - Group meeting/group discussion The Project conducted group meetings/group discussions with community leaders and the residents in NEF ≥ 40 area, NEF 30-40 area, and NEF 30 until the margin of the study area, public health practitioners, civil defense volunteers, and fisheries (26 groups) - Survey using a questionnaire The Project surveyed the public opinions on the Project by means of individual interviews with 5 groups, with a total of 908 interviewees. 1) households in NEF ≥ 40 (86 people) 2) households in NEF 30-40 (354 people) 3) households in NEF 30 until the margin of the study area (428 people) 4) sensitive receptors (religious places, schools, and hospitals) (14 people) 5) Leaders of communities in the NEF contour (26 people)	Compliant because the Project surveyed and received public opinions as per the Guideline for public participation in preparation of the EHIA report B.E. 2562
● Once the EHIA report provider surveys the public opinions, both positive and negative comments shall be summarized within 15 days	Disclosed the summary report from at least 18	The public hearing report was summarized within 15 days after the public hearing was over. The summary report was submitted to stakeholders such as ONEP and presented via at last 3 channels.	Compliant because the Project summarized the public hearing report within

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
after the public hearing is over. The summary report shall be presented at public places, namely provincial office of natural resources and environment, district office, local administrative organizations, subdistrict headman office, village headman office, provincial office of public health, district office of public health, and public hospitals where the Project is located or any position that the public and stakeholders can easily access. The report shall be presented for at least 15 days.	June – 2 July 2020	- The Project document was delivered to ONEP and stakeholders. - Project notice or documents were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). - Website: The project document can be downloaded from www. ehia-utprw2 . com along with the details about the Project document disclosure.	15 days after the public hearing was over The report was presented at several places for at least 15 days.
Public Consultation Meeting 3 to review the EHIA Report, the environmental impact mitigation measures and monitoring measures			
1) Stakeholders must be notified at least 30 days in advance before the meeting day via at least 3 channels so that interested parties can prepare themselves.	From 3 July 2020 and continuously to 4 August 2020	The Project notified ONEP and stakeholders at least 30 days in advance before the public consultation meeting via at least 3 channels. - This notification was aimed for ONEP and stakeholders to become aware of the Public Consultation Meeting 3 at least 30 days via 7 channels, namely 1) invitation letter 2) PR board 3) PR poster 4) website 5) local radio station 6) local newspaper and 7) PR vehicles.	Compliant Because - Notified 30 days in advance - Notified via 7 channels
2) The Final EHIA Report and Measures shall be disclosed at least 15 days before the meeting to allow stakeholders and the public to review. The disclosure shall be done via at least 3 channels, which should be the same channels as those for notifying about the Public	From 3 July 2020 and continuously to 4 August 2020	The Final EHIA Report and Measures were disclosed to stakeholders and the public at least 15 days before the meeting via 3 channels below. - The Project document was delivered to ONEP and stakeholders. - Project notice or documents were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total).	Compliant Because - Disclosed the EHIA report 15 days in advance - Disclosed via 3 channels

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
Consultation Meeting.		- Website: The project document can be downloaded from www. ehia-utprw2 . com along with the details about the Project document disclosure.	
3) The public consultation meeting to review the EHIA report must be held at appropriate time to allow stakeholders and the public to present additional data, facts, and comments on the draft EHIA. The Project must receive all aspects of the comments.	5-August 2020 17.00-20.20 hrs. 6 August 2020 08.30-12.30 hrs. (schedule based on actual meeting)	The Public Consultation Meeting 3 to review the EHIA Report and mitigation and monitoring measures was conducted on 5 August 2020 at the Multi-function building of the Elderly Life Quality Development Center of Samnak Thon Subdistrict Administrative Organization and on 6 August 2020 at the Grand Ballroom 1-3, Purimas Beach Hotel & Spa, Ban Chang District, Rayong Province. The purpose was to present the background, Project descriptions, EHIA scope and method, the draft environmental impact mitigation measures and monitoring measures, and receive comments and suggestions from the public and stakeholders on the Project.	Compliant Because the Project held the meeting at appropriate time to allow stakeholders and the public to present their comments and suggestions on the study results in the draft EHIA report and draft mitigation and monitoring measures until there was no more question.
4) After the Public Consultation Meeting, Project must open channels to receive public opinions for at least 15 days. There must be at least 3 communication channels, which should be the same as those for notifying about the Public Consultation Meeting.	7-21 August 2020	The Project continued to receive public opinions for at least 15 days from 7-21 August 2020 via 5 channels, namely 1) post 2) telephone 3) fax and 4) email.	Compliant because the Project continued to receive public opinions for at least 15 days via 4 channels.
5) The EHIA report provider shall summarize the comments of stakeholders and the public to present to the public.	29-31 August 2020	The Project summarized the public consultation meeting by indicating the comments and suggestions on the draft EHIA report and draft measures, along with explanations. The summary report was presented via 3 channels.	Compliant because the Project made the summary report, submitted to ONEP, and presented to the public

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
		- The Project document was delivered to ONEP and stakeholders. - Project notice or documents were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). - Website: The project document can be downloaded from www. ehia-utprw2 . com along with the details about the Project document disclosure.	and stakeholders.
Clarification (additional) to the study results in case that the Project revised the data of different NEF contours from the Public Consultation Meeting 3			
● Submitted a letter seeking meeting permission from the Communicable Disease Committee, Rayong Province	2-3 August 2021	The Project submitted a letter seeking permission to hold a meeting for clarification (additional) due to the COVID-19 pandemic. The Project had a meeting with the Communicable Disease Committee, Rayong Province No. 29/2564 (2021) at Pakdeesisongkhram Conference Room, Rayong Government Complex. The meeting was done online as a countermeasure to the COVID-19 pandemic.	Compliant because the COVID-19 pandemic was critical.
● The EHIA report provider shall disclose facts about the project that is conducting the public relations and clarification (additional)	From 9 August 2021	The data were communicated for stakeholders and public review in advance via 5 channels, namely 1) postal delivery 2) document presentation 3) PR board 4) PR poster and 5) website	Compliant because the Project disclosed the facts about the Project in advance.
To hold the Public Consultation Meeting, the EHIA report provider may use the following methods. - Individual interview - Allow the public to send their opinions via	7-14 August 2021	1) The Project met with community leaders and representatives of the affected via video conference to notify them about the data revision which may affect people differently from the Public Consultation Meeting 3 on August 2020. Therefore, the Project needed to inform the community leader and the public in NEF ≥ 40 and NEF 30 – 40 for one time.	Compliant because the Project surveyed and received the public opinions by different means per the Guideline for public

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
post, fax, electronic methods, or any other appropriate means. - Allow the public and stakeholders to receive information and express their opinions toward the state agency responsible for the Project. - Focus group interview - Workshop - Meeting with representatives of relevant groups or stakeholders		2) There was (additional) clarification to people affected by noise from U-tapao International Airport development via video conference to notify about the data revision which may affect people differently from the Public Consultation Meeting 3 in August 2020. Therefore, the Project needed to inform the community leader and the public in NEF ≥ 40 and NEF 30 – 40 for one time.	participation in the preparation of the EHIA report B.E. 2562
		3) An additional survey using a questionnaire/ individual interview was conducted due to changes in the number of flights in the scenario of aircraft noise impact assessment. As a result, the NEF contour reviewed as of July 2021 changed from the draft NEF contour in the Public Consultation Meeting 3 as of August 2020, and the number of households affected by aircraft noise may change, including those in NEF ≥ 40 and NEF 30 – 40. The Project has surveyed the number of households in the changed NEF contour and found that there were 57 households.	
• Once the EHIA report provider surveys the public opinions, both positive and negative comments shall be summarized within 15 days after the public hearing is over. The summary report shall be presented at public places, namely provincial office of natural resources and environment, district office, local administrative organizations, subdistrict headman office, village headman office,	20 August 2021	The public hearing report was summarized within 15 days after the public hearing was over. The summary report was submitted to stakeholders such as ONEP and presented via at last 3 channels. - The Project document was delivered to ONEP and stakeholders. - Project notice or documents were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). Website: The project document can be downloaded from www. ehia-utprw2.com along with the details about the Project document disclosure.	Compliant because the summary report was made within 15 days after the public hearing was over.

Table 4.6-1 Summary of procedures for public and stakeholder consultations in the EHIA process of the Project as per the Notification of MNRE

Requirements and methods	Time	Implementation details	Compliance with the Notification
provincial office of public health, district office of public health, and public hospitals where the Project is located or any position that the public and stakeholders can easily access.			

Remark : There were 47 places for public relations and displaying the Project documents.

- 17 government agencies: Rayong Provincial Hall, Rayong Provincial Office of Natural Resources and Environment, Rayong Office of Public Health, Rayong Office of Public Relations, Mueang Rayong District Office, Mueang Rayong District Public Health Office, Ban Chang District Office, Ban Chang District Public Health Office, Chon Buri Provincial Hall, Regional Environmental Office 13, Chon Buri Provincial Office of Natural Resources and Environment, Chon Buri Office of Public Health, Chon Buri Office of Public Relations, Bang Lamung District Office, Bang Lamung Public Health Office, Sattahip District Office, Sattahip District Public Health Office
- 16 medical facilities near the study area: Ban Chang Hospital, Samnak Thon Subdistrict Health Promotion Hospital, Khao Khrok Subdistrict Health Promotion Hospital, Ban Khlong Bang Yai Subdistrict Health Promotion Hospital, Ban Chak Mak Subdistrict Health Promotion Hospital, Ban Sa Kaeo Subdistrict Health Promotion Hospital, Yai Ra Subdistrict Health Promotion Hospital, Phala Subdistrict Health Promotion Hospital, Phayun Subdistrict Health Promotion Hospital, Public Health Center of Eastern – Nong Muang Community, Queen Sirikit Hospital, Sattahip Hospital (km 10), Wat Yannasangwararam Hospital, Ban Khong Wan Phen Subdistrict Health Promotion Hospital, Ban Chong Samae San Subdistrict Health Promotion Hospital, and Somdet Phrasangkharat Yannasangworn Hospital for the Elderly Chon Buri
- 14 local administrative organizations and community leader offices: Phala Subdistrict Municipality Office, Samnak Thon Subdistrict Municipality Office, Samnak Thon Subdistrict Administrative Organization Office, Ban Chang Subdistrict Municipality Office, Ban Chang Town Municipality Office, Map Ta Phut Town Municipality Office, Samnak Thon Subdistrict Headman Office, Huai Yai Subdistrict Municipality Office, Klet Kaeo Subdistrict Municipality Office, Phlu Ta Luang Subdistrict Administrative Organization Office, Sattahip Town Municipality Office, Samae San Subdistrict Administrative Organization, Khet Udomsak Subdistrict Municipality Office, and Khao Chi Chan Subdistrict Municipality Office

4.7 Overall Summary of Public Participation of the Project

The public participation process in the Public Consultation Meetings 1, 2, 3, additional clarification achieved the objectives to engage public participation in expressing their opinions and suggestions for the Project development, the EHIA results, and environmental and health measures. The opinions and suggestions were used to improve the EHIA report, the environmental impact mitigation and monitoring measures to be more inclusive and complete. The revised EHIA report was subsequently submitted for ONEP's review. The opinions and suggestions for the Project development, the environmental impact mitigation and monitoring measures are summarized in **Table 4.7-1.**

The bold circle symbol (●) means that participants expressed their concerns, ask questions, and gave opinions regarding the public participation activity (Public Consultation Meetings 1, 2, 3, and additional clarification). These questions, opinions, and suggestions in each meeting have been answered in the meeting. The summary report was made along with explanations and displayed at relevant agencies and local community offices in the Project study area.

Furthermore, the Project has a plan to receive complaints and the procedures to do so at different stages as shown in **Figure 4.7-1** and **Figure 4.7-2**.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
1. Project descriptions					
Access via Sukhumvit Road should be open to facilitate the traffic when U-tapao is operated as a commercial airport.	●	●	●		The project plans to open the access to the north of the airport (Rayong side) to connect with Motorway No. 7 and high-speed rail linking 3 airports that are related and connects the mass transit system for the service of Suvarnabhumi Airport, Don Mueang Airport, and U-tapao International Airport .
How is the Project connected the mass transit?	●	●			
How are the traffic network, mass transit to access / exit the airport, and the surrounding road networks? The Project should work thoroughly with transportation agencies.	●	●	●		
There should be special access for transporting construction material and equipment to minimize the impact on traffic of the existing access roads.	●	●	●		
What is Air Navigation Safety Zone? How is it enforced?	●	●	●		An air navigation safety zone is the area around the airport announced by the Ministry of Transport where constructions, buildings, and tall plants are controlled to not be an obstacle for air navigation at the airport. Constructions, buildings, and tall trees are prohibited from erecting in this area, except having written permission from relevant authorities (CAAT). The Project will contact the Provincial Public Works and Town Planning Office and relevant agencies to submit the NEF contour to integrate with the comprehensive town plan to control land use and constructions around U-tapao International Airport to be suitable and compliant with activities in U-tapao International Airport, the air navigation safety zone, and the area affected by the airport development. Local people were informed upon the Public Consultation Meeting 2.
The public should be informed and educated about Air Navigation Safety Zone.		●			
The Project should inform public works and town planning agencies about the activities in the Project area, the surrounding areas, NEF contour, and air navigation safety zone to integrate the data to make the comprehensive town plan.		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
The airport name should be up-to-date and the name should be used consistently in every document.	●	●			The Project uses the name "**U-tapao International Airport**" consistently in every document.
The Project should prepare facilities, electricity, water, wastewater and waste treatment systems for the new development.	●	●	●		The Project has prepared utilities for the development. - Electricity for consumption in U-tapao International Airport and the Eastern Airport City will be supplied from B. Grimm Public Company Limited. - Water for consumption in U-tapao International Airport and the Eastern Airport City will be produced by Eastwater with a total capacity of 20,000 million m^3/day. - Suitable containers will be provided to contain waste of different types and sources. 1) General waste - Food leftover will be disposed of according to the sanitary principles by a supplier with a license issued by a government agency or as required by law. - Recyclable waste: A private company will buy and collect recyclable waste from the waste transfer station. - Waste remaining from sorting will be stored in the sorting facility and wait for sanitary disposal outside of the airport on a daily basis. 2) Hazardous waste Hazardous waste will be stored separately in the hazardous waste storage building and wait for disposal by a company with a license issued by a government agency. 3) Infectious waste Infectious waste will be stored in a room where the temperature is controlled below 10 ℃ and wait for disposal outside U-tapao International Airport.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					Infectious waste will be incinerated in a furnace for infectious waste by a company with a license issued by a relevant government agency.
How was the study area scoped? Was it scoped based on an international standard?	●	●			The Project determined the scope of the study to cover the furthest area based on the noise forecast scenario and the experience from EHIA of Don Mueang Airport and Suvarnabhumi Airport.
In the construction, will TG MRO be knocked down? What are the measures to compensate employees and other affected people?		●	●		The existing TG MRO is located in the area where the second runway will be constructed. It is necessary to move the MRO to a new location in the Eastern Airport City (6,500 rai).
Will the Project be reviewed by NEB?		●			This Project must be reviewed by the National Environmental Board (NEB) because it is a state-owned project.
What agency will be the owner or responsible for operating this Project?		●			RTN and EEC are the Project Owners. The Project operator may be RTN or EEC, or any other agency that may continue the operations.
When will the construction start?	●	●			The flight volume forecast is estimated for the growth from the baseline to accommodate the aviation activities beyond the capacity of Suvarnabhumi Airport and Don Mueang Airport. Therefore, many airlines will use U-tapao International Airport. The flight volume forecast was divided into 3 phases: • Phase 1 (In the forecast until 2028, the Project must be developed during 2021-2023) 78,000 flights/year, accommodating 14 million passengers. • Phase 2 (In the forecast until 2038, the Project must be developed during 2030-2033) 189,000 flights/year, accommodating 38 million passengers. • Phase 3 (In the forecast until 2048, the Project must be developed during 2583-2576) 305,000 flights/year, accommodating 70 million passengers. The construction of the second runway is in Phase 1, which must be developed during 2021-2023, and when the EHIA is approved by ONEP and NEB.
How many flights will there be in the future at U-tapao International Airport? What aircraft models will be used, and what routes will be serviced?		●	●		
How many phases were estimated for the number of flights in the master plan? What is the current phase of the development?		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Why is the distance between the first and the second runways 1,140 meters. Is this distance based on any standard?		●			The Project has considered that the distance of 1,140 between the two runways is the most suitable to avoid the limitations of Khao Krok Tabaek, which may be an obstacle for aviation activities and the lowered elevation of Motorway No. 7. This distance has also been reviewed by the EEC's meeting resolution dated 4 October 2018 to set the distance of 1,140 between the two runways in the development plan for U-tapao International Airport.
Does the Project set the restricted area for fishing? If so, what is the distance? The squid fishing using light may disturb the take-off/landing.		●			The Project has not set any other restricted area than previously determined.
I would like to suggest the Zero Waste principle for the environmental impact study regarding waste, garbage, and wastewater management.	●		●		The Project plans to install a waste sorting system that will separate recyclable waste from other waste that will go to landfill sites. The Project also considered reusing post-treatment water as much as possible, such as watering the plant. This way, water resources will be used most efficiently, and the water volume to be released to the environment or natural waters will be minimized.
Suggestions					
There should be additional airport entrance signs. The agency operating the airport should seek permission from the Department of Highways.		●			The Project will later contact relevant agencies.
Rayong Rural Road District has a road network planning around U-tapao International Airport. It is important to get expert advice in order to get the right design.		●			
Lessons from Suvarnabhumi Airport should also be taken into account in the study.	●		●		The Project Owners acknowledge the opinion and suggestion

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
This is a good project. I agree with the development of the project because our country should be developed.		●	●		
It is expected to have a positive impact on tourism. Tourists may see that some flights are more convenient when taking off and landing at U-tapao International Airport because the airport is small and not busy, unlike Suvarnabhumi Airport.		●			
The Green Airport principle should be applied. There should be more green areas. The landscape should be designed to use renewable energy. The principle is great for aesthetics/ relaxation/ rest/ impression.		●			
The architecture should be unique and represent the eastern region.		●			
2. Environmental impact					
What are the issues covered in the EHIA? Does it cover the activities in the construction phase and operation phase?	●	●			The EHIA covered 4 environmental aspects: physical resources, biological resources, value for human use, and value for quality of life. The environmental issues assessed are as follows: 1) Physical resources included noise, vibration, air quality, topography, geology, and seismology, soil resources, surface water hydrology, quality of surface water, quality of ground water, and quality of seawater. 2) Biological resources included land ecosystem and aquatic ecosystem 3) Value for human use included waste and wastewater management, land use, transportation, public utilities and infrastructure (water, electricity, and communication), and water drainage and flood prevention

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					4) Value for quality of life included socioeconomic status, relocation and compensation for properties, personal health and public health, occupational health and safety, tourist attractions and scenery, and archaeological and historic sites The EHIA covers all activities in the construction phase and operation phase, considering the overall development picture of U-tapao International Airport in the future, including maximum passenger volume, maximum flight volume, and the demand for facilities.
The locations and frequency of the monitoring stations should be suitable and cover sensitive receptors that may be affected.		●	●		The Project determined the locations and frequency of monitoring stations appropriately. The stations will cover sensitive receptors that may be affected. The locations of the monitoring stations have been determined and received comments in the Public Consultation Meeting 1. The stations have been increased according to the suggestions.
The measures presented are complete and inclusive. I am more worried that the measures will not be followed. How will the contractor be controlled to follow the measures? If the contractor fails to follow the measures, how will the Project respond?		●	●		The measures determined in the report are considered as laws that require the contractor to strictly follow. If the contractor fails to follow, violates or avoids taking the measures, there will be punishments by law. If the citizens witness any problems from the construction and operation of the Project, they may report to the Project Owners to examine and take appropriate actions.
The Project should set up a tripartite committee to monitor the impact from the Project.	●	●	●		RTN and EEC are required to recruit a third party to monitor the compliance with the environmental impact mitigation and monitoring measures determined in the EHIA Report located in U-tapao International Airport, Ban Chang Subdistrict, Ban Chang District, Rayong Province. The cost for hiring such a third party is the burden of RTN and EEC, under the supervision of RTN and EEC. The Project shall set up a committee to monitor the compliance with environmental measures. The committee shall include representatives from RTN, EEC, Attorney General's Office,
The public sector should be allowed to monitor how the contractor follows the measures.	●	●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					ONEP, Office of Transport and Traffic Policy and Planning, Pollution Control Department, Office of the National Economic and Social Development Board, Royal Irrigation Department, Department of Public Works and Town & Country Planning, Rayong Provincial Office, Office of the Consumer Protection Board, Local Administrative Organization, NGOs and experts. The duty of the committee is to ensure that environmental measures are followed throughout the Project implementations.
When the Project is approved, how will the Project ensure that the measures are followed?		●	●		The Project has a plan for that and has assigned representatives from agencies or communities to monitor the compliance with the measures.
Does the Project conduct a marine survey? If yes, I would like to suggest adding a marine impact assessment since there are concerns over the impact on the sea as a lot of people are working in the fishing industry.		●			The Project monitors the quality of seawater and conducts a survey of marine ecosystems, phytoplankton, zooplankton, and benthic animals. There are 6 monitoring stations covering the areas potentially affected by the Project. The results will be taken into account for assessing the impact on the marine ecosystem.
The survey of impact on transportation should start from the sources of construction material which are located outside the Project study area.	●	●	●		The Project receives construction materials from Phetchaburi and Ratchaburi at Chuk Samet Pier (Highway No. 3126). If that is not sufficient, the Project will consider receiving construction materials from Pluak Daeng District near Khao Chi Chan (Highway No. 312). The assessment starts from the transportation of material from the sources until they arrive at the Project area.
The results of noise and vibration monitoring should be presented to the public.		●			Noise and vibration were monitored (24 hours and 7 consecutive days). The first round of monitoring was in the rainy season from 18-24 July 2019 at 6 stations: Phatthanawetsueksa School, Staff Operation Building, Airside area of the Project, Wat Khiriphawanaram School, Wat Phala, and Ban Khlong Bang Phai School. The second monitoring was in the dry season from 3-9 November 2019 at 7 stations (Wat Sa Kaew School was added as a sensitive receptor that may be affected).

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					The results at all stations passed the standards. The monitoring results are included in the EHIA Report and presented to the Public upon the Public Consultation Meetings.
The Project should take cautions during the construction and operation phases to minimize the impact.		●		-	- In the pre-construction phase, construction phase, and operation phase, the Project has determined the measures to minimize the impact. - The Project will communicate the updates of the Project implementations, construction plans and activities, transportation routes of construction materials, and the complaint channels for local people and road users are aware of the information once in a while. If the Project receives a complaint from the construction, the complaint will be reviewed, and the solutions will be determined promptly.
3. Noise and vibration					
What is NEF? What tool is used for measuring? Can it be converted to decibel for easier understanding of the public?		●		●	- NEF (Noise Exposure Forecast) is the forecast of noise from aircraft. It is usually shown as a noise contour. - NEF can be converted into decibel as Day-Night Average Sound Level (Ldn). Although NEF has no direct relationship with Ldn, the relationship between Ldn and NEF can be estimated in the following equation. $\text{Ldn} \cong \text{NEF} + 35$ (**Source :** US EPA, 24CFR Subtitle A Part 51 Environmental Criteria and Standards)
What tool is used to calculate NEF? What are the input data?		●	●	●	NEF (Noise Exposure Forecast) is a standard method for noise assessment regarding noise disturbance on humans in the area affected by aircraft. The Consultant used the AEDT mathematical model in the noise contour forecasts (2028, 2038, and 2048). The input data included: - Forecast of flight volume and aircraft models
In the calculation of NEF, did the Project calculate abnormal take-off/landing, turning, or circulating flights?		●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
I have been affected by noise from aircraft circulating in the air because it could not land.		●	●		- Hypotheses of the study - Draft flight routes - Flight volume and aircraft models expected to increase in the operation year - Flight capacity of the runway - Flight management in the future - Physical data of U-tapao International Airport - Meteorological data of U-tapao International Airport
The noise contour seems to emphasize the first runway. Was the second runway included in the forecast?		●	●		
Were state-affair flights included in NEF calculation?		●		●	The forecast only involved the data of commercial flights. State-affair flights were not included in the forecast. The aircraft models already covered the future flight situation. Also, it is impossible to forecast the impact of military flights as they are for national security. However, the Consultant used "the maximum runway capacity". Therefore, even with military flights, the forecast still covers the flight volume in this study.
What are the sources of input data? Why is the current flight situation not used? Flight demonstration should be done to obtain accurate data.				●	The Project considers the impact based on noise contour as of the 2048 forecast year using the Aviation Environmental Tool (AEDT). NEF is the calculation of four input data: noise intensity that we know as decibel unit, duration of the noise, flight frequency, and time that aircraft pass (day/night). When calculating the noise intensity at 90 decibels, the NEF value did not reach the contour. U-tapao Project used the input data for the model, including the data of flight volume and aircraft model as per the Final Report of the Master plan of the Feasibility Study Project for U-tapao Airport and the surrounding area in Rayong Province (December 2018). The passenger volume and flight volume at U-tapao International Airport were forecast upon the ultimate development in 2028, 2038,

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					and 2048. The actual flight situation used in the assessment consists of two sets of data. 1) The actual flight situation of U-tapao International Airport in 2019 (operating one runway) 2) The actual flight situation of Suvarnabhumi Airport in 2018 (operating 2 runways) The actual flight situation of Suvarnabhumi Airport in 2018 to represent the scenario of operating 2 runways is used because of the following factors. - The flight volume/day that U-tapao International Airport needs upon the development is forecast at 889 flights/day. Currently, the airports that have two runways and the average daily flights close to 800 flights/day are Suvarnabhumi Airport (1,032 flights/day) and Don Mueang Airport (842 flights/day). - The pattern of origin-destination of Suvarnabhumi Airport involves both domestic and international flights. Long haul intercontinental routes, such as Russia, are of similar patterns as in U-tapao International Airport in the future (ultimate development in 2028, 2038, and 2048). The details are shown in **Appendix 4.-4:** Forecast of flight volume and aircraft models
Does the Project hold a certificate for using the American forecast model?				●	The Consultant has a valid license for using the AEDT model for calculating noise contour.
Did the Project use the research data of aircraft noise pollution management by the Department of Environmental Quality Promotion in this study?		●			The project used the research data of aircraft noise pollution management by the Department of Environmental Quality Promotion in this study.
What is the size of the area in the noise contour? What are administrative areas covered?		●	●		The areas affected by noise are: - NEF ≥ 40 area is in Samnak Thon Subdistrict, Ban Chang District, Rayong Province • Moo 3 Ban Sa Kaeo (Samnak Thon Subdistrict)

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					- NEF 30-40 areas are in Phala Subdistrict, Samnak Thon Subdistrict, Phlu Ta Luang Subdistrict, and Huai Yai Subdistrict • Moo 1 Ban Samnak Thon (Samnak Thon Subdistrict) • Moo 2 Ban Chak Mak (Samnak Thon Subdistrict) • Moo 3 Ban Sa Kaeo (Samnak Thon Subdistrict) • Moo 4 Ban Khlong Phai (Samnak Thon Subdistrict) • Moo 6 Ban Khao Khrok (Samnak Thon Subdistrict) • Moo 7 Ban Nong Takhian (Samnak Thon Subdistrict) • Moo 8 Ban Choeng Khao (Samnak Thon Subdistrict) • Moo 5 Ban Khao Bai Si (Phlu Ta Luang Subdistrict) • Moo 11 Ban Map Fak Thong (Huai Yai Subdistrict) **Remark :** NEF contour as of July 2021
What are the policies for sensitive receptors (schools, hospitals, and religious places) affected by aircraft noise and vibration?		●	●		The remedy policies are as follows: **1 Compensation condition** • The compensation for people affected by noise from the construction of the second runway and taxiway of U-tapao International Airport is based on the noise contour for the year 2048. The buildings to be compensated must be constructed before the date the EHIA Report is approved by NEB. EEC must publish the construction details of the Project to the public in advance. • The Project surveys and creates a database and compensation plan for those affected by noise caused by the Project development. The survey team shall complete the survey and determine the compensation value before operating the second runway.
What are the remedy measures for people affected by noise?		●	●	●	
What is the construction year for a building to get the compensation?				●	

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					2 Compensation criteria *NEF ≥ 40* • EEC shall negotiate to buy land and properties constructed before the date the EHIAg0 Report is approved by NEB. If the landowner does not wish to sell, EEC must support the renovation cost to reduce noise impact. The landowner receiving the compensation money is responsible for all the renovation activities. *NEF 30-40* • EEC must support the renovation cost to reduce noise impact. The landowner receiving the compensation money is responsible for all the renovation activities. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB. • EEC must support the renovation cost for places that need quiet in particular, such as schools, hospitals, and religious places. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB. The basic procedures and methods for renovating buildings • The owner of the building participates in the review and inspection starting from appraisal, the engineering report, and details of renovation costs. • When the owner has reviewed the details, the response form for renovation cost must be signed as consent. • Upon receiving the compensation, the owner shall renovate the building according to the survey details. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
If a house is not located in the noise contour, but affected by noise, and in the future it is more affected, what is the Project's remedy policy?	●	●	●	●	The Project has determined the measures for noise complaints as below. - The Environmental Impact Mitigation Coordination Center of U-tapao International Airport is mainly responsible for complaint management. The Center will assess, analyze, investigate, and explain the complaint to the public about noise and/or other problems caused by the airport operation. There will be an electronic database that will locate and link the coordinates around U-tapao International Airport. The data must at least consist of the following details. - Name of the person or agency filing the complaint - House number - Building - The number of residents - Statistics of complaint - Estimated NEF area - Monitored NEF area (if any) - Land use - Other relevant information - Complaints can be reported all day all night. If there is a complaint about noise impact from the operation of U-tapao International Airport, RTN and EEC/the Project operator will consider monitoring noise again the NEF or Ldn unit to assess the impact for the individual case. If the reported impact is accurate, RTN and EEC/the Project operator will compensate according to the policy that RTN and EEC/the Project operator have earlier determined. The study results presented herein are only the forecast noise contour. When the EHIA report is approved by NEB, the Project will conduct a survey, create a

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					database, and make a compensation plan for those affected by noise before operating the second runway. When the Project starts the operation, it will be able to monitor noise from the permanent noise monitoring stations, which must be installed before the Project operation.
In the construction phase, the Project should monitor noise during the construction because it is noisy in the airport.		●	●		The impact mitigation measures for the construction phase are as follows: - Reduce noise and vibration from construction by using the machines and equipment that are in good condition and using the construction techniques that create the least noise and vibration. Also, install the noise-proofing equipment at the noisy machines or equipment. - Regularly check and maintain the construction machines or equipment to ensure that they are always in good condition and do not create too much noise. - Build a wall with 2 m. high when the construction area is close to the sensitive receptors using a metal sheet with a thickness of 0.6 mm (transmission loss = 18 dB(A)). The wall is installed 10-15 m. away from the noise source to reduce noise from machines and construction activities. - Noisy construction activities will be done only during the day (06.00 – 18.00). If noisy activities need to be done at night, the contractor must notify relevant agencies and those who might be affected in advance. - Provide PPE such as earplugs or earmuffs for construction workers. - Limit working hours of workers in a noisy area, e.g. 8 hours in areas with noise levels more than 90 dB(A) - Provide an area that is free of noise from aircraft so that workers can rest during the break.
What is the policy to mitigate noise and vibration?		●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					- Provide information on the project operation plan and construction activities, as well as the complaint channels for local residents and nearby road users through different communication channels from time to time, such as the PR web board of U-tapao International Airport and online channel. - Assess the activities that increase noise level from background sound (the sound level at percentile 90: L_{90}) to avoid complaints about noise disturbance. - RTN and EEC / the agency responsible for the construction shall coordinate or notify the contractor to avoid noisy activities and keep noise low during the construction. - The Project shall create the complaint channels for noise impact from the construction of the Project at the CSC/EEC site office or U-tapao International Airport to receive the problems and impact and accelerate the solutions. The Project has determined the monitoring measures for the construction phase as below. - RTN and EEC / the agency responsible for the construction shall monitor noise for 24 hours for 7 consecutive days at 2 points • RTN Early Childhood Nursery 6, Naval Aviation Division • Eastern – Nong Muang Community The monitoring is conducted once a month during the construction of the second runway and taxiway.
I would like to know the current locations of the monitoring stations and their results.		●	●		- The noise monitoring (24/7) was conducted two times.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
The Project should install automatic monitoring devices for air quality and noise and present the results to the public.		●	●		- The first round of monitoring was in the rainy season from 18-24 July 2019 at 6 stations: Phatthanawetsueksa School, Staff Operation Building, Airside area of the Project, Wat Khiriphawanaram School, Wat Phala, Ban Khlong Bang Phai School. - The second monitoring was in the dry season from 3-9 November 2019 at 7 stations (Wat Sa Kaew School was added as a sensitive receptor that may be affected). The results at all stations passed the standards.
The monitoring measures for aircraft noise				●	In the operation phase, there will be monitoring stations for general sound and aircraft noise in the community. They consist of 7 permanent noise monitoring stations and 4 noise intensity monitoring stations. Noise intensity will be monitored before the operation of the second runway. The results will be presented to the public. The 7 locations for the permanent noise monitoring stations are listed below. 1. North of Runway 18R/36L 2. South of Runway 18L/36R 3. Southwest of the first runway 4. Southeast of the second runway 5. Moo 13 Ban Nong Phak Kut, Huai Yai Subdistrict Municipality 6. Wat Somburanaram School (Tem Rat Anuson) 7. Moo 2 Ban Chak Mak, Samnak Thon Subdistrict Municipality These monitoring stations must be installed before operating the second runway to prevent noise impact. The locations for installing are under review in the procedures for surveying the location of this EHIA report.
What is noisier between take-off and landing?		●			- Take-off is noisier but shorter. - Landing is less noisy, but the noise is prolonged and continuous.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
What noise contour passes the sea? Will it affect marine lives?		●			- Noise is a kind of wave. When passing the water as the medium, the energy lessens. • Noise from aircraft has less impact than that from ships. • Noise from ships affects marine life. There is an international guideline by IMO* to control the noise level. Source: https://wildwhales.org/threats/noise-and-cetaceans/ * International Maritime Organization (2014). Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life, MEPC.1/Circ.833. London, U.K: IMO Publishing. 8pp
What is the noise level that does not affect human health as stipulated by law?		●			WHO determines that the noise level that is dangerous for health is more than 85 dB(A) at all frequencies.
Is the noise contour presented final?		●	●		It is the draft noise contour based on the basic forecast. After discussion with relevant agencies, the data might change.
Why does the Project not set the take-off/landing from the sea to minimize the impact?				●	The direction of runways depends on seasonal wind according to the meteorological data. For U-tapao International Airport, the pattern for using the runways shall be compliant with the abovesaid wind directions in two flight seasons. - Summer (Feb – Sep): Aircraft will land on the head side of the runway from the land (18R/18L) and take off at the head side of the runway from the sea (36L/36R). - Winter (Oct – Jan): Aircraft will land on the head side of the runway from the sea (36L/36R) and take off at the head side of the runway from the land (18R/18L).

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Suggestions					
There should be a noise lab to simulate the actual noise for aircraft at the NEF30 and NEF 40 areas and allow the affected people to test for themselves whether they can take the noise impact or not.		●			The Project Owners acknowledge the suggestion.
Ban Chang Sub-district Municipality would like to ask the Project to provide information about noise contour in order that the Municipality can plan the local development because it is part of the EEC, a Smart City, and Airport City.		●			The Project Owners acknowledge the information.
4. Air quality					
What is the fuel type that aircraft use? In the future, when there are more flights, will there be a negative impact on local people, such as odor and oil mist from aircraft?		●			- Aircraft use the fuel for Jet A-1, which has a mixture of benzene/ kerosene/ diesel, depending on the model. The pollution control measures are as follows: - RTN and EEC / the Project operator contact with CAAT, airlines, and ground functions to control ground traffic in the airside area effectively to reduce the time for aircraft to wait for the runway and minimize pollution released to the environment. - Promote energy that is friendly to the environment, such as an electric vehicle. - Promote the Ground Support Equipment (GSEs) to use low pollution energy. For example, use electricity in the airside area and use natural gas or electricity outside the landside area.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					- RTN and EEC / the Project operator improve the Ground Power Unit and Pre-conditioned Air to cover the apron and require airlinese to use this system instead of the Auxiliary Power Unit (APU) of the aircraft.
There should be measures to reduce the impact of dust on the community both in the construction phase and operation phase.	●	●	●		The air quality measures are as follows: - The construction areas where vehicles and construction activities may cause dust dispersion, including the roads inside the airport that have not been paved with asphalt or concrete, must be sprayed with water at least 2 times a day or as appropriate to mitigate the impact of dust dispersion. - The trucks transporting the construction materials and equipment that might cause dust dispersion must be tightly covered with canvas or similar materials. - A 2-m high wall will be built around the construction area to identify the construction area and to minimize dispersion of dust and exhaust from construction equipment and spillage of construction materials to outside. - Wash the tires of all vehicles leaving the construction area free of dirt, mud, and sand before allowing them to use public roads. The washing area shall be properly provided. - Ensure that vehicles do not cause more pollution than the standard. Properly maintain the engine of vehicles and construction machines in good condition. If their emission exceeds the standard, they have to be fixed before they can be used again. - Limit the speed of vehicles transporting the construction materials and equipment according to law. Trucks loading more than 1,200 kg. cannot drive faster than 60 km/hr. Trailer trucks cannot drive faster than 45 km/hr. The speed limit in the construction area is 30 km/hr.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Does the current air quality assessment run the mathematical model? What are the limits for PM2.5 and total VOCs?		●		●	The air quality assessment used the AEDT mathematical model to forecast air emission rates from engines and ground support equipment and to estimate the dispersion of air pollutants. The assessment considered both acute and chronic effects, assessing exposure that may cause both non-cancer health effects and likelihood of cancer or cancer risk. The indicators chosen were carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM10, PM2.5, and volatile organic compounds (VOCs). The Acute Effects Assessment was hypothesized in the case of a maximum flight forecast of 1,364 flights per day by comparing the 24-hour average of pollutants with benchmark or surveillance values of Thailand. For the Chronic Impact Assessment, the 2048 maximum flight forecast (2 runways) was assumed by the 1-year mean and compared to the expected non-productive exposure. Impact on health (RfC: Reference Concentration) and predict the risk of cancer risk results from the Acute Effects Assessment. It was found that benzene and 1,3 butadiene concentrations averaged 24 hours in the community area around the airport did not exceed the surveillance values of Thailand, while the 24-hour average acrolein is higher than the surveillance values of Thailand. The project must have measures to manage to prevent and correct the impact. When chronic effects were considered, the concentrations of acetaldehyde, benzene, 1,3 butadiene, cumin, ethylbenzene, naphthalene, styrene, toluene, xylene, average 1 year, not more than the allowable exposure or HQ>1. Risk areas in the airport area and the surrounding areas in the north and

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					east, including Huai Yai Subdistrict, Bang Lamung District and Plu Ta Luang Subdistrict, Sattahip District, Chonburi Province and Phala sub-district area, Samnak Thon Subdistrict, Ban Chang Subdistrict, Ban Chang District, Rayong Province. In addition, the project assessed the likelihood of cancer (Cancer Risk) from inhalation exposure to type 1 carcinogens, namely benzene 1,3 butadiene and formaldehyde. It can be seen that when people in the respiratory risk area are exposed to the expected concentrations of benzene, 2-4 out of 10 million people exposed are likely to develop cancer. In an area with a population of less than 10 million people, the chances of developing cancer are also lower. As well as exposure to 1,3 butadiene, there is a chance of cancer in 3 people from 1 million people exposed and formaldehyde with a chance of cancer 7 people out of 1 million people exposed. An important measure to minimize the likelihood of impacts is cooperation between organizations to consider management strategies to reduce air pollution impacts and to manage ground traffic effectively to reduce pollution. And in the field of health, cooperation with public health agencies has been established to monitor the health of at-risk groups. However, the environmental impact monitoring results must be analyzed together with health status to determine the potential impact on risk groups after the operation and provide appropriate solutions.
The Project should consider the indicators and frequency for air quality monitoring appropriately.		●	●		The Project determines the air quality indicators and their monitoring frequency in the construction phase as follows: • 24-hr TSP • 24-hr PM10

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					• 24-hr PM2.5 • 1-hr nitrogen dioxide (NO_2) • 1-hr and 8-hr carbon monoxide (CO) • 3-hr methane hydrocarbon (NMHC) • 1-hr total hydrocarbon (THC) • 24-hr VOCs • Wind direction and wind speed (WD/WS) The frequency is once a month during the construction of the second runway and taxiway. The Project determines the air quality indicators and their monitoring frequency in the operation phase as follows: **1) Ambient air quality** • 24-hr TSP • 24-hr PM10 • 24-hr PM2.5 • 1-hr nitrogen dioxide (NO_2) • 1-hr and 8-hr carbon monoxide (CO) • 1-hr total hydrocarbon (THC) • 24-hr VOCs • Wind direction and wind speed (WD/WS) **2) Air Quality Monitoring System** • 24-hr and 1-year PM10 • 24-hr and 1-year PM2.5 • 1-hr and 8-hr carbon monoxide (CO)

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					• 1-hr and 1-year nitrogen dioxide (NO_2) The frequency is twice a year throughout the Project term.
Regarding the impact of carcinogenic substances such as benzene combustion from the engine that falls down, what will happen when the wind direction changes, and what are the mitigation measures?				●	The Project considers the air quality indicators based on the potential impact caused by aircraft as follows: 1) 24-hr TSP 2) 24-hr PM10 3) 24-hr PM2.5 4) 1-hr nitrogen dioxide (NO_2) 5) 1-hr and 8-hr carbon monoxide (CO) 6) 3-hr methane hydrocarbon (NMHC) 7) 3-hr total hydrocarbon (THC) 8) VOCs 9) Wind direction and wind speed (WS/WD) The VOCs are compared to Thailand's standard not more than the standard of VOCs: 1-year benzene and 1,3 butadiene. The health risk is assessed for exposure via breathing (non-cancer risk). - Not exceeding the reference concentration (RfC) or HQ<1: 1-year average of acetaldehyde, benzene, 1,3 butadiene, cumene, ethylbenzene, naphthalene, styrene, xylene - Exceeding the reference concentration (RfC) or HQ>1: 1-year average of acrolein in the risky area exceeded the RfC more than 0.02 mg/m^3 at • U-tapao International Airport • The surrounding areas on the north and the east - Huai Yai Subdistrict of Bang Lamung District and Phlu Ta Luang Subdistrict of Sattahip District, Chon Buri Province

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					- Phala Subdistrict, Samnak Thon Subdistrict, Ban Chang Subdistrict, Ban Chang District, Rayong Province
What agency is responsible for monitoring the air quality of the Project?		●			In the EHIA process of the Project, the environmental consultant (United Analyst and Engineering Consultant Co., Ltd.) is responsible for air quality monitoring. In the construction phase and operation phase, the monitoring will be conducted by EEC and/or the Project operator might hire a third party to monitor the air quality.
Suggestions					
The Project should grow plants as the buffer zone.		●			Having plants as the buffer zone must be based on the safety of air transport.
5. Quality of surface water, seawater, and aquatic ecosystem					
Has the Project designed the rainfall drainage system? How will rainfall be managed before releasing it to the environment?		●	●		The Project determined the measure for the marine ecosystem as follows: The rainfall drainage system will be installed at the second runway and taxiway. The water drainage system is divided into 2 parts. First, the secondary canal will drain the surface water from the second runway and the taxiway into the open rail system capable of handling approximately 50.25 cubic meters per second, and the water will be drained into the main drainage system. Second, the main drainage system can handle up to 242.70 cubic meters per second of water. The water will be released to settle in the holding pond. The project has designed a holding pond to hold water for 1 hour before releasing it into the sea. The duration of the holding pond helps precipitation which does not affect marine lives.
Particles of aircraft wheel might affect marine lives. What are the preventive measures?	●	●	●		
How are the quality of seawater and marine ecosystem monitored, and what is the result?		●		-	- To measure the seawater quality and seawater ecology of the Project, there are 6 sampling stations (based on mixing zone) in the rainy season and dry season. Three stations are located 300 m away from the coast and three other stations at 500 m. - The results are compared to the standard of seawater quality Types 3, 4, and 5 as per the Notification of NEB re: the seawater quality standard B.E. 2560. It was

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					found that the seawater in the Project study area is within the standard (type 3) at every station. The seawater can be used for aquaculture according to the fisheries law.
Regarding monitoring the quality of surface water, did the monitoring stations have the effluent sources from factories?		●		-	- The Project will sample the surface water at 4 stations, namely Sampling point 1: Khlong Bang Phai upstream of the discharge point Sampling point 2: Khlong Bang Phai downstream of the discharge point Sampling point 3: Khlong Bang Phai at the canal mouth to the sea Sampling point 4: Khlong Phala - Frequency: 2 times 1) Rainy season (18 July 2019) 2) Dry seaon (31 October 2019) The sampling points did not have the effluent sources from factories
Does U-tapao International Airport currently release effluent to Khlong Bang Phai? It is the main canal in military area and nearby communities.	●	●			The measures for surface water quality are determined as follows: • The Project will prepare the central wastewater system with a minimum capacity of 8,000 m^3/day to manage wastewater when the passenger volume increases to 70 million people adequately. • The Project will operate the central wastewater system and maintain its proper efficiency regularly. • The Project will monitor to ensure that the treated effluent passes the standard of effluent from Type A building according to the Notification of the Ministry of Industry re: determining the standard for effluent from some type and some size of building B.E. 2548 or the latest notification before discharging to canals in U-tapao International Airport. • The Project will reuse treated effluent as much as possible, such as watering the plants in the green area of the airport and reusing them in
The monitoring results of water quality at Khlong Bang Phai were poor. What are the policies?	●	●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					toilets to achieve zero discharge from U-tapao International Airport.
There could be heavy metals such as arsenic and manganese in the seawater in the Project area due to mineral veins in the soil layers.		●		-	- According to the analysis to detect arsenic (As) and manganese (Mn) in the seawater 1) Rainy season • Arsenic = 8.06 µg/l • Manganese = 0.150-1.11 µg/l 2) Dry season • Arsenic = 0.556-0.985 µg/l • Manganese = 0.310-0.760 µg/l The results of arsenic and manganese concentrations in the seawater during the rainy season and dry season did not exceed the standard (arsenic ≤ 10 µg/l and manganese ≤ 100 µg/l) **Source :** Standard of seawater quality by the Pollution Control Department
6. Waste management					
What is the management method for waste, wastewater, and sanitary waste from worker campsite outside the airport?	●	●	●		The project determines waste management measures as follows: Measures outside U-Tapao International Airport (Construction worker campsite) 1) Sorting and collecting solid waste • Requires construction worker accommodation area to be classified as general solid waste and toxic or municipal solid waste such as toxic, flammable, corrosive, reactive, or other substances that may cause or are likely to cause harm to persons, animals, plants, property, or the environment • Contractors must prepare areas and containers for all types of solid waste in the construction worker accommodation area by separating the containers

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					from mixing such as dry solid waste, wet solid waste, recyclable solid waste, and toxic or hazardous waste from the community. • There must be a label indicating the type of solid waste on the container or in a prominent area. • Containers for each type of solid waste must be of sufficient quantity to accommodate the amount of solid waste generated over a specified period of time collected in various locations in the construction worker accommodation area. • The container must have a capacity of not less than 3 times the amount of solid waste generated each day. It must be made of permanent and fireproof materials. Internal surfaces must be smooth and waterproof, in good condition, not cracked, have a cover that can prevent rainwater, flies, rats, cats, dogs, and other animals that are disease carriers from touching or digging on solid waste. • The container area must be ventilated, prevent odor and rain. It also prevents flies, rats, cats, dogs, and other animals that are disease carriers from touching or digging in solid waste. • The size of the container is suitable for the location and is convenient for cleaning. • Solid waste collection accommodation must have a distance of not less than 4 meters from the place of cooking and food storage, but if the solid waste collection accommodation has a capacity of more than 3 cubic meters, it must have a distance of not less than 10 meters and can easily move solid waste. 2) Solid waste collection and disposal. • Dispose of solid waste daily to avoid breeding grounds for insects and other

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					carries. • Do not dispose of solid waste by burning it outdoors in the construction worker accommodation area. • Requires contractors not to transfer, dump, dispose of general solid waste and toxic or dangerous solid waste in a public place or way, which must be transferred, dumped, or disposed of at the place or in accordance with the method specified or provided by the local government only. • Waste containers must be in good condition, not cracked, have lids, can prevent digging or touching of pets or nuisance animals so that they are not breeding grounds for insects and other carrier animals. 3) Hazardous waste management • Follow the same hazardous waste management measures as those within U-Tapao International Airport. • Measures to supervise contractors. • Specify in the contract regarding the management of solid waste and hazardous waste that occurs during the construction of the project. Both inside and outside U-Tapao International Airport, including sending for disposal by the waste collection contractor, must be carried out by agencies that are properly licensed by the relevant government agencies. Then report to the Royal Thai Navy and Eastern Economic Corridor (EEC)/or the project manager or project maintenance. • Record the amount of general solid waste, construction waste, and hazardous waste collected daily and prepare a monthly report for inspection.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					2) Wastewater Management • The construction supervisory office area must provide sanitary rooms sufficient for the number of workers and staff. • The construction supervision office area must provide toilets that are sanitary enough for the number of workers and staff, with at least 3 toilets for the first 80 workers. For every 50 workers, there must be an additional toilet, and a prefabricated wastewater treatment system is installed that can treat at least the amount of wastewater generated each day. Prohibiting sewage from draining into water sources within U-Tapao International Airport by requiring contractors to pump to treat the central wastewater treatment system of U-Tapao International Airport. • The Construction worker accommodation area must provide toilets that are sanitary enough for the number of workers and staff, with at least 1 toilet for the first 20 workers. Install a prefabricated wastewater treatment system can treat wastewater at least equal to the amount of wastewater that occurs each day to treat the wastewater to be qualified according to the building effluent standards according to the announcement of the Ministry of Natural Resources and Environment, B.E. 2548 or according to the latest announcement before being released into the drainage system or public water sources. • Keep construction materials and equipment in order and line the embankment or use materials to block the drainage canals within U-Tapao International Airport near the construction site to reduce sediment or debris flow into the drainage canals. • Limit areas and regions where wastewater can be generated to the minimum number of spots possible.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					• Provide a system to prevent wastewater from construction and to wash construction equipment into the drainage system of U-Tapao International Airport by using protection lines, make gutter or evaporation yard and when the construction is completed, the prefabricated septic tank must be dismantled from the area. • Encourage workers to use water efficiently to produce the least wastewater.
What are the control measures for infectious waste from the worker camp site?		●			The waste management measures are as follows: • To transport general waste, infectious waste, and hazardous waste from U-tapao International Airport, there must be a waste manifest. The vehicle must be covered with canvas to prevent the spill of general waste and hazardous waste during transportation. The vehicle must obey the law. • Procure the infectious waste management supplier who monitors the air quality from the incinerator exhaust and is authorized by a government agency as stipulated by law every year. • Randomly audit the management of general waste, infectious waste, and hazardous waste in U-tapao International Airport by suppliers at least twice a year and the disposal facilities (all 3 types) at least once a year to assess the capacity and efficiency of their service and ensure that they operate according to the academic principle. If it turns out that they violate the employment contract, RTN and EEC or the Project operator may terminate the contract and consider hiring another supplier as deemed appropriate.
What is the management method for wastewater in the airport during the operation phase?	●	●			The wastewater management measures are described below. • The Project will prepare the central wastewater system with a minimum capacity of 8,000 m^3/day to manage wastewater when the passenger volume

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					increases to 70 million people adequately. • The Project will operate the central wastewater system and maintain its proper efficiency regularly. • Record the operation of the central wastewater treatment and its problems daily to prevent negative consequences by using the Thor Sor 1 Form (Statistics and data that present the operation of the wastewater treatment system of the generation source). Make a summary report and monitor the wastewater quality once a month. Present the data in the Thor Sor 2 Form to local authorities on the 15th of the following month as per the Notification of the Ministry Re: determining the criteria, method, and form for recording the statistics and data, and summary report of the wastewater treatment system B.E. 2555 • The Project will make a regular maintenance plan for the central wastewater. • The Project will monitor to ensure that the treated effluent passes the standard of effluent from Type A building pursuant to the Notification of the Ministry of Industry re: determining the standard for effluent from some type and some size of building B.E. 2548 or the latest notification before discharging to canals in U-tapao International Airport. • The Project will reuse treated effluent as much as possible, such as watering the plants in the green area of the airport and reusing in toilets to achieve zero discharge from U-tapao International Airport.
There should be a proper area for waste disposal in the Project area		●	●		The waste (garbage) management measures are described below.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
I am concerned about illegal dumping of garbage and waste in public areas. What are the Project measures?		●			• The measures for recyclable and non-recyclable waste are described below. - Non-recyclable waste such as sediment from the central wastewater treatment system shall be stored in a facility with a roof to make fertilizer. The rest shall be landfilled or disposed of according to the hygiene principle. Asphalt from repairing the runway shall be collected at the storage area specified by RTN and EEC/ or the Project operator. - The waste remaining from the sorting system shall be kept in the leak-proof container before disposal at a facility outside U-tapao International Airport every day (including weekdays and weekends). They shall be properly handled with a sanitary landfill or other suitable methods by a supplier authorized by law or local government. • Decomposable waste such as food leftover from food stores inside U-tapao International Airport shall be kept in a gallon at the source to prevent mixing with general waste. The food stores shall sort the plastic, wooden chopsticks, and contaminants in order to use the food leftover to feed animals. Note that this type of waste shall be collected from U-tapao International Airport every day to prevent accumulation. • Infectious waste from the infirmary unit in U-tapao International Airport, when collected, shall be kept in a chamber with the temperature control below 10 degrees Celsius not more than 30 days. It shall be disposed of U-tapao International Airport by means of incineration for infectious waste or other means specified by law, by a supplier authorized by a government agency. • Solid and liquid waste must be sorted and kept separate from other types of waste. The hazardous waste containers must be able to prevent spills or leaks. It shall be stored not more than 90 days (by law) and be treated, disposed of,
The airport development generates waste. What are the policies for sorting, transporting, and disposing of waste? Currently, local people are suffering from waste management issues.		●			
What agency is responsible for waste management? If the Project needs the local administration to help with waste management, the Project must notify the local administrations and earn consent first.		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					or recycled properly by a supplier authorized to treat, dispose of, or recycle hazardous waste. • Minimize the amount of waste to be disposed of, by making the most out of the waste and reducing the dampness of waste after sorting. • Make a plan and study the technology suitable for waste management inside U-tapao International Airport and the disposal method that suits the amount and properties of the increasing general waste and hazardous waste in the future. • Ensure that the containers for general waste and hazardous waste are in good condition to prevent spills and leaks during transportation • Provide vehicles to collect general waste and hazardous waste to be enough for the amount generated. The vehicles must regularly be maintained in good condition. There shall be vehicles to spare for emergency immediately. • Wastewater and water flushing the waste caused by transportation and sorting of waste shall enter the preliminary wastewater treatment system at the waste transfer station until it passes the standard of wastewater of U-tapao International Airport before entering the central wastewater treatment system. • The waste storage area in the waste storage facility and the machine used for sorting general waste shall be cleaned regularly to prevent the odor problems for nearby communities. • The recyclable waste warehouse shall be cleaned regularly and shall not store recyclable waste for too long to prevent fire, odor, and pest problems. • Regularly maintain the equipment used for sorting waste to be always in good condition. • To transport general waste, infectious waste, and hazardous waste from U-

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					tapao International Airport, there must be a waste manifest. The vehicle must be covered with canvas to prevent the spill of waste during transportation. The vehicle must obey the law. • Procure the waste management supplier in U-tapao International Airport who has the management efficiency and standard to find the space for waste disposal sufficiently throughout the operation phase. The supplier shall be authorized by a government agency. • Procure the infectious waste management supplier who monitors the air quality from the incinerator exhaust and is authorized by a government agency as stipulated by law every year. • Randomly audit the management of general waste, infectious waste, and hazardous waste in U-tapao International Airport by suppliers at least twice a year and the disposal facilities (all 3 types) at least once a year to assess the capacity and efficiency of their service and ensure that they operate according to the academic principle. If it turns out that they violate the employment contract, RTN and EEC or the Project operator may terminate the contract and consider hiring another supplier as deemed appropriate.
Suggestions					
The Project should establish awareness of waste management for local people and the increasing number of tourists.		●	●		The Project Owners acknowledge the suggestion.
7. Transportation					
The Project vehicles should be clearly attached with the Project contact number and reporting channels on the side of the vehicles because there might be		●			• Trucks and other vehicles shall have a sign and the project name to identify as the transport vehicle for the Project's construction material. There shall be

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
other construction projects that occur at the same time in the area.					a phone number, serial number of vehicles, and name of the company at the visible position so that the public can check and report a problem. Install GPS for tracking the vehicles transporting construction materials.
GPS should be installed to strictly control vehicle speed by law to prevent accident.		●			
In the construction phase, the transportation routes should be notified to the public so that they can avoid the routes.		●	●		
The contractor should be responsible for the damage from its operations, such as road damage and accident.	●	●			• If transportation activities of the Project cause road damage, the contractor under the supervision of RTN and EEC or the agency responsible for the construction shall coordinate with the agency in charge to repair the road immediately. • The contractor shall limit the speed of vehicles transporting the construction materials and equipment according to law. Trucks loading more than 1,200 kg. cannot drive faster than 60 km/hr. Trailer trucks cannot drive faster than 45 km/hr. The speed limit in the construction area is 30 km/hr.
When roads are damaged by transportation activities of the Project, the roads should be restored to their original condition.	●	●	●		
There should be a measure to control the weight for transporting construction material from the source, such as stone mills, because overweight trucks might damage the roads.		●			
What are the sources of the construction materials? What routes will be used to transport them? The vehicles should avoid passing communities, temples, schools, and congested roads.		●			• The contractor shall make a plan for transporting materials, equipment, workers, and construction staff and propose to RTN and EEC or the agency responsible for the construction before starting the transportation activities. The plan shall be the condition attached to the employment contract. • The contractor records the transportation of materials, equipment, and workers, including the start and destination, record the accident statistics in U-
There is a problem of traffic congestion because several projects are implemented concurrently in nearby area.		●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
The transportation activities should avoid rush hours in the morning (06.00-09.00 hrs.) and evening (16.00 – 19.00 hrs.) and public holidays because this area is already congested.		●	●		tapao international Airport to prevent and monitor the incidents. • Install signs, warnings, and warning lights (blinking lights) to clearly identify the construction area according to the Land Traffic Act B.E. 2522 or the latest notification at the spots that might be dangerous or cause traffic jam such as entrance/exit of the construction area and the construction site. The signs must be easily visible both day and night. • Avoid transportation of materials during rush hours in the morning (06.00 – 09.00) and evening (16.00 – 20.00) or as required by law. • The contractor shall limit the speed of vehicles transporting the construction materials and equipment according to law. Trucks loading more than 1,200 kg. cannot drive faster than 60 km/hr. Trailer trucks cannot drive faster than 45 km/hr. The speed limit in the construction area is 30 km/hr. • Choose the route for transporting the equipment and workers that does not block the main entrance/exit of the U-tapao International Airport which may affect the convenience of airport users and local residents. Avoid the roads that are already congested. Use Highway No. 3 on the north side of the airport as the main route during transporting the construction materials no matter where the materials are from. • Coordinate with traffic police to facilitate the use of such roads and notify the public about the route, date, and time of transporting construction materials, equipment, and large machines in advance. • Make an emergency plan with DOH in traffic management in case of critical emergency or accident to avoid traffic congestions e.g. opening the aisle at some points to facilitate the traffic or making the entrance/exit of the main road and frontage road so that other vehicles can avoid the accident scene.
The Project should instruct vehicles to avoid transporting during rush hours in Sattahip at KM 10 at the intersection of Road No. 311 because it is a densely populated and highly congested area.		●			
The Project should determine the safety measures for transporting construction workers.		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
The canvas should be used to cover trucks to prevent dust dispersion and spills of dirt or sand during transportation to avoid an accident.		●			• Cover the part of the trucks transporting the construction material and equipment with canvas or similar material to prevent them from falling on public roads. If construction materials fall on the road and shoulders of the road, clean them as soon as possible.
Vehicles should be regularly maintained to ensure safety.		●			• Ensure that vehicle and machines of the contractor are always in good condition to prevent a breakdown during operation. Check the condition of trucks that transport construction materials regularly.
The Project should reconsider transporting large equipment because it might not be able to cross under bridges.		●			• Coordinate with traffic police to facilitate the use of such roads and notify the public about the route, date, and time of transporting construction materials, equipment, and large machines in advance.
The contractor should spray the water as appropriate to the activities or the areas during the construction, such as near the stone mill.		●			• The construction areas where vehicles and construction activities may cause dust dispersion, including the roads inside the airport that have not been paved with asphalt or concrete, must be sprayed with water at least 2 times a day or as appropriate to prevent and mitigate the impact of dust dispersion.
What agency is responsible for ensuring that the contractor follows the transportation measures? There should be serious punishment for violating the measures.		●	●		• The contractor shall make a plan for transporting materials, equipment, workers, and construction staff and propose to RTN and EEC or the agency responsible for the construction before starting the transportation activities. The plan shall be the condition attached to the employment contract. • The contractor records the transportation of materials, equipment, and workers, including the start and destination, record the accident statistics in U-tapao international Airport to prevent and monitor the incidents.
Suggestions					
There should be clear traffic signs to tell the directions in the airport. There should be more parking lots in the airport.		●			The Project Owners acknowledge the suggestion.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
The road section at KM 16 should be connected to Phala Beach to improve the landscape and view of the airport.		●			
Equipment transported by large trucks should be transported at night.		●	●		
8. Socioeconomic status					
There should be complaint channels that the public have easy access and the problems should be seriously addressed.		●	●		• Provide information about the project operation, plan, construction, transportation routes, and complaint channels so that local people and passers-by know through U-tapao International Airport website or online platforms. • Provide the complaint channels about the impact from the construction at the construction control office or U-tapao International Airport to know the problems and find the solution. • When a complaint of construction impact is reported, the Project shall consider the mitigation measures immediately. • Follow the environmental impact mitigation measures on transportation during the construction phase. • RTN and EEC / or the Project Operator must communicate and report the noise monitoring results to the public regularly. • Follow the environmental impact mitigation measures on noise during the operation phase. • Follow the environmental impact mitigation measures on transportation during the operation phase. • Consider hiring local people around U-tapao International Airport with the qualifications suitable for the positions as the priority.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Where is the worker camp site? It should be far from local communities to avoid issues like conflicts, gambling, drugs, and pets.	●	●	●		• The contractor checks the history of workers before hiring and makes a report of worker profile, including photos, at the Project office. When there is a problem, this will allow for immediate investigation. • Promote employment and support local businesses. • Provide suitable and clear places to stay. Determine measures to control workers in the construction area and the campsite to prevent them from disturbing local people such as gambling, drugs, and noisy activities. There are serious punishments for violations. • Allocate security guards in the construction area and the campsite around the clock. The foremen shall supervise workers' behavior to relieve the concern of local people over safety such as crime and theft.
Immigration leads to social changes and urbanization. This affects the availability of infrastructure, which may fall behind the development, potentially resulting in a shortage.		●	●		
What is the number of workers? Local people should be hired. Employing migrant workers should be avoided.	●	●	●		
With this development, the economy will improve. This area will be more developed. There are both advantages and disadvantages. Coordination with local organizations will benefit all relevant parties.		●			• Coordinate with relevant agencies to promote community activities, such as agriculture, coastal animal farming (crab bank), community development, health promotion, education, arts and culture, tourism, and environmental conservation. • Set up a committee to monitor the impact and seek participation from the community to assist with the monitoring.
The Project should create jobs, promote quality of life, and strengthen people who are affected in the area as the top priorities.	●	●	●		
Local tourism businesses should be allowed to install PR booths in the airport.		●	●		
Local people should be allowed to make a living in the airport, such as selling products and vehicle services.	●	●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
There should be a CSR unit to meet with local organizations and local people. The CSR unit should work really hard.		●			
The Project should have some activities to help society, community, and fishery groups affected by the Project.		●	●		
There should be educational support such as scholarships, internships, and field trip at the airport.		●	●		
There should be measures to reduce the impact on the fishing industry because there are several projects around the area and the safety zones are prohibited, leaving only a small area for fishing.		●			
There should be measures to reduce the impact on quality of life and the psychological impact of people who are asked to relocate.	●	●	●		
Economic development should occur together with social development.		●	●		
The Project should prioritize helping the affected first and come up with suitable solutions.		●	●		
The public would like to have a fund to take care of affected people before starting the construction.		●	●		- The Project will set up the fund to remedy the impact from U-tapao International Airport, as well as environmental and health impact in general.
The airport and community development fund should be established first. What is the fund management direction? There should be clear	●	●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
elements. The fund should truly benefit the community.					
Representatives from the public and other local sectors should be part of the fund management committee.		●	●		
When will the compensation fund be established? What is the amount of the fund? Who will manage the fund? When will the compensation be considered? What is the consideration process like?		●	●		
The Project should survey the current condition of the community and report the impact to the interviewees.		●			- Public Consultation 2 aims at hearing the public opinions. It consists of several activities, including group meetings, in-depth interviews, and public opinion survey using a questionnaire. It is required by law to give appropriate advance notice. The Project has coordinated with community leaders and invited them as well as local people to attend the meeting. The Project documents can be reviewed in advance from the Project's website. - The Project conducted a semi-structured interview form with close-ended and open-ended questions to survey the public opinions toward the Project. The interviewers always present and explain the data on the flip chart before each interview. - The current website of the Project (http://www.ehia-utprw2 . com/) has a channel to ask questions via the Project email: ehia-utprw2@gmail.com and telephone number 0-2763-2828 extension 4083, 4086.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Suggestions					
U-tapao International Airport should observe the compensation policy from Suvarnabhumi Airport.	●	●	●		The Project Owners acknowledge the suggestion.
Airport taxes should be deducted for the Fund contribution.	●	●			
This useful project will improve the local economy, including tourism and education.		●	●		
There should be more measures about the conservation and promotion of wild plants and wild animals.		●			
9. Relocation and compensation for properties					
Is there any law regulating the compensation for affected people in NEF 30-40 and NEF ≥ 40?		●			The measures are as follows **1 Compensation condition** • The compensation for people affected by noise from the construction of the second runway and taxiway of U-tapao International Airport is based on the noise contour for the year 2048. The buildings to be compensated must be constructed before the date the EHIA Report is approved by NEB. EEC must publish the construction details of the Project to the public in advance. • The Project surveys and creates a database and compensation plan for those affected by noise caused by the Project development. The survey team shall complete the survey and determine the compensation value before operating the second runway.
The compensation should cover NEF 30-40 because the noise impact is not different from NEF ≥ 40.		●	●		
The Project should include opportunity costs for people receiving the compensation and having to move away from this area which will be more developed.		●	●		
The affected people in the blue area (NEF 30-40) and red area (NEF ≥ 40) should be combined. The needs of local people should be summarized in 2 solutions, whether they want to sell or renovate the buildings.			●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Local residents do not wish to move away from NEF ≥ 40. Will they be compensated? Are they any other ways for them to stay in the area?		●	●		**2 Compensation criteria** *NEF ≥ 40* • EEC shall negotiate to buy land and properties constructed before the date the EHIA Report is approved by NEB. If the landowner does not wish to sell, EEC must support the renovation cost to reduce noise impact. The landowner receiving the compensation money is responsible for all the renovation activities. *NEF 30-40* • EEC must support the renovation cost to reduce noise impact. The landowner receiving the compensation money is responsible for all the renovation activities. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB. • EEC must support the renovation cost for places that need quiet in particular, such as schools, hospitals, and religious places. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB. The basic procedures and methods for renovating buildings • The owner of the building participates in the review and inspection starting from appraisal, the engineering report, and details of renovation costs. • When the owner has reviewed the details, the response form for renovation cost must be signed as a consent. • Upon receiving the compensation, the owner shall renovate the building according to the survey details. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB.
The compensation rates should be fair. The compensation received might not be enough to buy land and houses somewhere else because it might be more expensive.		●	●		
If the house does not have a construction certificate and house number and is located in Sor Por Kor Land, Phor Bor Thor 5 Land, and other types of land, how will the property be compensated?		●	●		
If a building is not compensated at the beginning. But after a while, it is inhabitable. Will the house owner be eligible for the compensation?		●			
What are the compensation details for noise impact? What agency is responsible for the compensation?		●	●	●	
Will land in NEF ≥ 40 with no buildings be compensated? To whom can this land be sold?		●	●		
In the case of renovation, what is the guideline? Who will check whether the renovation actually happens? There should be compensation for material degradation.		●	●	●	
The Project should consider the compensation in both the construction year and compensation amount.		●	●	●	

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
In the case of schools and temples, they cannot move away. The Project should install air conditioners and noise-proof material and pay for the electricity bills to mitigate the problems in the noise contour.		●	●		RTN and EEC/ the Project Operator must support the renovation cost for places that need quiet in particular, such as schools, hospitals, and religious places. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB.
Relocation of religious places, schools, and hospitals requires a lot of budget. Who is responsible for this cost.		●	●	●	
Relocation of religious places, schools, and hospitals might affect the transportation of local people.		●		●	
If the impact on temples and schools is high, they might have to move away. However, the new location should be suitable and have enough area.		●			
When will the compensation start? When to move out after the Project buys the land? Please notify at least a year in advance.		●	●		The compensation details shall be further studied in the later stage. RTN and EEC or the agency responsible for the construction must notify the public in advance.
Regarding compensation, what agency will receive the complaint? Please clearly indicate the contact number. What agency will check if the measures are not properly followed?		●	●		• Provide information about the project operation, plan, construction, transportation routes, and complaint channels so that local people and passers-by know through U-tapao International Airport website or online platforms. • Provide the complaint channels about the impact from the construction at the construction control office or U-tapao International Airport to know the problems and find the solution. • When a complaint of construction impact is reported, the Project shall consider the mitigation measures immediately.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Suggestions					
The agency taking care of affected people is unable to find a new place to live, such as housing estate and Community Organization Development Institute (public organization)		●			The Project Owners acknowledge the information and suggestions.
The use of the royal property can be done. If it is public, it will be in the form of rental. There are 3 types of renting in the Treasury area, namely housing, farming and other uses. In the case of an agency, they can request to use the area. The Treasury will have criteria for consideration, for example, the temple can apply for a royal property for about 6 rai, a school or a government medical facility can make a request to access the land according to the criteria.		●			
If having to move away from the noise contour area, Rayong has 3 districts spared for residential purpose, namely Want Chan District, Khao Chamao District, and Klaeng District.		●			
There should be special accommodation for people who are affected by the airport construction.		●	●		
Land in U-tapao International Airport is being buy for commercial and residential purpose. If this is the case, what is the building control measure?		●			
The Project should maximize the land acquired from the compensation.		●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
10. Public health (personal health)					
The health measures should suit the impact caused by the Project activities.		●	●		The Project has determined the measures according to the impact caused by the Project activities.
The Project should monitor the hearing ability of people affected by noise.	●	●	●		**Noise pollution** • Follow the mitigation measures for noise and socioeconomic impact in the operation phase. • Monitor noise intensity continuously • Set up a fund to compensate for impact from U-tapao International Airport and mitigate environmental and public health impact in general. • Coordinate and cooperate with local public health agencies to plan the monitoring of hearing ability of people affected by noise caused by U-tapao International Airport operation. • Support the monitoring of health pollution of public health agencies and volunteer groups. • Open complaint channels such as the airport website, the website of RTN, EEC, or the Project operator, and other online platforms.
There should be additional mitigation measures for noise that affect physical and mental health, as well as preventive measures.	●	●	●		
There should be measures to prevent communicable diseases from workers, tourists, and non-registered population coming to work in the area, who may cause new outbreaks or recurrence of local outbreak.	●	●	●		**Social network of the community/ safety in life and property** • Follow the mitigation measures for socioeconomic impact in the construction phase. • The list of workers and their history shall be presented to local administrations. The list shall be monitored and reviewed once a year.
There should be physical examination, the list of workers along with their background history before work. Their physical health should be monitored once a year.		●	●		**Common communicable disease (main cause of sickness, diseases with water and food as medium)** • Follow the mitigation measures waste and wastewater in the construction

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
There should be basic preventive measures and vaccinations for the vulnerable group.		●			phase. • The contractor makes a monitoring plan for an outbreak at the campsite of workers and presents the plan to RTN and EEC or the agency responsible for the construction. • RTN and EEC or the agency responsible for the construction coordinate with local public health services to plan the preventive measures for environmental and health impact at the worker campsite of the Project. • Inform local public health services about the activities, the number of workers, and working duration. • There will be regulations for housing sanitation, waste and sewage management, preventive measures for disease carriers. The regulations shall be strictly enforced. • Workers shall undergo physical examinations and present their medical history to local public health services. • Open complaint channels such as the airport website, the website of RTN, EEC, or the agency responsible for the construction, and other online platforms. **Accident** • Follow the mitigation measures for transportation and socioeconomic in the construction phase. • Determine the guideline for contractor and subcontractor to monitor the implementation of the measures. • Open complaint channels such as the airport website, the website of RTN, EEC, or the agency responsible for the construction, and other online platforms.
There are concerns about the number of workers and non-registered population coming to work. These people may share the public health services with local people.		●	●		
Nonlocal workers should be registered to the local housing registration system in order to increase the public health budget from the central system.		●	●		
There are concerns over more traffic accidents caused by the construction.		●	●		
The accommodation for workers should be sanitary. There should be a first aid unit and sanitary education to minimize the risk of an outbreak.		●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
This measure should be added "coordinate with local public health services to plan public health operations"		●			**Preparedness and adequacy of public health service, medical staff, and medical supplies** • RTN, EEC, or the agency responsible for the construction coordinate with local public health services to plan the measures for environmental and health impact in the construction area and worker campsite. • RTN, EEC, or the agency responsible for the construction provide or indicate hospitals or public health services to the contractor so that the Project does not cause more burden to the main public health facilities for local people. • RTN, EEC, or the agency responsible for the construction provides contact channels for local public health agencies and supports them in terms of medical facilities and medical staff. • Make a list of hospitals and public health units near the Project area, contact persons and contact numbers to communicate about the activity details. • Prepare media and contact channels for RTN, EEC, or the agency responsible for the construction and submit to public health units. Record the details of activities about promoting the public health units. • Open complaint channels such as the airport website, the website of RTN, EEC, or the agency responsible for the construction, and other online platforms. Operation phase • Follow the environmental impact mitigation measures for transportation, noise and vibration, air quality, waste management, socioeconomic status, and public safety. • Set up a fund to compensate for impact from U-tapao International Airport and mitigate environmental and public health impact in general.
There should be a physical examination and health status of local people to monitor negative impact. This will highlight public awareness in the area.		●	●		
There should be measures to address the mental health of people affected by the Project.	●	●			
I agree with the measure about coordinating with local public health services and setting up a fund to remedy the affected. I would like to suggest sustainable compensation.		●			
EEC should support the public health system and increase medical staff and support the budget to accommodate future developments.	●	●	●		
Ban Chang Hospital should be upgraded into a large hospital with the standard to treat international patients adequately.	●		●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Air quality in the airport should be monitored to find a way to minimize the impact of respiratory diseases.		●			**Air pollution** • Follow the environmental impact mitigation measures for air quality in the operation phase. • Follow general measures for personal health and public health. • Monitor air pollution regularly, especially the areas at risk of air pollution. • Cooperate with public health units to monitor the health of vulnerable groups. Analyze the monitoring data of environmental impact with health status to examine the potential impact on vulnerable groups after operating the Project. Find appropriate solutions to the impact.
The public health measures should be adapted to the COVID-19 pandemic.		●			The health impact mitigation measures (operation phase) are described below. • Follow public health measures to control the pandemic such as SARS-CoV, Covid-19, avian flu, and H1N1 influenza. Domestic and international laws shall be strictly followed, including (1) The Communicable Disease Act, B.E. 2558, (2) Notification of the Department of Health on Criteria, Methods, and Measures for Risk Prevention from Coronavirus Disease 2019 (COVID-19) for government offices, private workplaces and establishments B.E. 2563, (3) Notification of the Department of Health on Criteria, Methods, and Measures for Risk Prevention from Coronavirus Disease 2019 (COVID-19) for public transportation service providers B.E. 2563, (4) Operational considerations for managing COVID-19 cases or outbreak in aviation (WHO, 2020), (5) Aircraft cleaning and disinfection during and post pandemic (IATA, 2020), (6) Preventing spread of disease on commercial aircraft: Guidance for cabin crew (CDC, 2020), (7) Suspected communicable disease universal precaution Kit (IATA, 2017), (8) ICAO Guidelines for managing communicable disease in aviation, and (9) Communicable disease surveillance and response systems: Guide to monitoring and evaluating (WHO, 2006).

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					• Coordinate with local public health units to plan the environmental and health impact mitigation measures for communities around U-tapao International Airport. • The holder of the airport operating certificate shall provide contact channels for the local health authorities as well as supporting the local public health agencies in the availability of health services and potential of medical personnel. • Local public health authorities must be aware of management plans and participate in activities of emergency management such as planning and training according to emergency management plans, especially those related to infectious diseases and quarantine. • Communicate with communities and allow local people to attend emergency drills, especially those related to infectious diseases and quarantine. • Support the potential of emergency management of public health authorities and volunteer groups. • Record the action plans of communication and emergency management plans, especially those related to infectious diseases and quarantine. • Open complaint channels such as the airport website, the website of RTN, EEC, or the agency responsible for the construction, and other online platforms.
11. Occupational health and safety					
The Project should have detailed preventive measures, an emergency response plan, and a restoration plan.	●	●	●	•	• Analyze the cause of an accident, collect statistics of the accident, and analyze the trend of the accident to find appropriate preventive measures. • Prepare the preventive plans to reduce occupational accidents. • Follow the Occupational Safety, Health and Environment Act • Establish the safety committee • Prepare safety staff. • Prepare the occupational health and safety plans, such as risk assessment and
Does the Project have emergency response plans for an accident?	●	●	●		
The Project should be prepared about security by setting regular plans for emergency response drills.		●	●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					identification of risky areas, such as confined space, hot work, area with noise levels exceeding the standard, and area or work with chemical exposure in the working environment. • The working environment monitoring plans • General physical examinations and risk-based physical examinations • Health promotion plans • Occupational accident preventive and monitoring plans • Emergency response plans The occupational health and safety plans and their implementation results must be submitted for the safety committee to review the measures at least once a year.
Suggestions					
Civil Defense Volunteers in the local community are ready to support in terms of equipment and staff as a plan B in the future. There could be emergency response drills together in order to create a connection with external organizations and those in the airport area.		●			The Project Owners acknowledge the information and suggestions.
There should be enough public health facilities for emergency situations.		●			
The capacity of flood mitigation should be improved by providing adequate knowledge and equipment.		●			
12. Forest and wildlife					
Do the take-off and landing activities of aircraft near the mountaintop affect the ecosystem and wildlife in the mountain?		●			The operation phase of the second runway and taxiway will result in more frequent flights/hour. It may also increase the frequency of bird strike incidents. According to the statistics of bird strike incidents at U-tapao International Airport

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
What is the current result of the forest and wildlife survey?		●			from January 2017 to July 2019, the frequency of bird strikes is lower than one time/month. The most frequent bird strike incidents occurred in 2017 (9 times). Statistics also pointed out that bird strike most frequently occur in December which is the migration season. The risk of bird strikes was also assessed for U-tapao Rayong – Pattaya International Airport by the Standard and Safety Division of Airports of Thailand Public Company Limited in 2018. The assessment pointed out that the bird species that tend to cause hazards are large birds, medium-sized birds, and small birds, respectively. The first wildlife survey in the Project area (rainy season) from 15-17 July 2019 and 19-22 July 2019, most birds are small-sized birds (lighter than 300 grams), followed by medium-sized birds (300 – 1,000 grams), and large birds (more than 1,000 grams). It could be said that the chance of severe accident from bird strike is low. Also, the Project has followed the plan to prevent aircraft accidents caused by birds and other animals.
What is the purpose of a bird survey in the airport area?		●			
What is the measure for handling Asian open bills? I am concerned about the ecosystem.		●			
Bird management in the airport to prevent impact on the ecosystem	●				
Suggestions					
The Project should support forest conservation at Khao Krok Tabaek.	●	●			The Project Owners acknowledge the suggestion.
The Project should launch the reforestation to replace the green area before turning the area into the airport.		●			
The Cabinet Resolution in 1998 delayed the arrest of forest invaders as per the Department of Land. The Cabinet Resolution has a list of people who can stay in the forest area.		●			The Project Owners acknowledge the information.
Khao Chi On Wildlife Sanctuary is a wildlife breeding and conservation area. Wild animals from smuggling cases will be kept here. The disturbance will affect		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
some of these animals, especially magpies. It may also affect breastfeeding of mammals.					
13. Public participation and public relations					
There should be a meeting to explain the appraisal and compensation again before the actual selling.		●	●		The Project Owners acknowledge the suggestion. This would be the process of negotiation and compensation.
The Project should communicate the updates via community leaders such as district mayor, subdistrict headman, village headman, subdistrict administrative staff, so that they can spread news to locals.		●	●		• Communicate about the updates of the Project implementations, construction plans and activities, along with complaint channels for local residents and road users from time to time via U-tapao International Airport website and other online platforms. • Publish noise contour approved by the Cabinet to the community via at least 3 channels such as website. • Open complaint channels such as the airport website, the website of RTN, EEC, or the agency responsible for the construction, and other online platforms. • Communicate about the progress of the Project, construction plans and activities, the routes for transporting construction material in advance so that road users can avoid the routes or avoid traveling during such times. • Communicate with relevant agencies and the public about closing the runway for maintenance and mitigation measures via various channels such as U-tapao International Airport website, online platforms, and public relations activities. • The Project will contact the Provincial Public Works and Town Planning Office and relevant agencies to submit the NEF contour to integrate with the comprehensive town plan to control land use and constructions around U-tapao International Airport to be suitable and compliant with activities in U-
Communications can be made via Line and Facebook applications.		●			
Facts should be presented to the public.		●	●	●	
The Project should make people who may be affected understand the impact.	●	●	●		
The Project should notify the public immediately upon emergencies via all available channels.		●			
The public should be informed about the construction, what current phase is, and how much time each phase will take.		●	●		
The Project should present the Project progress to the public regularly.		●	●	●	
Please provide Project contact channels.		●			
Is it possible to have a website with Q&A channel?		●			
Communication should be made in many languages because there are foreigners in the area.		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					tapao International Airport, the air navigation safety zone, and the area affected by the airport development. • Coordinate with local authorities to enforce the Building Control Act and the Town Planning Act around U-tapao International Airport to issue the construction permit for new buildings. • Inform local authorities to communicate with the public about air navigation safety zone and the areas affected by the Project development. • Submit the reviewed noise contour to local authorities granting authorization/permission as the guideline to consider granting permission for new buildings. Communicate with the public about noise contour approved by the Cabinet and present the current results from permanent noise monitoring stations on the website.
Before the next official meeting, the Project should send PR vehicles to inform relevant stakeholders to attend the meeting.		●			For the Public Consultation Meeting 3, the Project will send PR vehicles to inform stakeholders to attend the meeting.
There should be complaint channels that are easily accessible for the affected people. Who will receive the complaint and respond to the complaint?		●	●		• There will be complaint channels regarding impact from the Project construction at the construction control office or at U-tapao International Airport to acknowledge the problems, impact, and find the solution. • When a complaint of construction impact is reported, the complaint shall be investigated and resolved as soon as possible. • Make the complaint channel available around the clock. • If there is a complaint that the community is affected by noise, the Project will use the noise level from the permanent noise monitoring stations which is connected to the flight database or the measuring results by a mobile unit. The Project will consider monitoring in the NEF or Ldn unit to verify the

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					impact on a case-by-case basis if the impact is proven real. • RTN and EEC or the Project Operator shall compensate according to the determined guideline. • There will be the main channel to receive complaints about impact from aircraft thrust or fallen objects. The public may report the incident via the Environmental Impact Mitigation Coordination Center of U-tapao International Airport located at U-tapao International Airport every day during office hours (08.00 – 17.00 hrs.) • Staff will be sent to inspect the damage and record the evidence in every case to estimate the repair cost. The building owner will find a contractor for the repair. The repair cost shall be billed from RTN and EEC/ or the Project Operator within the amount estimated by the damage estimation committee for impact from aircraft thrust. If the building owner is unable to find a contractor, RTN and EEC/ or the Project Operator will find a contractor to repair the damaged building. • RTN and EEC/ or the Project Operator follow the objectives of the fund for compensating the impact from U-tapao International Airport, especially the impact from fallen objects due to aircraft and aircraft thrust.
The Project should have a group meeting with the affected people to provide them with accurate information.		●			The Project has conducted public consultation meetings with people affected by noise as below. - Public consultation meeting 1 was held in Ban Chang District. All people who might be affected in the Project study area were invited to attend the meeting. - Public consultation meeting 2 was held at local administrative organizations and the area of Moo 3, Moo 4, Moo 6, and Moo 8 of Samnak Thon Subdistrict.
The Public Consultation Meeting 3 should be conducted NEF ≥ 40 because the target groups are located at 4 villages, namely Moo 3, Moo 4, Moo 6, and Moo 8 of Samnak Thon Subdistrict.		●			

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					- Public Consultation Meeting 3 was held twice. The first one was in Samnak Thon Subdistrict for those affected by noise, and the second one was in Ban Chang District for all agencies and people who might be affected in the entire Project study area.
Is the Public Consultation Meeting 2 part of the law? What stage is this now? How was stakeholders notified in advance? Did the Consultant distribute documents to them in advance as determined? How?		●			The Public Consultation Meeting 2 involved several activities, including group meetings, in-depth interviews, and public opinion survey using a questionnaire. The Project has notified the public in advance via print media regarding the Project descriptions and facts. The information is available on the PR boars, PR posters, and the Project website http://www.ehia-utprw2.com/.
The EHIA Report should be presented to the public.		●	●		Before the Public Consultation Meeting, the Project notified ONEP and stakeholders via at least 3 channels. - Notified ONEP and stakeholders via 7 channels, namely, 1) invitation letter 2) PR board 3) PR poster 4) website 5) local radio station 6) local newspaper and 7) PR vehicles. - The Project document was delivered to ONEP and stakeholders. The project document and the draft EHIA Report were presented to relevant stakeholders at least 15 days in advance via 3 channels, namely: - Project document was delivered to ONEP and stakeholders. - Project notice or documents were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). - Website: The project document can be downloaded from www. ehia-utprw2.com along with the details about the Project document disclosure. The Project summarized the public consultation meeting by indicating the concerns, suggestions for the EHIA scope and method along with the explanation, and presented to the public via 3 channels.
Basic knowledge should be communicated to all stakeholders before the meeting starts.		●	●		
Regarding the Public Consultation Meeting 1, did the Project inform the public?		●			
The Project should submit the summary of the Public Consultation Meeting 2. Local people should be notified to ensure that the Project has presented the data.		●			
The Project should submit the summary of the Public Consultation Meeting 3. Local people should be notified to ensure that the Project has presented the data.			●		

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
					- The Project document was delivered to ONEP and stakeholders. - Project notice or document were presented at relevant government agencies, medical facilities, local administrative organizations, and community leaders in the Project study area (47 places in total). - Website: The project document can be downloaded from www. ehia-utprw2.com along with the details about the Project document disclosure.
Suggestions					
Previously, Ban Khong Wan Phen Health Promotion Hospital has been the central PR authority about the stone mill project for the community. In this Project, the Hospital is willing to communicate the information with the community as well.		●			The Project Owners acknowledge the information.
14. Additional suggestions					
Is it possible to view the Master Plan for U-tapao International Airport?		●			The Master Plan was studied by AECOM Consulting (Thailand) Co., Ltd. as of December 2018. There will be further studies in detail. It was only the basic design for the EEC covering 6,500 rai. Data are subject to change in the future.
When was the Master Plan made? When is the breakeven year?		●			
I would like to keep the EHIA Report of the Project as the database.		●			When the EHIA Report is approved by the ECEIA and NEB, the Final Report will be presented to the public.
We have the case of Suvarnabhumi Airport. Is there any comparative study about the forecast noise and the actual noise?		●			The forecast noise and the actual noise are very similar.
The stone mill at Khao Chi Chan has been affected local people significantly. They did not follow the transportation measures. There are several complaints.		●			The Project Owners acknowledge the information and opinions.

Table 4.7-1 Public and stakeholder opinions and suggestions from the Public Consultations 1, 2, 3, and additional suggestions

Opinions and suggestions	Meeting 1	Meeting 2	Meeting 3	Additional	The Project's actions / environmental measures
Land in Rayong, Chon Buri, and Cha Choeng Sao should be an economic zone, resulting in higher land prices.		●			
Chon Buri people travel to Suvarnabhumi Airport more conveniently.		●			
Is there any restrictions for national security for managing military-owned land? Is it going to be independent like private land?		●	●		
Rayong Province may not gain many advantages because most tourists will head to Pattaya instead of Rayong.		●			
Local people should gain the benefit or discount for using the airport. Profit should be used to develop the community.			●		
It promotes tourism of the country.			●		
Several projects and authorities are collecting public opinions. Please integrate the data among the Project for harmonious development and look at the impact from a broader perspective (many projects combined).		●			
I suggest building a dam to prevent damage from the wave and to breed aquatic animals. It will restore marine resources. Phala is an open sea. Artificial corals may be easily swept away by storm or tugboats.		●			The Project Owners acknowledge the suggestion.

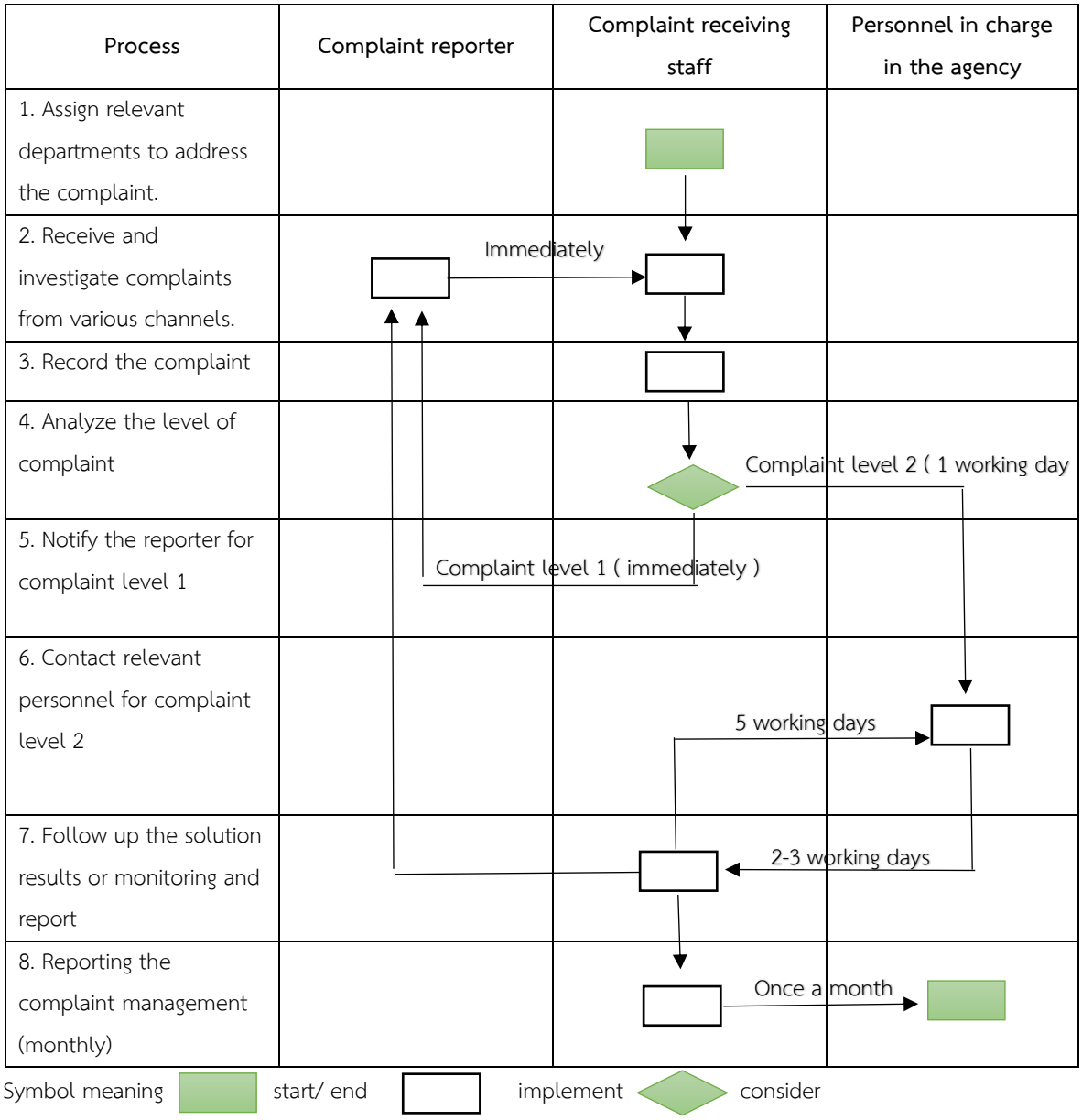


Figure 4.7-1 Complaint procedures for environmental impact mitigation

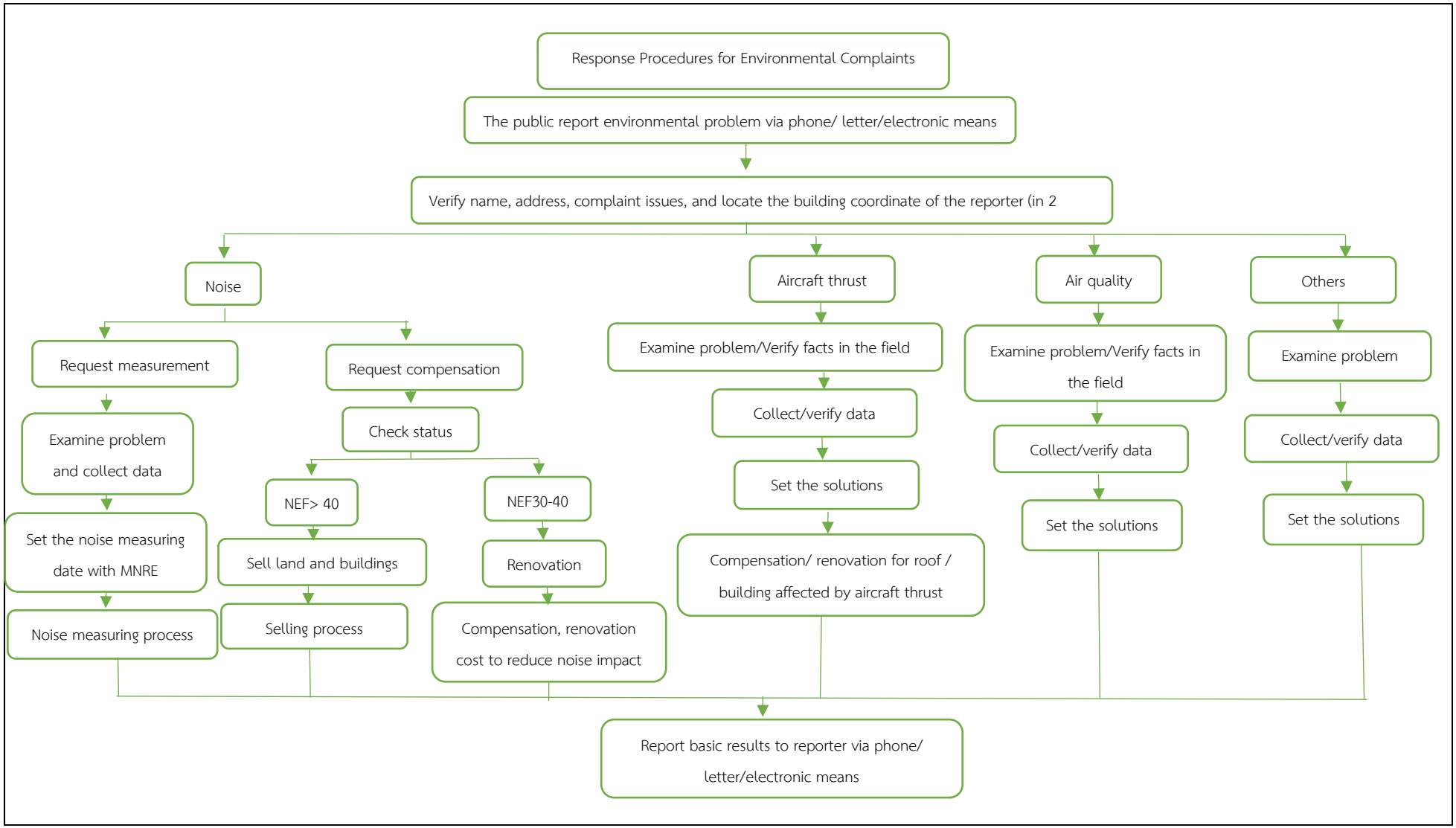


Figure 4.7-2 Complaint procedures for environmental issues of U-tapao International Airport

Chapter 5
Summary of Environmental Impact and Relevant Measures

5.1 Summary of Environmental Impact, Environmental Impact Mitigation Measures, and Environmental Impact Monitoring Measures

The Environmental Impact Assessment and preparation of the EHIA Report for the Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport, Ban Chang District, Rayong Province adheres to the guideline and requirements mentioned earlier in **Chapter 1 Item 1.5 (Guideline for Environmental Impact Assessment).**

Environmental impact assessment is the assessment of potential impact on environmental resources and various values of the study area in both positive and negative, primary and secondary effects in such short and long terms in order to understand the characteristics and the degree of environmental impacts. The environmental assessment of the second runway and taxiway of U-tapao International Airport, Ban Chang District, Rayong has 4 aspects of assessment which are physical environmental resources, biological environmental resources, value of human use, and value for quality of life.

In this assessment, an accepted academic tool shall be used to forecast and assess the impact. In some cases, a mathematical model is required to predict results to consider the formulation of mitigation measures and monitoring measures.

This assessment starts from considering the nature of the Project operations, surveying the existing environmental resources around the Project area, and identifying the types and degree of environmental impacts that may rise from the Project activities. Characteristics of environmental impacts are classified into two types:

1. Positive impact refers an activity that will result from project construction that lead to a positive impact for environment and human use in the Project area and surrounding areas.

2. Negative impact refers an activity that will result from project construction that lead to an adverse impact for environment and human use in the Project area and surrounding areas.

The criteria for determining the degree of environmental impacts are considered from the scale of environmental impacts which are the standard values of environmental resources, area/distance

that are affected, impacts duration and impact on public health. Those criteria can be classified into 4 degrees:

1. High degree impacts : Activities or results of Project construction that change the natural resources and environment beyond the benchmark or cause severe/permanent impacts to the environment. The affected area is spread extensively outside the project area. The impact occurred throughout the project area for a prolonged or permanent period. The activities affect resources and public health at a life-threatening level. There is no measure to mitigate the environmental impact or the environmental or the environmental impacts are irreversible.

2. Moderate degree impacts: Activities or results of the project construction that cause moderate effects to natural resources and environment compared to the benchmark. The affected area is moderately wide, but still limited in the project area only. The impacts occur in many areas of the project. The duration of the effect is relatively long, but not permanent. Activities affect the resources and public health but not on a critical or life-threatening level. It is possible to formulate measures to mitigate the impact.

3. Low degree impacts : Activities or results of the project partially affect natural resources and environment. Natural resources still remain within the benchmark. The affected area is not extensive. The impacts occur in a partial area of the project. The impact happens for a short period of time. Activities affect the resources which affect mental health of local residents, such as public disturbance. It is possible to formulate measures to mitigate the impact or elimitately it entirely.

4. No impact or insignificant impact: Activities or results of the project do not cause changes or affect natural resources and the environment either directly or indirectly.

The scale and significance of the impact are based on the Project description, the results from the existing environmental condition, and opinions of environmental experts. In the EHIA for the construction phase, this study considered the construction activities of the second runway and taxiway, the tunnel under the runway and the parallel taxiway, Terminal 3, SAT, apron, U-tapao Train Station, commercial gateway, supporting area, and cargo in the extension area. The details were earlier discussed in **Chapter 2 Item 2.1 Guideline for U-tapao International Airport development (extension)**. These elements will accommodate the maximum 70 passengers in 2048. According to the study and preparation of the report for the Project, Undertaking, or Operation that May Seriously Impact Natural Resources, Environmental Quality, Health, Sanitation, Life Quality of People in a Community, the Construction Project of the 2nd Runway and Taxiway of U-tapao International Airport, Ban Chang District, Rayong Province, the environmental impact, the mitigation and monitoring measures can be summarized in **Table 5.1-1.**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
General measures			
		1. Environmental measures and action plans that the Royal Thai Navy (RTN) and the EEC must follow. 1.1 RTN and EEC must follow the environmental impact mitigation measures and monitoring measures as proposed in the EHIA Report for the 2nd Runway and Taxiway of U-tapao International Airport by RTN and EEC in Phala Subdistrict, Ban Chang District, Rayong Province, and as additionally determined by the Expert Committee to Consider Environmental Impact Assessment Reports (ECEIA). The Measures shall be included as part of the agreement with the construction designer and/or the construction contractor and the Project Operator. 1.2 RTN and EEC must instruct the construction designer and/or the construction contractor and the Project Operator and ensure that they follow the environmental impact mitigation measures and monitoring measures as proposed in the EHIA Report. 1.3 RTN and EEC must recruit a third party to monitor the compliance with the environmental impact mitigation measures and monitoring measures as proposed in the EHIA Report. The hiring cost of such a third party shall be included in the expense budget of the project under the supervision of RTN and EEC (and/or the Project Operator) and assign a committee	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		(consisting of RTN and EEC, ONEP, PCD, Rayong Office of Natural Resources and Environment, Regional Environmental Office 13, representatives of Chon Buri and Rayong administrations, local administrative organizations, NGOs, and experts) to monitor the compliance with the environmental impact mitigation measures and monitoring measures 1.4 RTN and EEC must make a report of the compliance with the environmental impact mitigation measures and monitoring measures as proposed in the EHIA Report and submit the report to the agency granting authorization/permission. If there is no agency granting authorization/permission, the report shall be presented to ONEP and relevant agencies every 6 months, both in the construction and operation phases. 2. If RTN and EEC (and/or the agency responsible for the Project Operator) need to revise the Project descriptions or the environmental impact mitigation measures and monitoring measures from those determined in the EHIA Report commented by the National Environmental Board (NEB), the agency granting authorization/permission or the Project Owners, as the case may be, shall make the decision. The following procedures shall be followed: 2.1 If the agency granting authorization/permission or the Project Owner, as the case may be, deem that the Project description revisions do not affect the essence	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		of the environmental impact assessment in the EHIA that has been commented or approved by ECEIA and NEB, the agency granting authorization/permission or the Project Owner as the case may be, shall register such revisions according to the rules and conditions by law and make a copy of the registered revised measured for ONEP's acknowledgement. 2.2 If the agency granting authorization/permission or the Project Owner, as the case may be, deem that the Project description revisions affect the essence of the environmental impact assessment in the EHIA Report, the following actions shall be taken. 2.2.1 In case where the project, undertaking, or operation of the state agency, for which requires the Cabinet's approval, the report will be submitted to NEB who will provide opinions for the Cabinet's consideration. The agency granting authorization/permission or the Project Owner, as the case may be, shall make a report of the revised Project descriptions or the revised environmental mitigation and monitoring measures and submit it to ONEP who will propose the ECEIA and relevant committees to provide opinions for the revisions and to the Cabinet's consideration. If the Project in question applies to the condition that needs the Cabinet's review, the opinions of NEB shall also be presented to the Cabinet. Once the project or undertaking revises the project descriptions or	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		revise the environmental impact mitigation and monitoring measures as commented by ECEIA, NEB, or the Cabinet, the agency granting authorization/permission or the Project Owner, as the case may be shall notify the results of such revisions for ONEP's acknowledgement. 2.2.2 In case where the project, undertaking, or operation of the state agency that NEB has commented on the EHIA for the Cabinet's consideration, and the revised descriptions of the project or undertaking or operation of the state agency for which the EHIA is required, does not need the Cabinet's review, the agency granting authorization/ permission or the Project Owner, as the case may be, shall make a report of the revised Project descriptions or the revised environmental mitigation and monitoring measures and submit it to ONEP who will propose the ECEIA and relevant committees to provide opinions for the revisions before such revisions are in effect, and submit it for NEB's acknowledgement. Once the project or undertaking revises the project descriptions or revises the environmental impact mitigation and monitoring measures as commented by ECEIA and NEB, the agency granting authorization/permission or the Project Owner, as the case may be shall notify the results of such revisions for ONEP's acknowledgement. 3. If the Project construction and operation are found to cause environmental impact or leads to any complaint, RTN and EEC (and/or the agency responsible for the	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		construction and the Project Operator) must find urgent mitigation measures. ONEP and other relevant agencies shall be informed in order to find the solutions. 4. RTN and EEC shall set up a public relations unit before the construction in order to communicate with local residents and relevant agencies, such as the Fine Arts Department/ Fine Arts Office 5 Prachinburi, Royal Forest Department (incase wood must be removed from U-tapao International Airport), Department of Highways, local administrative organizations, and NGOs so that the public is aware of the construction method and the Project operation plan, expected impact, the environmental impact mitigation and monitoring measures, and allow the public to observe and monitor the implementations to ultimately establish mutual understanding and minimize the number of complaints. **5. General environmental measures and action plans that must be followed** **5.1 Structure of the tunnel** • The subsidence of the compacted soil layer beside the tunnel and the tunnel roof shall be inspected during the construction period and every 2 years after the tunnel was opened. Road surface subsidence measurement equipment shall be installed at the tunnel roof and on the side of the tunnel roof at the second runway and taxiway at 4 positions because the tunnel under the second runway will not be in	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		use for a long time after the construction was completed. • A subdrain must be constructed beside and under the tunnel so that water can pass easily and is not stuck in the tunnel. This will reduce the risk of weakening of the soil layer beside the tunnel due to groundwater. **5.2 The construction area** • The construction area must be clearly identified. The site must be closed as suitable for the performance of the contractor and the traffic condition in order to use the construction area efficiently and minimize the impact on the public. • The fence should be erected at the construction site as appropriate, depending on the activities and area conditions. • Provide traffic signs and symbols as per the guideline of signs and symbols determined by relevant agencies, both during the day and night. • Soil and construction materials must be stored as far from the waterside as possible to prevent erosion by raindrops and wind. Ensure that soil and construction materials are not eroded into water sources and that they are removed from the area as soon as the construction is completed. • Machines, equipment, and the maintenance shop must be at least 200 meters away from water sources.	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		That area must have a container to collect spent oil and a simple wastewater treatment system that can separate oil or grease and store it in a 200-liter tank to be disposed of with an appropriate method or by a supplier with a valid license. • Prevent oils and chemicals used for the construction from spilling into water bodies by digging a moat and making a concrete floor around the oil and chemical storage area. The moat and concrete floor are meant to contain oil and chemical spills. Workers must be instructed to take cautions when transferring oil and chemicals to prevent oil and chemical contamination with soil and water bodies. • The contractor must make a concrete floor in the area that might experience spills of oil and grease and at the maintenance shop, vehicle washing area, oil storage area, engine oil tanks and spent oil tank storage area. The concrete floor must have an elevated edge. The concrete floor must connect with the grease trap to collect the spills from the concrete floor to the grease trap directly and discharge the water after passing the grease tap to the central wastewater treatment system in the construction area.	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
1. Physical resources			
1) Noise Construction phase	Noise from the construction is divided into 2 cases: 1) noise in sensitive areas and communities and 2) noise in the construction area. **Noise in sensitive areas and communities:** There are 201 sensitive areas and communities around the Project area. They are at the distance of 40 – 13,740 meters away from the construction area. The 24-hr noise ranged from 59.6 - 85.6 dB(A). Most values were within the standard of general sound as per the Notification of the National Environment Board, No.15 (B.E. 2540) determining that Leq 24 is less than 70 dB(A). However, noise values at 3 historic sites and religious places, namely Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), Admiral Phrachao Boromwongse Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion), and Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion), which are located at 40, 90, and 180 meters from the construction area, respectively. The maximum noise values were 85.6, 78.7, and 73.2 dB(A), respectively, due to the excavation, installations of support, pilings, and the roof the underpass tunnel. These noise values exceeded the standard, but did not have significant impact because these places are not resided by people. It should be noted that the current background sound values at these historic sites and religious places were relatively high (65 dB(A)) and they are located	• Reduce noise and vibration from construction by using the machines and equipment that are in good condition and using the construction techniques that create the least noise and vibration. Also, install the noise-proofing equipment at the noisy machines or equipment. • Regularly check and maintain the construction machines or equipment to ensure that they are always in good condition and do not create too much noise. • Noisy construction activities will be done only during the day and avoid night time. If noisy activities need to be done at night, the contractor must notify relevant agencies and those who might be affected in advance. • Provide PPE such as earplugs or earmuffs for construction workers. • Limit working hours of workers in noisy area, e.g. 8 hours in areas with noise level more than 85 dB(A) • Provide the area that is free of noise from aircraft so that workers can rest during the break. • Assess the activities that increase noise level from background sound (sound level at 90th percentile: L_{90}) to avoid complaints about noise disturbance. • RTN and EEC ensure to reduce noise in the construction activities. • Provide complaint channels about noise impact from construction activities of the Project at the construction	**Monitoring method(s)** • monitor Leq 24 for 7 days consecutively **Implementation area(s)** Monitor at sensitive areas near the Project as shown in **Figure 5.1-1** including 2 stations below. • RTN Early Childhood Nursery 6 , Naval Aviation Division • Eastern - Nong Muang Community **Indicator(s)** • 1-hr noise average ($L_{eq\ 1\ hr}$) • 24-hr noise average ($L_{eq\ 24\ hr}$) • Day-and-night noise average (L_{dn}) • Maximum noise (L_{max}) • Noise at 90th percentile (L_{90}) • Annoyance noise **Frequency** • Once a month during the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	near the construction site. Therefore, it is estimated that the noise impact is low. **Noise in the construction area:** The assessment of noise impact was conducted for workers who will have to work in the construction area for 8 hrs/day. If all machines operate at the same time, the workers working for 8 hrs/day will be exposed to 84.8 - 90.0 dB(A), which exceeds the standard of acceptable daily exposure levels for noise in the workplace as per the Notification of Department of Labor Protection and Welfare B.E. 2561 determining the limit of 85 dB(A). However, the construction activities do not normally operate all machines at the same time. Therefore, it is estimated that the noise impact on workers is high. **Noise level from transporting construction materials:** The Project assessed the impact of noise from transporting construction materials on 88 sensitive areas and communities (52 sensitive areas and 36 communities) at a distance of 500 meters (each way) from the transportation routes. The Leq 24 values at the receptors along the transportation roads (Highways No. 3, 332, 3126, and 3376) at the distances of 12 – 416 meters ranged from 40.2-63.1 dB(A) while the background sound (existing normal condition) ranged from 60.2-65.0 dB(A). When combined with the noise from transporting construction materials, the noise levels ranged from 61.3-67.2 dB(A), most of which were within the standard of general sound	control office or U-tapao International Airport in order to acknowledge the problems and impacts and to address them appropriately. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	as per the Notification of the National Environment Board, No.15 (B.E. 2540) determining that Leq 24 is less than 70 dB(A). Therefore, the noise impact from transporting construction materials is low.		
1) Noise Operation phase	• The forecast of aircraft noise impact in 2048 showed that sensitive areas and communities in NEF ≥ 40 and NEF 30 - 40 are listed below. - NEF ≥ 40 area ▪ 5 sensitive areas 1) Song La Early Childhood Development Center 3 2) Wat Sa Kaeo School 3) Wat Sa Kaeo 4) Admiral Phrachao Boromwongse Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion) 5) Ban Sa Kaeo Health Promotion Hospital ▪ 93 buildings in the community - NEF 30 - 40 area ▪ 17 sensitive areas 1) Pattanavechsueksa School 2) Pattanavech Technological College 3) Wat Somburanaram School (Temrat Anuson) 4) Samnak Thon Subdistrict Municipality Early Childhood Development Center in Wat Somburanaram School 5) Wat Samnak Thon School	**1) Management measures** • EEC will follow Doc 9829 AN/451 "Guidance on the Balanced Approach to Aircraft Noise Management" which handles noise impact under 4 key principles: (1) Reduction of Noise at Source, (2) Land-use Planning and Management, (3) Noise Abatement Operational Procedures and (4) Operating Restrictions on Aircraft. • EEC will assess the results of noise monitoring and noise impact mitigation continuously. • EEC will improve or review the airport development plan regarding noise impact assessment and reduction at least every 2 years by using the impact monitoring committee or the team assigned or appointed by the said committee. • Control the flight volume to not exceed the maximum specified in the EHIA Report. There will be an annual summary report of flight volume and aircraft type. • Aircraft noise limit: Aircraft noise must not exceed the limits specified in Chapter 3 of Annex 16 of the The Convention on International Civil Aviation or the regulation of CAAT for airlines to follow. If it is found that any aircraft fails to follow the standard, the reasons and corrective measures must be specified in the Report on the	<u>1) General background sound</u> **Monitoring method(s)** • Monitor and record general background sound. • Collect and summarize the results from all general sound monitoring stations. • Report the monitoring results at all stations and disclose to the public, such as on the website, and communicate with the public about the access to the information. **Implementation area(s)** The general sound monitoring stations are shown in **Figure 5.1-2** including 4 stations below. • Ban Khlong Bang Phai Subdistrict Health Promotion Hospital • Elderly Life Quality Development Center of Samnak Thon Subdistrict Administrative Organization • Ban Khao Khrok Subdistrict Health Promotion Hospital • Wat Samnak Thon School **Indicator(s)** • $L_{eq\ 1\ hr}$ • $L_{eq\ 24\ hr}$

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	6) Ban Samnak Thon Early Childhood Development Center 7) Admiral Phrachao Boromwongse Krom Luang Chumphon Khet Udomsak Monument 8) Naval Aviation Museum 9) King Taksin the Great Monument (1 st Anti-Aircraft Division) 10) Somdet Ong Prathom (1st Anti-Aircraft Division) 11) Admiral Phrachao Boromwongse Krom Luang Chumphon Khet Udomsak Monument (1st Anti-Aircraft Division) 12) Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion) 13) Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion) 14) Wat Somburanaram 15) Wat Samnak Thon 16) Ban Khlong Bang Phai Subdistrict Health Promotion Hospital 17) Ban Khao Khrok Subdistrict Health Promotion Hospital ▪ 2,466 buildings in the community • The impact level is high.	implementation of environmental impact mitigation measures. • Make an annual report of the results of complaint management that includes the statistics of complaints, actions taken, analysis, and the impact mitigation plan. • Follow the measures for noise pollution from public airports approved by NEB in the meeting 6/2562 on 19 September 2019 and acknowledged by the Cabinet on 28 January 2020. • If the aviation practices at U-tapao International Airport change significantly, EEC or the entity holding the airport operating license and AEROTHAI shall assess noise from the changed aviation practices. • EEC holds a meeting with relevant agencies to make the action plan and noise monitoring plan for U-tapao International Airport at least once a year. • Install permanent noise monitoring stations before operating the second runway. • Measure background sound at permanent noise monitoring stations before using each station. • Install a 24-hr automatic aircraft noise monitoring system and analyze the results with the flight data from the Automatic Dependent Surveillance Broadcast (ADSB). Report the results of real time noise monitoring system to the public e.g. on the website and communicate with the public about the access to the information.	• L_{dn} • L_{max} • L_{90} • Annoyance noise **Frequency** • Monitor 24hrs/day for 7 consecutive days, 2 times/year throughout the lifetime of the Project. The report of monitoring results shall be submitted to the environmental impact monitoring committee. The Report on the implementation of environmental impact mitigation measures shall be submitted to the agency granting authorization/permission every 6 months. **Responsible party:** EEC **2) Noise from source** **Monitoring method(s) :** • Monitor noise from aircraft at the runway using an automatic noise monitoring device 24 hours continuously to monitor the noise during take-off and landing. • Record, collect, and summarize the results of the 7 noise monitoring stations, and identify the sources that might cause an impact. • Set up a system to monitor aircraft noise linked with the flight database. • Report the real time results at all stations and disclose to

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		• Airlines operating in U-tapao International Airport shall follow the take-off/landing method that causes the least noise or the method specified by EEC. This method must not affect safety factors and other factors such as airport service capacity, efficiency, accessibility. They shall summarize the data of flights and noise from noise measuring stations every 6 months. • Make PR campaigns about U-tapao International Airport operation, receive complaints and suggestions from relevant agencies and the public from at least 3 channels. • EEC makes a database of flights to link with the noise measuring stations to support future operations. **Responsible party:** EEC coordinates with relevant agencies **2) Ground noise control measures at U-tapao International Airport** • Upon receiving complaints, consider noise levels at nearby permanent noise monitoring station. If noise levels exceed the standard, change the engine testing time and limit it only during day time or as appropriate. Closely monitor the data. Present the monitoring results to the public. Disclose the monitoring results on a public website and other channels. • EEC coordinates with AEROTHAI, airlines, and ground service authorities to manage ground traffic in the airside effectively to reduce the activities that release pollution to the environment. **Responsible party:** EEC coordinates with relevant agencies	the public e.g. on the website and communicate with the public about the access to the information. • Prepare a work procedure to record and summarize the implementation in the log sheet. **Implementation area(s)** Permanent noise monitoring stations are shown in **Figure 5.1-2** including 7 stations below. • Southwest of the first runway • Southeast of the second runway • Eastern - Nong Muang Community Public Health Center • Moo 3 Ban Sa Kaeo, Samnak Thon Subdistrict Municipality • Wat Somburanaram School (Temrat Anuson) • Moo 2 Ban Chak Mak, Samnak Thon Subdistrict Municipality • Moo 1 3 Ban Nong Phak Kut Huai Yai Subdistrict Municipality **Indicator(s)** • L_{AE} or SEL • EPNL • $L_{eq\ 1\ hr}$ • $L_{eq\ 24\ hr}$ • L_{dn} • L_{max}

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		3) Noise mitigation measures at exposure points • Personnel working at the airside must wear PPE such as earplugs or earmuffs all the time. • Office buildings in U-tapao International Airport must have walls and doors installed with the air conditioning system to reduce noise. **Responsible party:** EEC **4) Land use planning measures** • EEC coordinates with relevant agencies, namely local administrative organizations around the Project Area, and Rayong and Chon Buri Offices office of Public Works and Town Planning, and provide data for Land Use Planning and Management. • EEC communicate with the public about air navigation safety zone and the areas to be affected by noise and advise them how to choose the noise protection methods and materials every year. Local authorities should also be informed. **Responsible party:** EEC coordinates with relevant agencies **5) Compensation measures** **5.1 Compensation conditions** The compensation for people affected by noise from the construction of the second runway and taxiway of U-tapao International Airport is based on the noise contour for the year 2048. The buildings to be compensated must be constructed before the date the EHIA Report is approved by NEB. EEC must	• L_{90} • Aircraft noise level in the community area (L_{dn}) **Frequency** • Monitor 24 hrs/day throughout the lifetime of the Project • Throughout the lifetime of the Project, the report of monitoring results shall be submitted to the environmental impact monitoring committee. The Report on the implementation of environmental impact mitigation measures shall be submitted to the agency granting authorization/permission every 6 months. **Responsible party:** EEC **3) Noise in the community area** **Monitoring method(s)** • Use the noise data from permanent noise measuring stations linked with the flight database or mobile units for 24 hrs/day for 7 consecutive days. • Make a summary report of complaint every year, comprising the statistics of complaints, solutions, analysis, and mitigation plans. The report shall be submitted to Civil Aviation Authority of Thailand (CAAT) once e year by 31 January each year. **Implementation area(s)** • In the area where the community complains that they have noise impact.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		publish the construction details of the Project to the public in advance. • The Project surveys and creates a database and compensation plan for those affected by noise caused by the Project development. The survey team shall complete the survey and determine the compensation value before operating the second runway. • Make a compensation plan and monitor the progress of the compensation according to the plan. Assess the implementation every year. Allocate enough budget for the compensation plan and communication plan. • Assess the compensation results and make a progress summary, communication, and problems arisen from the compensation measures. • Formulate the measures to monitor and assess the results of implementing the noise impact mitigation measures in NEF 30-40 area within 12 months to reduce repeated complaints from not renovating the buildings according to the compensation objectives. • Assign staff to survey and inspect degradation of equipment installed for longer than 5 years. If the problem is found to be the quality of material degrading faster than normal use, staff should be able to advise the repair and maintenance and consider adding financial support at the discretion of the Working Group considering the Environmental Impact Assessment and Quality of Life Improvement Fund to prevent	**Indicator(s)** • L_{AE} or SEL • EPNL • $L_{eq\ 1\ hr}$ • $L_{eq\ 24\ hr}$ • L_{dn} • L_{max} • L_{90} • Aircraft noise level in the community area (L_{dn}) **Frequency** • When there is a complaint **Responsible party:** EEC **4) Noise from actual flight situation** **Monitoring method(s)** • Make a summary of noise contour in the NEF or L_{dn} units every year. • Assess noise impact in the NEF or L_{dn} units using the mathematical model based on the actual flight data based on the Automatic Dependent Surveillance Broadcast (ADSB) linked with the noise monitoring station system. If there are areas affected by noise in addition to those compensated, the new affected areas shall be surveyed and compensated as soon as possible. • Record, collect, and summarize the noise monitoring results from all permanent stations and indicate the

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		the impact of noise and complaints after the compensation. **5.2 Compensation criteria** *NEF ≥ 40* • EEC shall negotiate to buy land and properties constructed before the date the EHIAg0 Report is approved by NEB. If the landowner does not wish to sell, EEC must support the renovation cost to reduce noise impact. The landowner receiving the compensation money is responsible for all the renovation activities. • EEC must support the renovation cost for places that need quiet in particular, such as schools, hospitals, and religious places. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB. *NEF 30 - 40* • EEC must support the renovation cost to reduce noise impact. The landowner receiving the compensation money is responsible for all the renovation activities. To be eligible for the compensation, the properties must be constructed before the date the EHIA Report is approved by NEB. • EEC must support the renovation cost for places that need quiet in particular, such as schools, hospitals, and religious places. To be eligible for the compensation, the properties must be constructed	source that might cause an impact. **Implementation area(s)** • The area with noise impact **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		before the date the EHIA Report is approved by NEB. **Responsible party:** EEC **6) Noise mitigation measures in case of complaints** • The Environmental Impact Mitigation Coordination Center of U-tapao International Airport is mainly responsible for complaint management. The Center will assess, analyze, investigate, and explain the complaint to the public about noise and/or other problems caused by the airport operation. There will be an electronic database that will locate and link the coordinates around U-tapao International Airport. The data must at least consist of the following details. - Name of the person or agency filing the complaint - House number - Building - The number of residents - Statistics of complaints - Estimated NEF area - Monitored NEF area (if any) - Land use - Other relevant information • There are complaint channels opening around the clock. • If there is a complaint from the community about noise impact from the operation of U-tapao International Airport, EEC will use the noise level from the permanent noise monitoring stations which is connected to the flight database or the measuring results by a mobile unit that works 24	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		hrs/day for 7 consecutive days. The Project will consider monitoring in the NEF or L_{dn} units in the area. There will be a committee to assess the impact from the Project. If the impact is proven real, EEC will compensate according to the determined measures. **Responsible party:** EEC **7) Noise impact mitigation measure in case of runway maintenance** • If a runway is closed for scheduled maintenance, EEC shall hold a meeting or send a letter to explain to relevant agencies and communities. AOT will have a meeting with relevant agencies to plan the measures for flight operation and air traffic at U-tapao International Airport by promoting appropriate use of runways to minimize impact on flights and environment while maintaining maximum safety. For example, EEC may increase flights during off-peak time and manage flight slots by reducing the number of flights in relation to the flight capacity in the scenario of closing a runway before the next flying season. EEC shall coordinate about the plan and prepare 6 months in advance before allocating the airport slot for the next flying season. • In case of non-scheduled maintenance, EEC shall plan and coordinate with relevant agencies for efficient air traffic management and minimum impact. Such an implementation shall be documented and communicated with the public. • EEC shall make a summary report of the implementations	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		during the scheduled maintenance and non-scheduled maintenance that includes such information as the allocation of airport slots and the number of affected flights. • EEC will investigate and assess the impact in the above scenarios of closing a runway for maintenance and make a plan to minimize the impact and notify relevant agencies and the public about the maintenance of the runway via at least 3 channels such as PR web board of U-tapao International Airport, online media, and community relations activities. • Assess the compensation results and make a progress summary report of the compensation, communication, and problem arisen from the compensation measures. • EEC communicates with the public about the air navigation safety zone and the areas to be affected by noise, and advise on the noise mitigation techniques and materials every year and coordinate with local authorities. • The licenses and the building owner shall mtaintain and take appropriate actions to ensure that the equipment and materials designed to mitigate aircraft noise can prevent noise from aircraft throughout the service life of the buildings. **Responsible party:** EEC coordinates with relevant agencies	
2) Vibration Construction phase	Vibration impact assessment was performed by comparing the maximum particle velocity values with	• There must be engineers to supervise the construction and select the machines and equipment that are in good	**Monitoring method(s)** • Monitor vibration in the community area 24 hrs/day

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	the impact of vibration on humans and buildings. It was found that 144 sensitive areas and 27 communities (totally 201 places) at the distances of 40 – 13,740 meters had the maximum particle velocity caused by the pile driver (sonic) ranging from 0.0000 - 0 . 0610 inches/sec) (0.0003-1.5501 mm/sec) . The impact on local people was not sensible. Regarding the impact on building structures, the vibration at this degree does not affect or damage any type of structure. Therefore, the impact level is low.	condition and suitable construction methods that cause minimum vibration. Vibration reduction equipment may be used to reduce vibration. Make sure to use the equipment as instructed by the manufacturer. • If it is necessary to use metal sheets to block the road temporarily, the thick metal sheets should be used. The metal sheets should be closely attached to the road surface. Elastic material should be used to minimize noise and vibration from the vehicles using the road. • The contractor mut control or limit the vehicle weight below 25 tons. Large truck weight must not exceed the limit by law. When passing the community area, the speed limit is lower than 40 km//hr to minimize vibration. **Responsible party:** RTN and EEC finstruct the contractor to follow the measures	for 7 consecutive days. **Implementation area(s)** Monitor in the areas where vibration may affect building structures as shown in **Figure 5.1-1** including 2 stations below. • RTN Early Childhood Nursery 6 , Naval Aviation Division • Eastern - Nong Muang Community **Indicator(s)** • Vibration **Frequency** • Once a month when there is a construction activity near the construction area throughout the construction phase. **Responsible party:** RTN and EEC
2) Vibration Operation phase	The main activities in the operation phase at U-tapao International Airport are the more frequent take-off and landing, resulting in more vibration in the air caused by aircraft thrust (wingtip vortex). According to the vibration impact assessment on 201 sensitive areas and communities in the Project study area, 34 places are in the scope of the affected area, as listed below. **Schools:** 11 places, namely 1) Pattanavechsueksa School, 2) Pattanavech Technological College, 3) Song La Early Childhood Development Center 3, 4) Wat Sa Kaeo School, 5) Wat Somburanaram School (Temrat Anuson), 6) Samnak	• Prepare the main channel to receive complaint via the Environmental Impact Mitigation Coordination Center of U-tapao International Airport located in U-tapao International Airport every day during office hours (08.00-17.00 hrs.) • Staff will be sent to inspect the damage and record the evidence in every case to estimate the repair cost. The building owner will find a contractor for the repair. The repair cost shall be billed from the fund for developing life quality of the public within the determined amount. There will be a fund management committee to consider the damages for	**Monitoring method(s)** • Monitor vibration in the community area for 24 hrs/day for 7 consecutive days. • Record the monitoring results. • Collect and summarize the vibration monitoring results from all stations. • Report the results of all monitoring stations and disclose the results to the public such as on the website. The public should be notified about the access channels to the data.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Thon Subdistrict Municipality Early Childhood Development Center in Wat Somburanaram School, 7) Ban Chang Disitrict Non-formal and Informal Education Center 8) Chumchon Wat Suwan Rangsan School, 9) Ban Yai Ra Childhood Development Center 10) Wat Samnak Thon School, and 11) Ban Samnak Thon Early Childhood Development Center. **Religious places:** 11 places including 1) Admiral Phrachao Boromwongse Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion) , 2) Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), 3) Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion), 4) Wat Sa Kaeo, 5) Wat Somburanaram, 6) Ban Chang Abundant Grace Church, 7) Wat Samnak Thon, 8) Wat Suwan Rangsan, 9) Wat Nong Bot 10) Luang Tia Chak Mak Shrine, and 11) Wat Chak Mak. **Hospitals:** 3 places including 1) Ban Sa Kaeo Subdistrict Health Promotion Hospital 2) Ban Khao Khrok Subdistrict Health Promotion Hospital and 3) Samnak Thon Subdistrict Health Promotion Hospital **Communities:** 9 communities - Samnak Thon Subdistrict Municipality (Samnak Thon Subdistrict, Ban Chang District, Rayong Province) 7 villages, namely 1) Moo 1 Ban Samnak Thon, 2) Moo 2 Ban Chak Mak, 3) Moo 3 Ban Sa Saeo, 4) Sa Kaeo Community 1,	aircraft thrust in every case. • EEC shall follow the objectives of the fund for compensating the impact and developing life quality, especially the impact from fallen objects due to aircraft and aircraft thrust. **Responsible party:** EEC	**Implementation area(s)** The vibration monitoring stations are presented in **Figure 5.1-3** including 4 stations below. • Ban Khlong Bang Phai Subdistrict Health Promotion Hospital • The Elderly Life Quality Development Center of Samnak Thon Subdistrict Administrative Organization • Ban Khao Khrok Subdistrict Health Promotion Hospital • Wat Samnak Thon School **Indicator(s)** • Vibration **Frequency** • 2 times/year throughout the lifetime of the Project. Summarize the results to the Environmental Impact Monitoring Committee and submit the report of implementing the environmental impact mitigation measures to the agency granting authorization / permission every 6 months. **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	5) Sa Kaeo Community 2, 6) Moo 6 Ban Khao Khrok, and 7) Moo 7 Ban Nong Takhian. - Huai Yai Subdistrict Municipality (Huai Yai Subdistrict Bang Lamung District, Chon Buri Province) 2 villages, namely 1) Moo 11 Ban Map Fak Thong and 2) Moo 13 Ban Nong Phak Kut. It is estimated that the impact level of vibration in the air caused by wingtip vortex will be moderate.		
3) Air quality Construction phase	The construction will release exhaust from machines used for land preparation, land grading, and other construction activities. The air quality assessment can be summarized below. **The forecast results of total suspended particulate (TSP)** caused by the construction at the sensitive areas and community area ranged from 1.627-132.226 µg/m³. The highest concentration was found at Eastern - Nong Muang Community, which is 1,120 m. from the construction area. When combining the forecast value and the background value, the TSP concentration ranged from 79.852-274.226 µg/m³. It is concluded that the results at every sampling point were within the standard of ambient air quality. **The forecast results of PM10** caused by the construction ranged from 0.350-26.912 µg/m³. The highest concentration was found at Eastern - Nong Muang Community, which is 1,120 m. from the	• The construction areas where vehicles and construction activities may cause dust dispersion, including the roads inside the airport that have not been paved with asphalt or concrete, must be sprayed with water at least 2 times a day or as appropriate to mitigate the impact of dust dispersion. • The trucks transporting the construction materials and equipment that might cause dust dispersion must be tightly covered with canvas or similar materials. • A 2-m high wall will be built around the construction area to identify the construction area and to minimize dispersion of dust and exhaust from construction equipment and spillage of construction materials to outside. • Wash the tires of all vehicles leaving the construction area free of dirt, mud, and sand before allowing them to use public roads. The washing area shall be properly provided. • Ensure that vehicles do not cause more pollution than the	**Monitoring method(s)** • Monitor ambient air quality for 24 hrs/day for 7 consecutive days. **Implementation area(s)** Sensitive areas and communities near the construction area are shown in **Figure 5.1-1** including 2 stations below. • RTN Early Childhood Nursery 6 , Naval Aviation Division • Eastern - Nong Muang Community **Indicator(s)** • 24-hr TSP • 24-hr PM10 • 24-hr PM2.5 • 1-hr nitrogen dioxide (NO_2) • 1-hr and 8-hr carbon monoxide (CO) • 3-hr non-methane hydrocarbon (NMHC) • 1-hr total hydrocarbon (THC) • 24-hr VOCs

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	construction area. When combining the forecast value and the background value, the PM10 concentration ranged from 43.668-90.912 µg/m³. It is concluded that the results at every sampling point were within the standard of ambient air quality. **The forecast results of carbon monoxide (CO)** caused by the construction ranged from 2.174-135.462 µg/m³. The highest concentration was found at Ban Sa Kaeo Subdistrict Health Promotion Hospital, which is 2,620 m. from the construction area. When combining the forecast value and the background value, the CO concentration ranged from 1,506.131-2,375.462 µg/m³. It is concluded that the results at every sampling point were within the standard of ambient air quality. **The forecast results of nitrogen dioxide (NO_2)** caused by the construction ranged from 2.487-154.511 µg/m³. The highest concentration was found at Ban Sa Kaeo Subdistrict Health Promotion Hospital, which is 2,620 m. from the construction area. When combining the forecast value and the background value, the NO_2 concentration ranged from 32.411-234.311 µg/m³. It is concluded that the results at every sampling point were within the standard of ambient air quality. Overall, the impact level of pollutants from the construction is low to moderate.	standard. Properly maintain the engine of vehicles and construction machines in good condition. If their emission exceeds the standard, they have to be fixed before they can be used again. • Limit the speed of vehicles transporting the construction materials and equipment according to law. Trucks loading more than 1,200 kg. cannot drive faster than 60 km/hr. Trailer trucks cannot drive faster than 45 km/hr. The speed limit in the construction area is 30 km/hr. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	• Wind speed and wind direction (WS/WD) **Frequency** • Once a month during the construction **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
3) Air quality Operation phase	The Project assessed the impact of air quality based on the flight volume in the same way as noise impact. The 11 forecast scenarios of pollutant dispersion in the operation phase has the worst case scenario (the maximum of 70 flights/hr.) in 2048 can be summarized below. **1) Ambient air quality** By using AERMOD model to forecast the pollutant dispersion indicators of ambient air quality, it was found that the maximum concentration of 24-hr PM10, 24-hr SO_2, and 1-hr CO in every scenario did not exceed the standard of ambient air quality while the 1-hr NO_2 concentration in every scenario exceeded the standard of nitrogen dioxide in ambient air. Considering the pollutant concentrations at sensitive areas and community areas, the maximum concentration of 24-hr PM10, 24-hr SO_2, and 1-hr CO in every scenario did not exceed the standard of ambient air quality while the 1-hr NO_2 concentration exceeded the standard of nitrogen dioxide in ambient air at 5 places, namely 1) Wat Khao Bai Si Santitham, 2) Ban Khao Khrok Subdistrict Health Promotion Hospital, 3) Moo 3 Ban Sa Kaeo, Sa Kaeo Community 1, 4) Moo 6 Ban Khao Khrok, and 5) Ban Choeng Khao, Ban Chang – Phala Community, Wirat Phatthana Community.	**1) Management measures** • EEC coordinates with relevant agencies to manage flight slots according to flight capacity efficiently without compromising the safety factors. • Complete AQMS installations before operating the second runway. • Monitor ambient air quality as the background data at the air quality monitoring stations before using each station. • Airlines operating at U-tapao International Airport shall follow the take-off/landing method that causes the least noise or the method specified by law. This method must not affect safety factors and other factors such as airport service capacity, efficiency, accessibility. • EEC makes the flight database to link with the report from air quality measuring stations to use as supporting data in the future. **Responsible party:** EEC coordinates with relevant agencies **2) Air pollution control measures for ground operation at U-tapao International Airport** • All aircrafts parking at the Tunnel or Passenger Loading Bridge are required to shut the engine and use the power and air conditioning equipment provided by the utility system of U-tapao International Airport • EEC coordinates with AeroThai, airlines, and ground service units to manage ground traffic in the airside efficiently to	**1) Ambient air quality** **Monitoring method(s)** • Monitor ambient air quality for 24 hrs/day for 7 consecutive days **Implementation area(s)** The ambient air monitoring stations are presented in **Figure 5.1-4** including 5 stations below. • Ban Khao Khrok Subdistrict Health Promotion Hospital • Wat Somburanaram School (Temrat Anuson) • Wat Samnak Thon School • Moo 2 Ban Chak Mak Samnak Thon Subdistrict Municipality • Moo 13 Ban Nong Phak Kut Huai Yai Subdistrict Municipality **Indicator(s)** • 24-hr TSP • 24-hr PM10 • 1-hr and 8-hr carbon monoxide (CO) • 1-hr nitrogen dioxide (NO_2) • 1-hr total hydrocarbon (THC) • Wind direction and wind speed (WD/WS) **Frequency** • 2 times/year throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	2) Volatile organic compounds (VOCs) The dispersion forecast of VOCs revealed that the concentrations of benzene and 1,3-Butadiene did not exceed the surveillance values (Notification of the Pollution Control Department: Surveillance value for 24-hr volatile organic compounds determining that benzene must not exceed 7.6 µg/m³ and 1,3-Butadiene must not exceed 5.3 µg/m³). The concentration of acrolein exceeded the surveillance value (Notification of the Pollution Control Department: Surveillance value for 24-hr volatile organic compounds determining that acrolein must not exceed 0.55 5.3 µg/m³). Considering the concentrations of pollutants at sensitive areas and community areas, the maximum concentration of 24-hr benzene and 1,3-Butadiene did not exceed the surveillance values in every scenario. On the other hand, the concentration of acrolein exceeded the surveillance value at 24 places, namely 1) Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), 2) Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion), 3) Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion), 4) Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (1st Anti-Aircraft	reduce the waiting time of aircraft and the activities that produce pollutants to the environment. • Encourage staff and U-tapao International Airport users to use more public transit, which will reduce energy consumption and pollution from cars. • Promote environmental-friendly vehicle such as those run with electricity or biodiesel. • Promote the use of Ground Support Equipment (GSEs) that consumes low pollutant fuels such as using electricity in the airside and natural gas or electricity in the landside. • Manage traffic in U-tapao International Airport, especially at the terminals and parking building to minimize emission of air pollutants. • EEC develops or improve the ground power unit and pre-conditioned air to cover aircraft parking bay and require airlines to use such system instead of Auxiliary Power Unit (APU) of aircrafts. **Responsible party:** EEC coordinates with relevant agencies **3) Air pollution mitigation measures in case of runway maintenance** • Communicate with relevant agencies and the public about runway maintenance to minimize the impact via communication channels such as PR web board of U-tapao International Airport, online platforms, and community relations activities. • Ask cooperation from airlines to park aircraft at the apron	**2) Air Quality Monitoring System** **Monitoring method(s)** • Install the automatic air quality monitoring system to monitor the quality of ambient air **Implementation area(s)** The AQMS stations are presented in **Figure 5.1-4** including 4 stations below. • Southwest of the 1st runway • Southeast of the 2nd runway • Public Health Center of Eastern - Nong Muang Community • Ban Khlong Bang Phai Subdistrict Health Promotion Hospital **Indicator(s)** • 24-hr and 1-year PM10 • 24-hr and 1-year PM2.5 • 1-hr and 8-hr carbon monoxide (CO) • 1-hr and 1-year nitrogen dioxide (NO_2) • 24-hr VOCs* • Wind direction and wind speed (WD/WS) **Remark: *** - Measure volatile organic compounds (VOCs) in ambient air. The parameters, sampling method, and analysis method shall conform to Notification of Pollution Control Department Re: determining the warning level for VOCs in

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Division), 5) Moo 4 Ban Khlong Bang Phai, 6) Eastern - Nong Muang Community Public Health Center, 7) Pattanavechsueksa School, 8) Moo 3 Ban Sa Kaeo, 9) Moo 8 Ban Choeng Khao, 10) Moo 3 Ban Sa Kaeo, 11) Moo 8 Ban Choeng Khao, 12) Wat Khiri Phawanaram Community, 13) Ban Chang – Phala Community, 14) Sa Kaeo Community 2, 15) Song La Early Childhood Development Center 3, 16) Ban Sa Kaeo Subdistrict Health Promotion Hospital, 17) Wat Sa Kaeo School, 18) Sa Kaeo Community 1, 19) Ming Mongkhon Community, 20) Chor Khu Community, 21) Wirat Phatthana Community, 22) Moo 6 Ban Khao Khrok, 23) Thep Chinda Community, 24) Ban Khao Khrok Subdistrict Health Promotion Hospital. It impact is estimated at the moderate level.	while waiting for take-off. **Responsible party:** EEC coordinates with relevant agencies	ambient air within 24 hours dated 18 December 2008 or the latest notification or relevant laws as the guideline for addressing air pollution and reducing the risk of public health due to activities of U-tapao International Airport. - Record the environment condition e.g. the number of cars, motorcycles, and aircrafts while measuring to identify the sources of increased pollutants. **Frequency** • Monitor throughout the lifetime of the Project and submit the summary of the monitoring results to the Environmental Impact Monitoring Committee. Make a summary report for implementing the environmental impact monitoring measures and present to the agency granting authorization/permission every 6 months. • Monitor only VOCs twice a year, once in April (for summer) and once in December (for winter), throughout the lifetime of the Project or consider the three-year retrospective statistics. Make a summary report for implementing the environmental impact monitoring measures and present to the agency granting authorization/permission every 6 months. **Responsible party:** EEC
4) Topography Construction phase	The construction of the second runway will be limited within U-tapao International Airport. Activities that might affect topography are land preparation, land	• The contractor is required to conduct land reclamation according to the Land Excavation and Land Filling Act B.E. 2543, and its subsequent amendments.	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	reclamation, and land grading at the construction area. The current condition of construction area is now empty space. The land elevation will increase, but it will not affect the overall topography of U-tapao International Airport significantly. The scope of the impact will be limited only within the construction area of the Project. Therefore, the impact on the topography is low.	**Responsible party:** RTN and EEC instruct the contractor to follow the measures	
4) Topography Operation phase	Activities in the operation phase mainly involve take-off and landing of aircraft and administration of U-tapao International Airport. The area will remain mostly the same. Therefore, there is no impact on the topography.	-	-
5) Geology and seismology Construction phase	According to the survey of soil in the Project area, the soil is characterized by sedimentary condition. The construction site will be reclaimed, compacted, and hardened, covered with concrete and asphalt. The construction does not involve drilling into the lower soil layers. However, the constructions of building and warehouse structures will involve piling and drilling into lower soil layers. The design of buildings and structures shall conform to the ministerial regulation of the Ministry of Interior regarding the weight bearing capacity, resistance, durability of a building and land against seismic vibration B.E. 2564 announced in the Government	• It is prohibited to pump groundwater to use in the construction area and construction control office in order to prevent land subsidence. • RTN and EEC/the agency responsible for the construction shall use previous data of land subsidence and usage of systems at U-tapao International Airport as the data for designing future developments of U-tapao International Airport. • The design of buildings and structures shall conform to the ministerial regulation of the Ministry of Interior regarding the weight bearing capacity, resistance, durability of a building and land against seismic vibration B.E. 2564 announced in the Government Gazette on 4 March 2021.	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Gazette on 4 March 2021. Therefore, the construction does not cause an impact on the geological features of the airport. Based on statistics of earthquakes affecting Thailand from 2013 – 2017, Rayong Province does not have any active faults, and there is no record of earthquakes in the Project study area. Therefore, the impact level is low.	**Responsible party:** RTN and EEC instruct the contractor to follow the measures.	
5) Geology and seismology Operation phase	In the operation phase of the second runway and taxiway, the main activities at U-tapao International Airport will be take-off and landing of aircrafts. There will be no drilling into lower soil layers, adjustment of soil surface, or any geological features. Therefore, there is no impact on the geology.	• It is prohibited to pump groundwater to use for activities in U-tapao International Airport. **Responsible party:** EEC	-
6) Soil resources Construction phase	**1) Soil erosion** The soil in the Project area is mostly sandy with high erosion rates. Removal of plants and ground cover from the Project area as a preparation process for constructing the runway, taxiway, and other elements might cause more soil erosion caused by wind and water. In the construction phase, there will be such activities as clearing, digging, and piling. These activities may cause the soil to be eroded into water drainage in the Project area, resulting in a blockage of the drainage system. **2) Land subsidence** In the construction phase, running water will be bought from PWA offices around the Project, namely Rayong PWA Branch	• Survey the soil layer before designing and constructing the runway in order to choose the appropriate technology for construction that minimize subsidence of the runway. • To maintain stability of boreholes, use a polymer solution instead of bentonite. This requirement shall be included as part of the employment contract. • Ensure to reclaim land only in the areas necessary for the construction. The construction area must be clearly scoped. • Piles of soil and materials must be away from surface water and seawater as much as possible. Avoid the areas that are easily eroded. • Prevent soil erosion from the construction area to the drainage system by building a moat or using appropriate	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	and Ban Chang PWA Branch, which does not require digging or pumping groundwater. Therefore, land subsidence for this reason is not expected, and it does not affect the construction of the Project. **3) Soil hardening** Soil hardening uses different machines and tools, depending on the depth of soil to be improved. It applies the same principle: soil compaction. This technique is to improve soil quality or to make soil hard by applying mechanical force in soil compaction at a shallow level only about 1 – 2 meters from the surface. This can be done my typical machines such as rollers, water prayer, and motor grader. Soil hardening at the medium depth of 2-10 meters, the free fall hammering technique will be used with a minimum hammer weight of 7 tons and the diameter of the hammering area of 1.5 meters, and the distance between each hammering point at 3.00 meters. This technique is used to harden loose sand layer or thick sand layer of 4 - 8 meters. After compaction, the soil layer will be strong, have low subsidence, and be able to bear the designed weight. Therefore, the overall impact on soil resources is low.	material to prevent erosion into the drainage system. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
6) Soil resources Operation phase	**Soil erosion:** The Project will prepare a water pumping station at Water Holding Pond 11 to drain excess runoff outside. The water pump station will have 4 pumps	• Maintain ground cover plants in U-tapao International Airport to prevent soil erosion in the rainy season. • Examine land subsidence near the runway regularly by	**Monitoring method(s)** • Monitor subsidence near the runway and taxiway by surveying the height of the runway and the height of

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	with a capacity of 2 m^3/sec each (3 pumps operating and 1 pump spare). A maximum of 3 pumps will operate at the same with a total capacity of 6 m^3/sec. The flow rate from the water pump station is high and may result in soil erosion. **Land subsidence:** U-tapao International Airport will use water from the water manufacturer (Eastwater) who does not pump groundwater to use. Therefore, there is no factor that causes land subsidence in the Project area.	ensuring that the runway evenness always meets the requirement. If the runway evenness values are different by more than 13 cm, it is necessary to even the surface immediately. • Repair the runway where unevenness is detected to ensure safe take-off and landing according to the requirements of the International Civil Aviation Organization (ICAO). • Assign a division in U-tapao International Airport to be in charge of monitoring subsidence of the runway and taxiway. **Responsible party:** EEC	the vertical and horizontal control monument. **Implementation area(s)** • The surface of the second runway and taxiway and apron. **Indicator(s)** • The height of the runway and the height of the vertical and horizontal control monument. **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC
7) **Surface water hydrology** Construction phase	The construction activities include 1) land clearing/ soil hardening/ land reclamation, 2) reclamation of runway and taxiway strip/ construction of the runway surface structure, 3) the structure and surface of the runway, 4) excavation, installation of supports/ pile cutting, and the roof the tunnel under the runway, 5) foundation, 6) structure, 7) architecture and utilities, and 8) construction in the station/ utilities, and architecture in the railway station. These activities may cause erosion of soil and construction materials into nearby canals, resulting in shallowing and poor drainage in certain periods of the construction phase. Based on the survey of repeated flooding situation in Rayong Province, Phala Subdistrict is not located in a repeated flooding area. Therefore, the construction in	• Keep construction materials and equipment tidily and prevent particles of construction materials from blocking the waterway and water drainage system in U-tapao International Airport. Build a moat or use a suitable material to block nearby drainage to prevent erosion of soil and materials into the canals. • Ensure that the drainage systems near construction site always drain water efficiently. If it is shallow due to eroded soil or weed, it shall be dredged for efficient drainage. • If canals or drainage systems in U-tapao International Airport are to be reclaimed, the new ones with equivalent capacity will be replaced. • Install sieve to filter out waste in drainage system as necessary. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**Monitoring method(s)** • Monitor the water drainage system and the canal, particularly those near the construction area. **Implementation area(s)** • The water drainage system and the canal near the construction area. **Indicator(s)** • Water level, water flow direction, and shallowing levels **Frequency** • Once a year before the rainy season throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	this Project does not pose the risk of severe flooding. There might still be some flooding at small puddles caused by digging for surface grading. However, such impact will last for a short time, and therefore, the impact level is low.		
7) **Surface water hydrology** Operation phase	When the second runway and taxiway of U-tapao International Airport is operated, there will be more take-off/landing. It will not affect the flooding situation because the Project area is located on the seaside. Statistics also showed no record of flooding in U-tapao International Airport. However, land use change from empty space into the runway might affect water drainage in the area and change hydrological features of the area. To prevent flooding, the Project prepares 2 holding ponds (the combined capacity of 320,077.41 m^3). The ponds can retain the runoff for at least one hour before discharging to the sea. The ponds are designed to prevent flood adequately. Therefore, the impact level is low.	• Check the general condition and the cross section of the canals in U-tapao International Airport regularly. If the bed is found to be shallow or erosion is detected, dreding is required to maintain the cross section as designed. • Inspect obstruction at canals every 6 months. If any obstruction is found, it must be removed immediately to facilitate the water drainage. • Maintain the water level at canals near the runway, taxiway, and parons as low as possible. The water remaining in the canals must be drained out instantly, especially when it rains. • Inspect the water drainage system at U-tapao International Airport regularly to ensure efficient drainage. Prepare a spare pump to drain out the water in case the main pumps are damaged. **Responsible party:** EEC	**Monitoring method(s)** • Collect the water level and patterns of water flow in the drainage systems and canals around U-tapao International Airport from relevant agencies and analyze draining efficiency of such canals. Make a monitoring report that summarizes the problems and suggestions for improvement. **Implementation area(s)** • Drainage systems and canals around U-tapao International Airport **Indicator(s)** • Water levels • Pattern of water flow **Frequency** • Once a year before the rainy season throughout the lifetime of the Project **Responsible party:** EEC
8) **Quality of surface water**	**1) Erosion from the construction area** The construction activities will cause an impact on the quality of seawater as they erode more suspended	• At the construction control office, there will be enough sanitary bathrooms for workers and staff with a minimum ratio of 3 bathrooms for the first 80 people, and one more	**Monitoring method(s)** Monitor the quality of surface water in the Project area. Use the monitoring method determined by the

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
Construction phase	solids (SS) from the construction area to natural water bodies and the sea. The analysis of SS concentration in the sea was performed in the rainy season on 19 July 2019 and in the dry season on 1 November 2019. The analysis compared SS concentration in the sea caused by erosion. The erosion did not have significant impact in the dry season while the trend rose in the rainy season. However, the construction activities of the second runway, the taxiway and other elements will occur in U-tapao International Airport. Wastewater from construction activities will not be discharged to natural water bodies. Therefore, the impact from erosion from the construction area is low. **2) Waste water from the Project activities** Wastewater from consumption of construction worker and construction supervisors **Phase 1 :** Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 161.8 m^3/day and from the worker campsite 318 m^3/day. **Phase 2 :** Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 49.4 m^3/day and from the worker campsite 97.6 m^3/day.	bathroom for the next 50 people. Install wastewater treatment system package that can handle with daily production of wastewater. Wastewater will not be discharged to water bodies inside U-tapao International Airport. A supplier will be hired to collect wastewater to the central wastewater treatment of U-tapao International Airport. • Prepare a clarifer pond to collect water used for cleaning the vehicle wheels to clarify the water before discharging to drainage canal. • Maintenance of machines and equipment is done within the maintenance shop with a system to prevent draining oil contaminated water to drainage canals. • Workers will be instructed to take cautions in transferring oil and chemicals to prevent contamination to drainage canals. Use hand pumps or other suitable tools to transfer oil. Prepare preventive tools for oil spill such as drip tray. • Waste, food leftover, oil, and construction materials cannot be thrown into drainage canals in U-tapao International Airport. The contractor shall provide bins to collect waste from workers. Prepare containers to collect used oil for appropriate disposal. Record the quantity of waste and disposal. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	Notification of the National Environmental Board No. 8 B.E. 2537 re: the standard of surface water quality. **Implementation area(s)** The sources of surface water in the Project area are presented in **Figure 5.1-5** including 4 stations below. • W1 : Khlong Bang Phai upstream of discharge • W2 : Khlong Bang Phai downstream of discharge • W3 : Khlong Bang Phai mouth to the sea • W4 : Khlong Phala **Indicator(s)** 1) Physical properties • Water Temperature • Transparency • Turbidity • Conductivity • Salinity 2) Chemical properties • pH values • Dissolved oxygen (DO) • BOD • Suspended solid (SS) • Total dissolved solid (TDS) • Fat, Oil, and Grease • Nitrate (NO_3) in the unit of nitrogen • Phosphate - Phosphorus

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Phase 3 : Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 91.5 m^3/day and from the worker campsite 180.5 m^3/day. The employment contract will require the contractor to install an onsite septic tank to treat the wastewater from the construction control office and the worker campsite to ensure conformance to wastewater standard according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). The treatment system at the construction control building shall have the minimum capacity that can handle with the daily wastewater production in each phase before discharging to public drainage systems. Therefore, the impact is low.		• Arsenic (As) • Manganese (Mn) • Total Hg • Zinc (Zn) • Cadmium (Cd) • Copper (Cu) • Nickel (Ni) • Chromium hexavalent (Cr^{6+}) • Lead (Pb) • Chromium (Cr) 3) Biological properties • Total Coliform Bacteria • Fecal Coliform Bacteria **Frequency** • Once a month throughout the construction phase **Responsible party:** RTN and EEC
8) Quality of surface water Operation phase	When the Project operates the second runway and taxiway and the extension area of U-tapao International Airport in Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048), the total wastewater volume will be 3,185 m^3/day, 5,625 m^3/day, and 9,212 m^3/day, respectively. The existing central wastewater treatment system of U-tapao International Airport is the Activated Sludge (AS) type with a capacity of 75	• The central wastewater treatment system will be operated and inspected regularly. • Monitor the properties of treated water to ensure conformance to the standard of wastewater from buildings Type A according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548) or the latest notification before discharging to drainage canal in U-tapao International Airport.	**Monitoring method(s)** • Monitor the quality of surface water in the Project area. Use the monitoring method determined by the Notification of the National Environmental Board No. 8 B.E. 2537 re: the standard of surface water quality. **Implementation area(s)** Sources of surface water in the study area are presented in **Figure 5.1-5** including 4 stations below.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	m^3/day. It cannot accommodate the wastewater volume in the future adequately. To improve the public utilities of the airport, the Sequencing Batch Reactor (SBR) wastewater treatment will be constructed. The construction is divided into 2 phases: Phase 1 (year 1 – 6) and Phase 2 (year 7). Each phase has a capacity of 8,000 m^3/day. The wastewater will be treated and recycled for about 5,000 m^3/day. This volume will be used for watering the plants in the green area (garden) in U-tapao International Airport. The rest of the water will be stored at the clarifier pond before discharging to the drainage system and collecting to Holding Pond 2 of the Project. All in all, the central wastewater treatment system can handle with the wastewater volume generated from the Project development adequately. Therefore, the impact level is low.	• Reuse treated water as much as possible such as watering the plants in green area in U-tapao International Airport to minimize the volume of water to be discharged. **Responsible party:** EEC	• W1 : Khlong Bang Phai upstream of discharge • W2 : Khlong Bang Phai downstream of discharge • W3 : Khlong Bang Phai mouth to the sea • W4 : Khlong Phala **Indicator(s)** 1) Physical properties • Water Temperature • Transparency • Turbidity • Conductivity • Salinity 2) Chemical properties • pH values • Dissolved oxygen (DO) • BOD • Suspended solid (SS) • Total dissolved solid (TDS) • Fat, Oil, and Grease • Nitrate (NO_3) in the unit of nitrogen • Phosphate - Phosphorus • Arsenic (As) • Manganese (Mn) • Total Hg • Zinc (Zn) • Cadmium (Cd)

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			• Copper (Cu) • Nickel (Ni) • Chromium hexavalent (Cr^{6+}) • Lead (Pb) • Chromium (Cr) 3) Biological properties • Total Coliform Bacteria • Fecal Coliform Bacteria **Frequency** • Every 4 months in the first 2 years and every 6 months (in the rainy season and dry seaon) in the next year and throughout the lifetime of the Project **Responsible party:** EEC
9) Quality of ground water Construction phase	In the construction phase, effluent or wastewater from construction activities and consumption of workers and supervisors may contaminate groundwater and affect the quality of ground water in the Project area. However, the employment contract will require the contractor to install an onsite treatment system to treat the wastewater from the construction control office and the worker campsite to ensure conformance to the wastewater standard according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). The onsite	• The Project will not wash equipment and machines in natural water bodies or the drainage systems. • Dumping waste or wastewater in natural water bodies is prohibited. • Prepare a oil/grease trap to prevent oil from machines spilling on the ground from entering the natural water bodies or the drainage systems. • Inspect machines every week to prevent leaks of engine oil. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	treatment system at the worker campsite must have a minimum capacity in Phase 1, Phase 2, and Phase 3 of 318 m^3/day, 97.6 m^3/day, and 180 m^3/day, respectively. The onsite treatment system at the construction control office must have a minimum capacity in Phase 1, Phase 2, and Phase 3 of 161.8 m^3/day, 49.4 m^3/day, and 91.5 m^3/day, respectively. Wastewater will be treated before discharing to public drainage systems. Therefore, there is no impact on the quality of ground water.		
9) Quality of ground water Operation phase	When the Project is operated, the passenger volume will be 14 million/year in 2028, 38 million/year in 2038, and 70 million/year in 2048. The forecast of the total wastewater volume in Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048), will be 3,185 m^3/day, 5,625 m^3/day, and 9,212 m^3/day, respectively. The central wastewater treatment system has the capacity to handle such volume of wastewater adequately without discharging to the ground and wastewater will not contaminate groundwater. Therefore, there is no impact on the quality of ground water.	• Inspect the condition of the canals and drainage systems regularly to ensure that the water flow is not blocked. • Maintain equipment for pumping and draining water to be always in good condition to work effectively. **Responsible party:** EEC	-
10) Quality of seawater Construction phase	**1) Erosion from the construction area**	• The contractor shall prepare the central construction storage area and use appropriate material to cover the area to	**Monitoring method(s)** • Monitor the quality of sea water in the Project area.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	The construction activities will cause an impact on the quality of seawater as they erode more suspended solids (SS) from the construction area to natural water bodies and the sea. The analysis of SS concentration in the sea was performed in the rainy season on 19 July 2019 and in the dry season on 1 November 2019. The analysis compared SS concentration in the sea caused by erosion. The erosion did not have significant impact in the dry season while the trend rose in the rainy season. However, the construction activities will occur in U-tapao International Airport. Sediment from the construction area will flow to nearby wastewater drainage systems and be collected at the wastewater clarifier pool before discharging to canals and the sea. Therefore, the impact from erosion from the construction area is low. **2) Wastewater from construction activities** Wastewater from consumption of construction worker and construction supervisors **Phase 1**: Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch	prevent erosion to natural water bodies in the rainy season. • Prepare mobile toilets in the construction area and temporary offices. The sanitary wastewater will be collected and disposed by a supplier with a valid license. • Signs must be posted to prohibit workers from dumping general waste and construction waste from the construction area to natural waters and the sea. • Require the contractor to inspect machines regularly and ensure that there is no oil leak that may be eroded to natural waters and the sea. • Workers will be instructed to take cautions in transferring oil and chemicals to prevent contamination to drainage canals. Use hand pumps or other suitable tools to transfer oil. Prepare preventive tools for oil spill such as drip tray. • General waste, food leftover, oil, and construction materials cannot be thrown into drainage canals in U-tapao International Airport. The contractor shall provide bins to collect waste from workers. Prepare containers to collect used oil for appropriate disposal. Record the quantity of waste and disposal. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	Use the monitoring method determined by the Notification of the National Environmental Board No. 8 B.E. 2537 re: the standard of seawater quality (announced in the in the Government Gazette dated 6 October 2021) **Implementation area(s)** Sources of seawater in the Project area are presented in **Figure 5.1-6** including 6 stations • SW1 : south of the 1st runway at 300 m. from the coast • SW2 : south of the 2nd runway at 300 m. from the coast • SW3 : southeast of the 2nd runway at 300 m. from the coast • SW4 : southwest of the 1st runway at 500 m. from the coast • SW5 : south of the 2nd runway at 500 m. from the coast • SW6 : southeast of the 2nd runway at 500 m. from the coast **Indicator(s)** **1) Physical properties** • Water Temperature • Transparency • Turbidity • Conductivity • Salinity **2) Chemical properties**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	break is about 161.8 m^3/day and from the worker campsite 318 m^3/day. **Phase 2**: Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 49.4 m^3/day and from the worker campsite 97.6 m^3/day. **Phase 3**: Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 91.5 m^3/day and from the worker campsite 180.5 m^3/day. The employment contract will require the contractor to install an onsite treatment system to treat the wastewater from the construction control office and the worker campsite to ensure conformance to wastewater standard according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). The treatment system at the construction control office shall have the minimum capacity that can handle with the daily wastewater production in each phase. Wastewater will not be discharged to the sea directly. Therefore, the impact is low.		• pH values • Dissolved oxygen (DO) • BOD • Suspended solid (SS) • Total dissolved solid (TDS) • Fat, Oil, and Grease • Nitrate (NO_3) in the unit of nitrogen • Phosphate - Phosphorus • Arsenic (As) • Manganese (Mn) • Total Hg • Zinc (Zn) • Cadmium (Cd) • Copper (Cu) • Nickel (Ni) • Chromium hexavalent (Cr^{6+}) • Lead (Pb) • Chromium (Cr) **3) Biological properties** • Total Coliform Bacteria • Fecal Coliform Bacteria **Frequency** Once a month throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
10) Quality of seawater Operation phase	When the Project is operated, the passenger volume will be 14 million/year in 2028, 38 million/year in 2038, and 70 million/year in 2048. The total wastewater volume will be 3,185 m^3/day, 5,625 m^3/day, and 9,212 m^3/day, respectively. The existing central wastewater treatment system of U-tapao International Airport is the Activated Sludge (AS) type with a capacity of 75 m^3/day. It cannot accommodate the wastewater volume in the future adequately. To improve the public utilities of the airport, the Sequencing Batch Reactor (SBR) wastewater treatment will be constructed. The construction is divided into 2 phases: Phase 1 (year 1 – 6) and Phase 2 (year 7). Each phase has a capacity of 8,000 m^3/day, making a combined capacity of 16,000 m^3/day. The wastewater will be treated and recycled for about 5,000 m^3/day. This volume will be used for watering the plants in the green area (garden) in U-tapao International Airport. The rest of the water will be stored at the clarifier pond before discharging to the drainage system and collecting to Holding Pond of the Project. All in all, the central wastewater treatment system can handle with the wastewater volume generated from the Project development adequately. Therefore, the impact level is low.	• Strictly follow the environmental impact mitigation and monitoring measures for surface water hydrology, quality of surface water, and aquatic ecosystem in the operation phase of the Project. **Responsible party:** EEC	**Monitoring method(s)** Monitor the quality of sea water in the Project area. Use the monitoring method determined by the Notification of the National Environmental Board No. 8 B.E. 2537 re: the standard of seawater quality (announced in the in the Government Gazette dated 6 October 2021) **Implementation area(s)** Sources of seawater in the Project area are presented in **Figure 5.1-6** including 6 stations below. • SW1 : south of the 1st runway at 300 m. from the coast • SW2 : south of the 2nd runway at 300 m. from the coast • SW3 : southeast of the 2nd runway at 300 m. from the coast • SW4 : Southwest of the 1st runway at 500 m. from the coast • SW5 : south of the 2nd runway at 500 m. from the coast • SW6 : southeast of the 2nd runway at 500 m. from the coast **Indicator(s)** 1) Physical properties • Water Temperature • Transparency • Turbidity • Conductivity • Salinity

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			2) Chemical properties • pH values • Dissolved oxygen (DO) • BOD • Suspended solid (SS) • Total dissolved solid (TDS) • Fat, Oil, and Grease • Nitrate (NO_3) in the unit of nitrogen • Phosphate - Phosphorus • Arsenic (As) • Manganese (Mn) • Total Hg • Zinc (Zn) • Cadmium (Cd) • Copper (Cu) • Nickel (Ni) • Chromium hexavalent (Cr^{6+}) • Lead (Pb) • Chromium (Cr) 3) Biological properties • Total Coliform Bacteria • Fecal Coliform Bacteria **Frequency** • Every 4 months in the first 2 years and every 6 months (in the rainy season and dry season) in the

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			following years throughout the lifetime of the Project **Responsible party:** EEC **Monitoring method(s)** Monitor and analyze quality of water and sediment as shown in **Figure 5.1-7** to ensure quality before releasing to the sea. The 3 sampling points are listed below. **Implementation area(s)** • Holding Pond 1 • Holding Pond 2 • Drainage canal before releasing to the sea **Indicator(s)** Water samples: (Refer to Notification of Ministry of Industry regarding Industrial Effluent Standards) The indicators are listed below. 1) Physical properties • Temperature • Color • Odor • Total dissolved solid (TDS) • Total suspended solid (TSS) 2) Chemical properties • pH values • BOD • COD

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			• Sulfide • Cyanide • Fat, Oil, and Grease • Formaldehyde • Zinc • Chromium hexavalent (Cr^{6+}) • Chromium trivalent (Cr^{3+}) • Arsenic • Copper • Mercury • Cadmium • Phenols • Free Chlorine • Pesticide • TKN • Fluoride • Surfactant • Barium • Selenium • Lead • Nickel • Manganease • Silver • Total Iron 3) Biological properties

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			• Total Coliform Bacteria • Fecal Coliform Bacteria **In sediment samples:** Indicator(s) monitored are as follows: • Lead (Pb) • Chromium (Cr) • Cadmium (Cd) • Total Hg • Copper (Cu) • Manganese (Mn) • Nickel (Ni) • Zinc (Zn) • Arsenic (As) **Frequency** • Every 4 months in the first 2 years and every 6 months (in the rainy season and dry season) in the following years throughout the lifetime of the Project **Responsible party:** EEC
2. Biological resources			
11) Land ecosystem Construction phase	The construction activities that cause changes in forest and wildlife are cutting, removing, and destroying plants in the Project area. This will result in fewer habitats, huning area, and nesting areas of birds and other animals. However, these animals are capable of adapting, moving	• Make a list of plant species in the construction area to count the plant number and identify the location of the plants to be cut down or moved away. Clearly identify the plants to be cut down or moved away. • Regarding large trees classified as restricted trees, category A,	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	to other areas, finding shelters new nesting area, and hunting areas. Therefore, the impact is low.	according to the Royal Decree Prescribing Restricted Trees B.E. 2530, RTN and EEC/or the agency responsible for the construction consider cutting out or moving to plant nearby or other areas in U-tapao International Airport • To cut down trees Category A according to the Royal Decree Prescribing Restricted Trees B.E. 2530, the following actions must be taken. (1) The contractor coordinates with RTN and EEC to survey around the cutting area and check the list of trees after cutting it down to prevent cutting of trees outside the construction area. (2) Every tree cut down from the construction area must be removed from the area for appropriate use conducted by the contractor under supervision of RTN and EEC. • To move trees Category A according to the Royal Decree Prescribing Restricted Trees B.E. 2530 from the original area, the following actions must be taken. (1) Digging and moving trees from the area must be done with care by experienced personnel. The contractor must coordinate with RTN and EEC to locate the new replanting area nearby other other areas in U-tapao International Airport. Forestry scholars shall be asked to control the digging and moving of restricted trees according to the academic principles. (2) The contractor must follow the procedures for digging and moving the trees, starting from the survey to identify	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		all trees, preparing tools and equipment, sieging and decorating the siege, transportation, and replanting. (3) The contractor must complete digging and moving trees from the construction area and replant them before the construction of the Project is completed. • Clearly identify the construction area and instruct the contractor to perform work only in that area. • Set up rules of construction control. Hunting wild animals is prohibited, especially watercock, Eurasian stone-curlew, purple heron, barn owl, Asian golden weaver, and red avadavat, both in the construction area and nearby areas. Violations are subject to punishments. • Land grading shall be done with care to prevent impact on the habitat and hunting area, wildlife activities, or harm on animals that move slowly. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
11) Land ecosystem Operation phase	In the operation phase of the second runway and taxiway, the frequency of flights / hr. will increase significantly. This could lead to higher risk of bird strike. According to the statistics of bird strike incidents at U-tapao International Airport from January 2017 to July 2019, the frequency of bird strikes is lower than one time/month. The most frequent bird strike incidents occurred in 2017 (9 times). Statistics also pointed out that bird strike most frequently occur in December	• Choose the decorative plants and shrubs for gardening outside of the airside to ensure they are not the source of food and habitat of birds. • Mow the lawn short to make sure that all 4 groups of animals (birds, mammals, reptiles, and amphibians) cannot find food, live in, lay eggs in the grass. Avoid the print of lawnmower which may could be animal shelter or cause flooding that attracts these animals. • Destroy the habitats of animals, such as tall trees, and	**Monitoring method(s)** • Collect statistics by using the ICAO Bird Strike Reporting Form and analyze the most troublesome bird based on the feather stuck in the aircraft. If bird flocks in U-tapao International Airport might pose hazards to aviation, it is necessary to introduce a plan to control the number of birds. **Implementation area(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	which is the migration season. The risk of bird strikes was also assessed for U-tapao Rayong – Pattaya International Airport by the Standard and Safety Division of Airports of Thailand Public Company Limited in 2018. The assessment pointed out that the bird species that tend to cause hazards are large birds, medium-sized birds, and small birds, respectively. The first wildlife survey in the Project area (rainy season) from 15-17 July 2019 and 19-22 July 2019, most birds are small-sized birds (lighter than 300 grams), followed by medium-sized birds (300 – 1,000 grams), and large birds (more than 1,000 grams). It could be said that the chance of severe accident from bird strike is low. Also, the Project has followed the plan to prevent aircraft accidents caused by birds and other animals. Therefore, the impact level is low.	remove unnecessary trees, trim the branches, and remove sources of food, worms, and insects, such as grasshoppers, bugs, glass worms, earthworms, and insect larvaes that could be food for other animals. • Remove aquatic plants such as itchy grass, water hyacinth, jointvetch, and narrowleaf cattail, from the area with physical methods. No chemical is allowed to destroy weeds. • Chase away all animals hunting or resting along the runway at all times, especially birds which are particular risks for aircraft during take-off or landing. • Get rid of small mammals such as rats and squirrels, which are prey of predatory birds. Remove carcass of frogs or lizards on the runway to reduce decomposers from feasting in the area. • Chase away and trap mammals and reptiles entering the area by, for example, using trap cage for water monitor, rats, squirrels, and snake. Coordinate with relevant agencies to free them in other natural habitats. • Survey biodiversity around the airport, covering the dry season (bird's migration season) and rainy season. **Responsible party:** EEC	• U-tapao International Airport **Indicator(s)** • Statistics of bird strike incidents, the number and species of bird, and aircraft model **Frequency** • Record bird strike incident data every day. The report shall be submit to CAAT every 3 months. Make a report of implementing the mitigation and monitoring measures twice a year throughout the lifetime of the Project **Responsible party:** EEC **Monitoring method(s)** • Survey biodiversity of plants and animals around U-tapao International Airport to at least cover the dry season, rainy season, and migrating season of birds. **Implementation area(s)** • U-tapao International Airport **Indicator(s)** • Biodiversity of plants and animals surveyed in U-tapao International Airport **Frequency** • 2 times/year throughout the lifetime of the Project covering the dry season, rainy season, and migrating season of birds. **Responsible party:** EEC **Monitoring method(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			• Record bird species data every day. **Implementation area(s)** • U-tapao International Airport **Indicator(s)** • Species and number of birds found in U-tapao International Airport **Frequency** • Monitor every day and summarize the data monthly and yearly throughout the lifetime of the Project. **Responsible party:** EEC
12) Aquatic ecosystem Construction phase	**1) Surface water ecosystem** **Erosion from the construction area :** The construction activities might cause erosion construction material such as rocks, soil, and sand. This may affect the quality of surface water, i.e., increased turbidity and suspended solids, to the extent that may affect aquatic lives. U-tapao International Airport is surrounded with drainage systems. All construction activities will occur inside the airport. The contractor is required to prepare an onsite wastewater treatment system that can treat wastewater from construction workers adequately without discharging wastewater from construction activities to natural waters. Sediments from construction areas will flow to the drainage systems and accumulate and settle at the holding pond before discharging to public drainage	• Strictly follow the environmental impact mitigation and monitoring measures for surface water hydrology, quality of surface water, and aquatic ecosystem in the operation phase of the Project. • Maintenance of equipment and machines is allowed only in the maintenance area with proper prevention of oil spills into canals. • Avoid construction activities at night because almost every species of sea turtles lay eggs at night. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**Monitoring method(s)** • Ecological survey in surface water and seawater in the Project area • Marine ecological survey in the Project area • Survey of rare sea animals in the Project area • Survey abundance of seagrass near the southern coast of the airport • Survey and record the presence of dugongs in the seagrass area near the south coast of the airport. **Implementation area(s)** Water sources in the Project area are listed below. 1) Sources of surface water are presented in **Figure 5.1-5** including 4 stations below. • W1 : Khlong Bang Phai upstream of discharge • W2 : Khlong Bang Phai downstream of discharge

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	systems. Therefore, the chance of contaminating outside water bodies to the degree that affects aquatic animals is very low, and the impact level is low. **Impact of salt water in the dry season:** The Project analyzed the indicators of biodiversity at 2 water sources: Khlong Bang Phai and Khlong Phala. It was found that the aquatic ecosystem condition of Khlong Bang Phai (W3: Khlong Bang Phai mouth to the sea) has the salinity ranging from 4.3-18.8 parts per thousand, and that of Khlong Phala 0.3 parts per thousand. These sampling points are under the influence of seawater. There is neither construction of the project nor its adjustment to the canal's condition. In other words, none of the Project activities will change the influence of saline water in both canals. Therefore, the Project will not cause additional impact in these areas. **Wastewater from consumption of workers and construction activities**: Wastewater from consumption of construction worker and construction supervisors **Phase 1 :** Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 161.8 m^3/day and from the worker campsite 318 m^3/day. **Phase 2 :** Wastewater generated from consumption of construction worker and construction supervisors		• W3 : Khlong Bang Phai mouth to the sea • W4 : Khlong Phala 2) Sources of seawater are presented in **Figure 5.1-6** including 6 stations below. • SW1 : south of the 1st runway at 300 m. from the coast • SW2 : south of the 2nd runway at 300 m. from the coast • SW3 : southeast of the 2nd runway at 300 m. from the coast • SW4 : southwest of the 1st runway at 500 m. from the coast • SW5 : south of the 2nd runway at 500 m. from the coast • SW6 : southeast of the 2nd runway at 500 m. from the coast **Indicator(s)** 1) Aquatic ecosystem in surface water • Phytoplankton, zooplankton, benthic animals, fish, and aquatic plants 2) Marine ecosystem • Phytoplankton, zooplankton, benthic animal, record of presence or absence of rare marine animals, such as dugong, dolphins, whales, and sea turtles entering the area. **Frequency** • 2 times/year (in the rainy season and dry season) throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	working in the construction site and taking the lunch break is about 49.4 m^3/day and from the worker campsite 97.6 m^3/day. **Phase 3 :** Wastewater generated from consumption of construction worker and construction supervisors working in the construction site and taking the lunch break is about 91.5 m^3/day and from the worker campsite 180.5 m^3/day. The employment contract will require the contractor to install an onsite septic tank to treat the wastewater from the construction control office and the worker campsite to ensure conformance to wastewater standard according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). The treatment system at the construction control office shall have the minimum capacity that can handle with the daily wastewater production in each phase before discharging to public drainage systems. Therefore, the impact is low. **2) Marine ecosystem** **Wastewater from consumption of workers and construction activities**: The forecast of the total wastewater volume from activities of workers in the Project in Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048), will be 161 m^3/day, 49.4 m^3/day, and 915		

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	m^3/day, respectively. In the construction phase, wastewater from the worker campsite and in the construction area will be treated with an onsite septic tank to ensure that the effluent has the properties according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). Wastewater will not be discharged to the sea. Therefore, there is no impact on marine life. **Sediment from construction activities:** The construction activities might cause erosion construction material such as rocks, soil, and sand. This may affect the quality of surface water, i.e., increased turbidity and suspended solids, to the extent that may affect aquatic lives. U-tapao International Airport is surrounded with drainage systems. Sediments from construction areas will flow to the drainage systems and accumulate and settle at the holding pond. This can help reduce erosion to natural waters. The wastewater will then flow to the wastewater pumping pond and the central wastewater treatment system which will make the water pass the properties according to the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). After that, it can be discharged to public drainage		

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	systems and subsequently the sea. Therefore, the chance of contaminating outside water bodies to the degree that affects marine lives is very low, and the impact level is low.		
12) Aquatic ecosystem Operation phase	1) Surface water ecosystem **The impact of wastewater from consumption on marine organisms**: In the operation phase of the Project, there will be more frequent flights per hour, including the number of passengers, airline operators, and related businesses. As a result, the wastewater volume is expected to increase. Wastewater will be treated and recycle, such as for watering plants in the garden in U-tapao International Airport and other activities. Substandard wastewater will be held at the emergency wastewater pond and pumped back to the central wastewater system again until the properties pass the standard of effluent by the Ministry of Natural Resources and Environment. The central wastewater treatment system can handle with the wastewater volume from the Project development adequately, and thus wastewater is not released to the sea. Regarding the drainage of rainfall. It was found that the volume of rainfall is not high. The Project has designed the rainfall drainage system to prevent flooding and control the water level in	• Strictly follow the environmental impact mitigation and monitoring measures for surface water hydrology, quality of surface water, and aquatic ecosystem in the operation phase of the Project. **Responsible party:** EEC	**Monitoring method(s)** • Ecological survey in surface water and seawater in the Project area • Marine ecological survey in the Project area • Survey of rare sea animals in the Project area • Survey abundance of seagrass near the southern coast of the airport • Survey and record the presence of dugongs in the seagrass area near the south coast of the airport. **Implementation area(s)** Sources of water in the Project area 1) Sources of surface water are presented in **Figure 5.1-5** including 4 stations below. • W1 : Khlong Bang Phai upstream of discharge • W2 : Khlong Bang Phai downstream of discharge • W3 : Khlong Bang Phai mouth to the sea • W4 : Khlong Phala 2) Sources of sea water are presented in **Figure 5.1-6** including 6 stations below. • SW1: south of the 1st runway at 300 m. from the coast • SW2: south of the 2nd runway at 300 m. from the coast

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	the Project area. The drainage system is divided into 2 parts. 1) The subsidiary drainage system will drain the runoff on the runway and taxiway to the open drainage system. 2) The main drainage system will direct the water to the holding pond of the Project before releasing to the sea. The holding pond is designed to hold the water for one hour before releasing to the sea. The holding time will promote sedimentation which can reduce the impact on marine organisms. Therefore, the impact level is low. **Impact on rare sea animals:** The survey of rare sea resources condition revealed that the habitat of rare sea animals is not found in the Project area. In fact, there is a source of seagrass on the south side of the Project, which is 800 meters from the first runway and taxiway and 1,700 meters from the second runway and taxiway. There has been no report of rare sea animal in this area. The nearest habitat of rare sea animals is the habitat and nesting area of sea turtles in Koh Khram Yai, Chon Buri Province, which is 13 km away from the Project area. It is outside the area to be affected by the NEF ≥ 40 and NEF 30 – 40 contours. The forecast of flights in 2048 showed that the impact of aircraft noise on rare sea animals is low.		• SW3: southeast of the 2nd runway at 300 m. from the coast • SW4: southwest of the 1st runway at 500 m. from the coast • SW5: south of the 2nd runway at 500 m. from the coast • SW6: southeast of the 2nd runway at 500 m. from the coast **Indicator(s)** 1) Aquatic ecosystem in surface water • Phytoplankton, zooplankton, benthic animals, fish, and aquatic plants 2) Marine ecosystem • Phytoplankton, zooplankton, benthic animal, record of presence or absence of rare marine animals, such as dugong, dolphins, whales, and sea turtles entering the area. **Frequency** • 2 times/year (in the rainy season and dry season) throughout the lifetime of the Project **Responsible party: EEC**
3. Value for human use			

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
13) Waste and wastewater management Construction phase	**1) Waste** **Inside U-tapao International Airport** Solid waste generated within U-tapao International Airport consists of general solid waste from the daily activities of construction workers and supervisors. Solid waste assessment for the construction phase of U-tapao International Airport - Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048), shows the total amount of solid waste generated at 1,271.6, 388.1, and 719.0 kg/day, respectively. The contractor must establish a system for sorting and disposing of the waste, including systematic management and strict control of solid waste, such that the aviation activities and the environment would not be affected. The solid waste and hazardous waste management of U-tapao International Airport is, therefore, expected to have a moderate impact. **Outside U-tapao International Airport** Solid waste generated outside of U-Tapao International Airport consists of general solid waste from the daily activities of construction workers within their accommodation. Solid waste assessment for the construction phase of U-tapao International Airport - Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048), shows the total amount of solid waste generated at 1,884, 577, and 1,068 kg/day,	**Measures in U-tapao International Airport** **1) Waste management** **Storing and sorting of solid waste** • Classify solid waste into general solid waste, solid waste from the construction, and hazardous waste • Encourage construction workers and related staff to sort the waste according to the provided containers. • Prepare an area and containers for all types of solid waste with separate containers for general solid waste, solid waste from the construction, and hazardous waste • Provide clear labels indicating types of solid waste on the containers or clear signs in the area • Provide a sufficient number of containers for each type of solid waste the whole period • The containers should have a capacity of not less than 3 times the amount of solid waste expected to be generated each day. They must be made from permanent and fireproof materials. The internal surface must be smooth and waterproof, no leaks, with covers to protect the waste from rain, as well as flies, rats, cats, dogs, and other animals which may carry a disease from digging in the trash • The area must be ventilated, odor-and-rainwater-proof, and prevents flies, rats, cats, dogs, and other animals which may carry a disease from digging in the trash • The size of the containers must suit the location and should make the cleaning process convenient. If the amount of	**1) Waste management** **Monitoring method(s)** • Record the amount of solid waste and hazardous waste collected daily **Implementation area(s)** • Construction site • Construction site office • Construction worker accommodation **Indicator(s)** • Total general solid waste • Total construction waste • Total hazardous waste **Frequency** • Provide a monthly report throughout the construction period **Responsible party:** RTN and EEC **2) Wastewater management** **Monitoring method(s)** • Measure and analyze the quality of effluent treated by the wastewater treatment system using the measurement and analysis specified in the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548), or the latest notification. **Implementation area(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	respectively. The contractor must provide a sufficient amount of waste containers, and coordinate with licensed private companies and responsible local government agencies to collect and dispose of the waste. The impact, therefore, is expected to be low. **2) Wastewater** **Inside U-tapao International Airport** Assessment of wastewater generated by the consumption of construction workers during the construction phase - Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048), shows the total amount of wastewater generated at 161.8, 49.4, and 91.5 m3. /day, respectively. The Project will state within the contract that the contractor must install an on-site septic tank for the treatment of wastewater such that its characteristics are in accordance with the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). The system must be able to treat wastewater no less than the amount of wastewater generated during each phase, before being discharged into the public drainage system. The impact, therefore, is low. **Outside U-tapao International Airport** Wastewater generated at the construction workers' accommodation outside U-tapao International Airport	construction waste generated per day is too high, additional large-sized containers are required. • The resting area for the waste must be located at least 4 m. away from a kitchen and food storage facility. If the capacity of the resting area is larger than 3 m^3, the distance from such places must be at least 10 m. where the waste can be easily moved out. **2) Transporting and disposing of solid waste** • The contractor must coordinate with the agency responsible for waste management in the area to regularly collect and dispose of the solid waste • Set a date and time for waste and solid waste collection by having the contractor place the waste solid waste daily in the area designated by the RTN and EEC • Provide vehicles to collect the waste. These vehicles must be completely covered, trap odor, and prevent the waste from falling off • Collection and sorting of solid waste must be managed and controlled. Waste collectors should transport the waste from the resting area to the disposal site without interfering with local operations or causing accidents in the area • Frequency of waste collection is determined by the quantity of the waste, size, and capacity of the containers and the resting area, nature of the operation, and collecting schedule • Allow vehicles to collect solid waste at the designated area. Supervisors are required to oversee the collection and	• All discharge points around the construction site office • All discharge points around the worker accommodation **Indicator(s)** • pH values • BOD • Suspended Solids • Sulfide • Total Dissolved Solid • Settleable Solids • Fat, Oil, and Grease • TKN **Frequency** • every month throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	is mainly from the daily activities of construction workers, for example, washing, bathing, and sewage from toilets. The assessment shows the amount of wastewater generated during Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048) are 318, 97.6, and 180.5 m3/day, respectively. The Project will state within the contract that the contractor must install an on-site septic tank for the treatment of wastewater such that its characteristics are in accordance with the Notification of Ministry of Natural Resource and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (B.E. 2548). The system must be able to treat wastewater no less than the amount of wastewater generated during each phase, before being discharged into the public drainage system. The impact, therefore, is low.	manage the vehicles that enter and exit the area • Types and number of the vehicles used are based on their suitability in the following areas: - Amount and characteristics of the solid waste to be collected - Method for collecting such waste, such as using bins which requires a forklift - Condition of the service area, such as road width and road condition - Number of staff/distance and method for transporting the waste • Construction waste such as wood chips, bricks, and cement that cannot be recycled must be collected and transported outside the area such as a landfill or using other methods which do not cause any local impact or to be disposed of in the area designated by the RTN and EEC • Do not dispose of the waste by burning outdoor at the construction site or the site office • RTN and EEC must strictly supervise all kinds of waste transport for disposal outside U-tapao International Airport. A responsible body must be assigned to manage the operation directly. A manifest is required to prevent illegal dumping of hazardous waste in a public area or discarded along with the general solid waste **3) Hazardous waste management**	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		• Collect and dispose of hazardous waste as per the law stated. The hazardous waste must be gathered separately from the general solid waste. The resting area and must be located in the shade and far from the flames, and able to prevent leachate from entering the drainage system • Hazardous waste must be properly managed by specialized operators. Disposal and recycling of hazardous waste must be permitted by Department of Industrial Works as per the Factory Act (B.E. 2535). RTN and EEC shall supervise the contractor's operations related to hazardous waste management • Separate hazardous waste from general solid waste and provide knowledge regarding safe disposal of hazardous waste. For example, disposing of fluorescent bulbs in a sealed package that prevents them from breaking; avoid smashing and penetrating the package • Prepare a resting area and containers specifically for hazardous waste, separated from the general waste • Set the date and time for the collection of hazardous waste and provide vehicles specifically for hazardous waste • Dispose of hazardous waste in the designated containers or resting area. Clear signs must be provided. The containers must have the following characteristics: - Made of strong material, can prevent animals from digging in the trash - Orange or gray in color, with orange lids or lids of other	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		colors besides blue, green, yellow, and red, to clearly distinguish them from, and not to be confused with other types of containers - Supporting containers must consist of sub-containers, or that the containers must have sufficient capacity to accommodate the amount of hazardous waste generated before being collected • The containers must be suitable for each type of hazardous waste and should prevent the waste from being taken out unreasonably • The sizes and heights of the containers must be reasonable, easily noticed, and prevent the disposal of other types of solid waste into or on the containers • The contractor must not transfer, dump, dispose of hazardous waste into the public area • The contractor must consider preparing a resting area specifically for toxic and hazardous waste using the following guidelines: - No less than 1,000 m. away from archaeological sites, conservation areas, and natural resources that should be preserved as per the Cabinet's resolution - Located no less than 700 m. away from public drinking water sources, raw water sources for consumption, and water production plants, or within a distance that does not affect the quality of the water - Located no less than 100 m. away from usable public	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		water sources or within a distance that does not affect the quality of the water - The resting area must be large enough to accommodate the accumulating volume of hazardous waste for at least 90 days - Hazardous waste must be collected in a closed building with a controlled ventilation system. The surface of the building shall be made from materials that are resistant to the breaks and leaks of hazardous waste - The floor of the resting area for hazardous waste shall be a slope that leads to a sewer pipe that directs the leachate to a specific pond or tank. Fire protection equipment must be provided • Transportation of hazardous waste from the resting area for further treatment or disposal must be in accordance with the law regarding hazardous substances. For example, written permission that allows the possession of hazardous substances must be issued before the transportation, compliance with the guidelines regarding vehicles and carriers of hazardous waste as per the Resolution of the Hazardous Substances Committee regarding Land Transport of Hazardous Substances, and regulations as per to the Notification of Ministry of Industry regarding Hazardous Waste Transport Documentation System • Treatment and disposal of hazardous waste must consider the following restrictions:	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		- Hazardous waste that can be recycled must be sent for recycling at an approved facility as per the Factory Law - Hazardous waste that cannot be recycled must be sent to an approved hazardous waste disposal facility as per the Factory Law **Measures outside U-tapao International Airport (worker campsite)** **1) Storing and sorting of solid waste** • General solid waste and hazardous waste in the construction worker accommodation area that is toxic or hazardous to the community such as toxic contaminant, flammable substance, corrosive substance, reactive substance, or any other substance that may cause harm to a person, animal, plant, property, or the environment, shall be sorted out • The contractor must provide containers to accommodate all types of solid waste in the accommodation area, so that the containers do not mix with each other, for example, providing a container specifically for dry solid waste, wet solid waste, recyclable solid waste, and waste that is toxic and hazardous to the community • Provide clear labels indicating types of solid waste on the containers or clear signs in the area • Provide a sufficient number of containers for each type of solid waste throughout the whole period and place them at different locations in the accommodation area • The containers should have a capacity of not less than 3	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		times the amount of solid waste expected to be generated each day. They must be made from permanent and fireproof materials. The internal surface must be smooth and waterproof, no leaks, with covers to protect the waste from rain, as well as flies, rats, cats, dogs, and other animals which may carry a disease from digging in the trash • The area must be ventilated, odor-and-rainwater-proof, and prevents flies, rats, cats, dogs, and other animals which may carry a disease from digging in the trash • The size of the containers must suit the location and should make the cleaning process convenient • The resting area for the waste must be located at least 4 m. away from a kitchen and food storage facility. If the capacity of the resting area is larger than 3 m^3, the distance from such places must be at least 10 m. where the waste can be easily moved out **2) Collecting and disposing of solid waste** • Dispose of solid waste daily to avoid being a breeding ground for insects and other disease carriers • Do not dispose of the waste by burning outdoor in the construction worker accommodation area • The contractor must not dump or dispose of general solid waste and toxic or hazardous waste in the public area. The waste must be disposed of or processed at a facility designated by the local government • Waste containers must be in good condition; no leaks with	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		lids to prevent pets and other animals from digging into the waste, and avoid being a breeding ground for insects and other disease carriers **3) Hazardous waste management** Follow the measures used inside U-tapao International Airport **Contractor regulations** • Specify within the contract the management measures for solid waste and hazardous waste generated throughout the construction period for both inside and outside of U-tapao International Airport. Also, the transportation of the waste must be carried out by an authorized agency and must report to RTN and EEC • Record daily amount of general solid waste, construction waste, and hazardous waste. Provide a monthly report for transparency **2) Wastewater management** • Provide a sufficient amount of proper sanitation facilities for the construction workers. The ratio between the number of toilets and construction workers must be 1:20. Provide a system capable of treating wastewater at least equal to the amount of wastewater generated each day. The quality of the wastewater must be in accordance with the effluent standards as per the Notification of Ministry of Natural Resources and Environment (B.E. 2548) or the latest Notification before being discharged into the public drainage	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		system • Worker accommodation must be constructed in the area that provides minimal impact on the community. Establish clear boundaries of each zone and keep the environment under control to reduce the impact caused by unregulated activities and expansion • Limit the number of areas that could generate wastewater at minimal • Provide a system to prevent wastewater from the construction and washing activities of the equipment from being discharged into the drainage system of the U-Tapao International airport. A defensive line may be built. The septic tank must be relocated outside the area after the construction • Encourage the workers to use water efficiently to generate the lowest amount of wastewater **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
13) Waste and wastewater management Operation phase	**1) Solid waste** During the operation phase of the second runway and taxiway, as well as the newly developed areas of U-tapao International Airport in Phase (2028), Phase 2 (2038), and Phase 3 (2048), the total amount of solid waste generated daily are expected to be at 21.71, 55.13 and 101.27 tons, respectively, which exceeds the capacity of the waste management system. The Project must establish a solid waste transfer station inside U-tapao International Airport,	**1) Solid waste management** • Recyclable and non-recyclable solid waste must be processed as follows: - The waste must be placed at the designated resting area. - Non-recyclable waste, such as sediment from the central wastewater treatment system, must be stored separately in a covered container for further usage as fertilizer. The rest shall be taken to a landfill or processed by an authorized agency. Asphalt from the	**1) waste management** **Monitoring method(s)** • Record the amount of solid waste and hazardous waste collected daily, with a monthly report for traceability **Implementation area(s)** • U-tapao International Airport **Indicator(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	with an area of approximately 16,000 m^2, consisting of a loading zone, maintenance building, office building, weighing building, garages and car wash area, waste sorting facility, entry route, and a buffer area. The designed system can support and manage solid waste within U-tapao International with a maximum capacity of 102 tons/day, able to manage the solid waste generated in the newly developed area of U-tapao International Airport, including the highest projection in Phase 3 (2048) with 101.27 tons/day. The impact, therefore, is expected to be moderate. **2) Wastewater** During the operation phase of the second runway and taxiway, as well as the newly developed areas of U-tapao International Airport in Phase (2028), Phase 2 (2038), and Phase 3 (2048), the total amount of wastewater generated daily are expected to be at 3,185, 5,625, and 9,212 m^3/day, respectively. The current central wastewater treatment system of U-tapao International Airport is an Active Sludge (AS) System, capable of handling only 75 m^3 of wastewater daily. However, there is a plan to build a central wastewater treatment system with Sequencing Batch Reactor (SBR), capable of handling 16,000 m^3 of wastewater daily, able to handle the projected volume of wastewater generated in the future. The impact, therefore, is expected to be low.	repairs of the taxiway and runway repairs must only be collected and piled in the designated by EEC - Non-recyclable waste must be placed in a resting container to prevent them from leaking and scattering before being disposed of daily outside U-tapao International Airport, including public and special holidays. The waste shall be sent to a sanitary landfill or processed using other suitable methods by those authorized by the government or by the law - Decomposable waste such as food scraps from various restaurants in U-tapao International Airport must be collected in the containers placed at the source to prevent the scraps from being mixed with general solid waste. The restaurants shall separate plastic, straws, chopsticks, water bottle caps, and other waste and discard them in a non-recyclable general waste container. This allows the food waste to be used as animal food. The waste must be taken out from U-tapao. International Airport daily • Infectious waste from medical centers in U-tapao International Airport, once collected, must be stored in a specific waste bunker under less than 10 degrees Celsius, and can be held for no more than 30 days, which then must be disposed of outside U-tapao International Airport using an incinerator for infectious waste, or other methods as specified by the law by an agency authorized	• Types and amount of general solid waste, infectious waste, hazardous waste **Frequency** • Daily, with a monthly report throughout the lifetime of the Project **Responsible party:** EEC **Monitoring method(s)** • Register all types of containers to recognize the total number of containers available **Implementation area(s)** • U-tapao International Airport **Indicator(s)** • Condition of the containers • Location of the containers **Frequency** • Every month throughout the lifetime of the Project **Responsible party:** EEC **Monitoring method(s)** • Inspect the final stage of waste disposal service for general solid waste and hazardous waste. Prepare a report for traceability **Implementation area(s)** • U-tapao International Airport **Indicator(s)** • Manifests for general solid waste, infectious waste, and legal manifest when transporting hazardous

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		by the government agencies or by the law • Solid and liquid hazardous waste must be stored separately and must not be mixed with other types of solid waste. The containers must prevent the waste from leaking and scattering. The waste shall be kept for no more than 90 days (according to the Law), and shall be processed, disposed of, or recycled according to academic principles by those authorized by the government to treat, dispose of, or recycle hazardous waste • Minimize the amount of waste disposal by making the most out of the waste, and reduce the humidity of the solid waste after sorting process • Provide a plan and study the appropriate technology for the management of waste generated at U-tapao International Airport, as well as waste disposal outside the Airport in accordance with the quantity and types of general and hazardous waste expected to increase in the future • Inspect the containers for general solid waste and hazardous waste. Ensure that they are in good condition and able to prevent the waste from leaking and scattering during transportation • Provide a sufficient number of vehicles for collecting general and hazardous waste. Ensure that the vehicles are in good condition and ready to be operated at all	waste **Frequency** • 2 times/year throughout the lifetime of the Project **Responsible party:** EEC **2) Wastewater management** **Monitoring method(s)** • Assess and analyze the quality of wastewater/effluent from the central wastewater treatment system of U-tapao International Airport by using measurement and analysis methods according to the Notification of Ministry of Industry No. 2 (B.E. 2539), regarding Characteristics of Effluent Discharged from Factories, and the Notification of Ministry of Natural Resources and Environment (B.E. 2548) or the latest Notification regarding Effluent Management by Buildings of Certain Types and Sizes (Type A) • According to the Notification of Ministry of Natural Resources and Environment regarding the Standard of Effluent Discharged from Industrial Plants, Industrial Estates, and Industrial Zones, dated 29 March 2016 **Implementation area(s)** • 1 wastewater collecting station before entering the treatment system • 1 discharge point connected to the central wastewater treatment system **Indicator(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		times. In the event of an emergency, there must be a replacement that can immediately replace the damaged vehicles • Wastewater and leachate generated from handling and sorting of the waste must be collected into the preliminary wastewater treatment system, and shall be treated according to the U-tapao International Airport's Effluent Standard before discharged into the central wastewater treatment system • Resting area inside the waste storage building, as well as sorting equipment, must be cleaned regularly to reduce the problem of disturbing smell that affects nearby communities • Resting area for recyclable waste must be cleaned regularly. Resting period must not be too long to reduce the risk of fire and odor problems, as well as rodents and insects • Sorting machines and equipment must undergo regular maintenance and must be kept in good condition, ready to be used at any time • Disposal of general solid waste, infected waste, and various types of hazardous waste outside of U-tapao International Airport requires a manifest every single time. Vehicles used for relocating the waste must be covered with canvas to prevent leakage, or falling of trash and hazardous waste onto the road, and comply with the law	• Temperature • pH • COD • BOD • Total Dissolved Solid • Suspended Solids • Sulfide • Settleable Solids • Fat Oil and Grease • TKN • Lead (Pb) • Chromium (Cr) • Cadmium (Cd) • Mercury (Hg) • Copper (Cu) • Manganese (Mn) • Free chlorine • Chloride **Frequency** • Every month throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		• Provide a waste management service provider with the ability to manage according to the standards and provide a backup space to support waste disposal throughout the operation period. The service provider must be authorized by the government • Select a service provider authorized by the government for processing infectious waste. Assessment shall be made annually • Randomly inspect the service providers that are responsible for dealing with general solid waste, infectious waste, and hazardous waste, including other service providers related to the management of solid waste within U-tapao International Airport at least twice a year. Inspect the backup waste disposal sites (all 3 types) at least once a year to evaluate the operational capability and efficiency of the service providers and examine whether the operations are in accordance with academic principles. If any of the operations does not comply with the employment contract, EEC has the right to terminate the contract and consider changing the service providers for all types of waste as deemed appropriate **2) Wastewater management** • Provide a central wastewater treatment system that can handle wastewater no less than 10,000 m^3/day as the number of customers is expected to reach 70 million in the future • Manage the central wastewater treatment system by assigning	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		specialized officers to maintain the efficiency of the system • Record the performance of the central wastewater treatment system and daily problems to provide data for the control and prevention of problems that would occur as per Tor Sor 1 Form (Statistics and Data of Wastewater Treatment System at the Pollution Source). Prepare a summary report on the performance of the wastewater treatment system, as well as effluent quality assessment once a month. Submit a report in Tor Sor 2 Form to local officials before the 15th of the following month as per the ministerial regulations, procedures for collecting statistics, detailed record preparation, and a summary report on the operation of the wastewater treatment system B.E.2555 • Regularly schedule a maintenance for the central wastewater treatment system • Monitor and inspect the characteristics of treated wastewater to be in accordance with the Effluent Standards Discharged from Type A Buildings as per the Notification of the Ministry of Natural Resources and Environment regarding Effluent Management by Buildings of Certain Types and Sizes (Type A) or according to the latest announcement, before being discharged into the drainage within U-tapao International Airport • Reuse the qualified treated wastewater as much as possible, for example, by watering plants in the green areas within U-tapao International Airport	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		Responsible party: EEC	
14) Land use Construction phase	The construction occurs within U-tapao International Airport, which is in accordance with the Ministerial Regulations in Comprehensive Town Planning of Rayong Province B.E. 2560 (announced in the Government Gazette on 12 January 2017), together with Land Use Plan and Infrastructure and Utility Development Plan for Economic Corridor. No additional expropriation has been taken place; local residents do not need to move out from the area. No conflict occurs in land use in EEC B.E 2562 (announced in the Government Gazette on 20 November 2019). The area is characterized as Type Khor Kor -5, Promotion Zone: Eastern Airport City, Special Economic Promotion Zone for Special Affairs. The objective is to support important projects that are the basis for the development of the EEC, according to the EEC Policy, and therefore in accordance with the Ministerial Regulations. No additional expropriation has been taken place during the construction phase; local residents do not need to move out from the area. No conflict occurs in land use. The study area may be affected by the construction activities, including noises, which are the major issues for local residents, communities, and local stores nearby. There might be some temporary changes in land use around worker	• Build the worker accommodation in an area with the lowest impact on the community. Establish clear boundaries and maintain the good environmental condition of the accommodation to prevent mixing of activities and unregulated expansion • Prepare a plan to support the impacts that may occur during the construction period, such as providing alternative transportation routes or creating alternative usage of land within the construction area and surrounding areas • Coordinate with the Department of Public Works and Town and Country Planning in Rayong and Chonburi, as well as other relevant agencies nearby, to send a report on noise contour map to be included in the city plan for land use and construction of buildings around U-tapao International Airport so that they would be in accordance with the activities occurred within U-tapao International Airport, Air Navigation Safety Zone and areas affected by the development of U-tapao International Airport • Coordinate with local authorities in the implementation of Building Control Act and Town Planning Act when granting permission to construct a new building around U-tapao International Airport • Coordinate with and provide information to local authorities to inform the public about Air Navigation	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	accommodation area, which may result in terms of waste and wastewater. Such changes, however, also lead to positive impacts including boosting trading activities and consumption of food and goods during the workers' stay. These changes are temporary and things would return to normal as they were after the construction is completed. Therefore, the impact on land use during the construction period is expected to be low.	Safety Zone and areas affected by the noise during the development of the Project • Submit the approved noise contour map to local authorizing agencies, to be used as the guideline when granting permission to construct a new building around U-tapao International Airport • Publicize the noise contour map that has been approved by the Cabinet via at least 3 channels, such as website, etc. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
14) Land use Operation phase	The number of flights per hour will increase during the operation phase, resulting in an increase in noise impact. Some activities are not academically recommended based on the Noise Level Suitable for Land Use around U-tapao International Airport, published by Pollution Control Department. The area with NEF 30-40 will receive more noise during the day than at night for 75 dB(A). When compared to the noise level suitable for land use around U-tapao International Airport, which has 201 sensitive areas, it is found that 170 of these are suitable for land use while 31 are not suitable, with details as follows: **Schools:** 57 places - Suitable: 49 locations - Not suitable: 8 locations 2 places within NEF ≥ 40	• Coordinate with the Department of Public Works and Town and Country Planning in Rayong and Chonburi, as well as other relevant agencies nearby, to send a report on noise contour map to be included in the city plan for land use and construction of buildings around U-tapao International Airport so that they would be in accordance with the activities occurred within U-tapao International Airport, Air Navigation Safety Zone and areas affected by the development of U-tapao International Airport • Coordinate with local authorities in the implementation of Building Control Act and Town Planning Act when granting permission to construct a new building around U-tapao International Airport • Coordinate with and provide information to local authorities to inform the public about Air Navigation Safety Zone and areas affected by the noise during the	**Monitoring method(s)** • Gather and study statistics related to construction permission for buildings around U-tapao International Airport granted by local authorities • Explore land use to study the changing trend of land use, and improve the preventive and mitigation measures **Implementation area(s)** • Areas around U-tapao International Airport no less than 6 km. from the east and west sides, and no less than 10 km. from the north and south sides **Indicator(s)** • Data on construction permission and land use **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	6 places within NEF30 - 40 **Religious places:** 69 places - Suitable: 58 places - Not suitable: 11 places 2 places within NEF ≥ 40 9 places within NEF30 - 40 **Hospitals:** 18 places - Suitable: 15 places - Not suitable: of 3 places 1 place within NEF ≥ 40 2 places within NEF30 - 40 **Communities:** 57 places - Suitable: 48 places - Not suitable: 9 places 1 place within NEF ≥ 40 8 places within NEF30 - 40 The sensitive areas around U-tapao International Airport according to the noise impact, are not suitable for land use and will be affected by in a long term. The impact, therefore, is high	development of the Project • Submit the approved noise contour map to local authorizing agencies, to be used as the guideline when granting permission to construct a new building around U-tapao International Airport • Publicize the noise contour map that has been approved by the Cabinet via at least 3 channels, such as website, etc. • Publicize the noise contour map that has been approved by the Cabinet via current website, along with noise assessment result from the permanent noise measuring stations **Responsible party:** EEC coordinates with relevant agencies	
15) Transportation Construction phase	**Transportation of construction materials:** Via Highway No. 3, 331, 332, and 3126. Projection on traffic volume during the 3 - year construction period (Phase 1) between 2021-2023, and (Phase2) between 2030-2032 shows that there will be a slight increase in traffic volume due to the transportation	• The contractor must propose a traffic plan to RTN and EEC for approval within 15 days from the signing date, containing details on plans and traffic management during the construction. The contractor of RTN and EEC must try their best not to let the operation affect the traffic on Sukhumvit Road or other main roads. They must	**1) Traffic on major routes around U-tapao International Airport** **Monitoring method(s)** • Survey the amount of traffic to assess traffic condition and road efficiency for the main routes around U-tapao International Airport

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	of construction materials. The impact will be insignificant, maintaining the service at Level A-B, which involves high mobility. The 3rd phase of construction, between 2040 and 2042, however, is expected to have an additional impact due to customers using the Airport, apart from the transportation of the workers. The impact will have a significant effect on the mobility of the traffic, from Level A to D and E, respectively. The 3rd phase of construction will accommodate 38 million passengers per year and the impact will be high.	provide or maintain temporary sub-routes, barriers, signs, lights, and equipment, to be in accordance with Traffic and Transport Safety Standard, Part 2, Volume 5, A Manual for Using Traffic Signs at Construction Site, published by the Office of Transport and Traffic Policy and Planning (2003), during the day and at night • RTN and EEC's contractor must propose a temporary route plan to RTN and EECPCP at least 1 month prior to the construction of the temporary routes. The plan must exhibit a traffic management system to ensure that the construction would not cause traffic congestion as stated in the contract • RTN and EEC's contractor must submit a detailed plan and procedures for public relations and traffic management during the construction to seek approval from employers and other related agencies such as Department of Highways or Traffic Police, etc. The contractor must hold a joint meeting for different parties and gather opinions and suggestions of various agencies towards the public relations plans and the traffic management, and improve such plans to be as efficient as possible • The contractor must submit a plan for transportation of materials, equipment, workers, and personnel to RTN and EEC before the transporting operation as stated in the terms and conditions of the employment contract • The contractor must keep the record of material and worker transportation, containing details of each trip	**Implementation area(s)** Main routes around U-tapao International Airport including • Highway No. 3 • Highway No. 331 • Highway No. 332 • Highway No. 3126 **Indicator(s)** • Types of vehicles and amount of traffic (hourly) of each main route around U-tapao International Airport **Frequency** • 24 hrs. for 2 days on weekends and weekdays. Three times each year throughout the construction phase **Responsible party** • RTN and EEC **2) Traffic to-from the construction site** **Monitoring method(s)** • Amount of traffic and vehicles entering-exiting the construction site **Implementation area(s)** • Routes used for entering-exiting the construction site **Indicator(s)** • Types of vehicles and amount of traffic (hourly) of each route used for entering-exiting the construction site **Frequency** • Daily, along with a monthly report throughout the

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		including routes, starting point and destination, as well as record the volume and cause of traffic accidents that occur inside U-tapao International Airport. The record can be used to improve surveillance • Install a temporary traffic sign at a U-turn location for trucks which usually causes traffic congestion and is unlikely to have these signs installed. The signs, text, and temporary signs (flashing lights) must be clear as per the Road Traffic Act B.E. 2522 or the latest announcement. Areas that require these signs include the entrance-exit of the construction site and inside the construction site. The signs must be clearly visible both during the day and at night • Avoid transporting construction materials during morning rush hours (06:00-09:00) and evening rush hours (16:00-20:00) or as otherwise stated by the law • The contractor must limit the weight of the vehicles used for transporting construction materials as required by the law. The speed limit for trucks weighing more than 1,200 kg. is 60 km./hr., whereas trailers should not be traveling faster than 45 km./hr. The speed limit for vehicles operating at the construction is 30 km./hr. • Choose the routes for transporting materials, equipment, and workers that do not block the main routes that connect to U-tapao International Airport. Avoid routes with heavy traffic. Highway No. 3 to the north of the Airport will be used as the main transportation route regardless of the materials' origin	construction period **Responsible party:** RTN and EEC **3) Occurrence of accidents** **Monitoring method(s)** • Collect accident statistics for routes inside U-tapao International Airport and main routes around U-tapao International Airport from the contractor **Implementation area(s)** Routes inside U-tapao International Airport and main routes around U-tapao International Airport including • Routes inside U-tapao International Airport • Highway No. 3 • Highway No. 331 • Highway No. 332 • Highway No. 3126 **Indicator(s)** • Number of road accidents, with causes and severity of the accidents **Frequency** • Daily, along with a monthly report throughout the construction period **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		• Coordinate with traffic police to facilitate the use of the route and inform the public about the date and time of the transportation of materials, equipment, tools, and large machines so that people living nearby and road users could know in advance • Prepare an emergency plan together with the Department of Highway to reduce traffic congestion, such as temporarily allowing vehicles to drive on the street isle, or making an entrance and exit between the frontage road and the main road to allow vehicles to avoid driving through the accident scene, etc. • In the event that the transportation of construction materials damages the road, the contractor under the supervision of RTN and EEC or the construction operator, must contact the responsible agency to repair and fix the road immediately • Vehicles used for transporting materials, equipment, and construction workers must comply with the Road Traffic Act B.E. 2522, Road Traffic Act (No. 4) B.E. 2535, and Road Traffic Act (No. 12) B.E. 2562. Workers are not allowed to sit in the back of a roofless truck while entering U-tapao International Airport • Vehicles and trucks must be labeled with symbols and the Project's name, contact number, vehicle number, and a contracting company's name that can be clearly seen as the public can check and make complaints when problems arise. GPS must be installed to track the vehicles • Provide a shuttle bus to transport construction workers	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		for public order and safety, as well as to prevent the workers from stealing the materials and reselling them later on • Surround the construction site with fences and control the access to the site using a single route for convenience and safety • Organize security personnel positioned at the entrance 24 hours a day and set the opening-closing hours for the gate • Maintain the condition of vehicles and machines of the contracting company to always be in good condition in order to prevent such vehicles and machines from being damaged during the operation. Regular inspection is recommended • Cover the loading part of the vehicle used when transporting construction materials and equipment using canvas or similar material to prevent the items from falling onto the road. In the event that construction materials fall onto the road surface, a cleaning team must be dispatched as soon as possible • Clean the wheels of all vehicles leaving the construction site to be free from dirt, mud, or sand before driving into the main road outside the construction area • Require the contractor to take control of drivers and machine operators in the construction area. Remind them to operate with caution and strictly comply with relevant laws and regulations. Punishment shall be made upon	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		those who do not follow the rules to prevent possible accidents • Require the contractor to determine the types of vehicles and volume of traffic at the construction site on a daily basis. Report any traffic accidents inside and outside U-tapao International Airport to RTN and EEC at least once a month throughout the construction period. • Vehicles operating in the airside area require permission from U-tapao International Airport and must strictly comply with the rules and procedures for driving inside the airport • Drivers must be trained and tested before operating the vehicles in the airside area. Vehicles used must be certified by responsible authorities from U-tapao International Airport to prevent outsiders from entering the construction area and prevent workers from the construction site entering into the airside area or other restricted zones • Organize a system for entering and exiting the construction site within U-tapao International Airport using a hierarchical access through layers of security **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
15) Transportation Operation phase	The assessment of traffic conditions on various routes shows that the Motorway No. 7 which will be constructed as a 4-lane elevated road across Highway	• Increase the number of trips for shuttle buses inside U-tapao International Airport during busy hours • Coordinate with relevant agencies to add more routes to	**1) Traffic on major routes around U-tapao International Airport** **Monitoring method(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	No. 3 (Sukhumvit Road) and directly connected to the north side of the project, which will be available in 2025, will help alleviate traffic on Highway No. 3126 connecting with the Airport, which will be an F-Level route with high amount of congestion in 2045 onwards. In case there are projects in all routes, when it comes to the 3rd phase of the development (2048), the main road networks such as Highway No. 3 (Sukhumvit Road), Highway No. 331, Airport Entrance-Exit Road, and Motorway No. 7 will be very congested with a service level of F. Therefore, it is necessary to increase the lanes of all major roads by adjusting to at least 6 traffic lanes during the 2nd phase of the development (2038) and 10 lanes during the 3rd phase of the development (2048). Roads inside the airport will be able to support the amount of traffic moving in and out of the Airport until 2045, which will reach their maximum capacities. The roads should be expanded to 6 traffic lanes. Highway No. 3216 as the route to the south of the Airport, which is currently under construction to increase the number of lanes to 6 lanes as it is the route leading to Chuk Samet Pier. The route can support the traffic between the Pier and the Airport. Meanwhile, Motorway No. 7, which is an elevated road to the north of the Airport, should be renovated to a 6-lane road before 2047. Therefore,	U-tapao. International Airport to provide more convenience for customers traveling to U-tapao users International Airport • Coordinate with transport agencies involved in the study of public transport and mass transit systems for U-tapao International Airport in the future, by promoting the use of public transport and mass transit as much as possible. The government should provide a policy to improve the mass transit and electric train system which can reduce the use of personal cars when traveling to U-tapao International Airport. Improvement shall be made for the connectedness and accessibility of the system to provide more convenience for the customers and reduce problems that may arise • Coordinate with the local traffic police to improve traffic light management around the U-tapao International Airport, as well as the U-turn locations nearby U-tapao International Airport in accordance with the traffic volume, not to cause delays or lengthen queue length at intersections. The police shall arrest or warn those who violate traffic rules • Coordinate with the agencies responsible for facilitating traffic on routes leading to U-tapao International Airport and connecting routes nearby during rush hours • Coordinate with relevant departments to develop and improve the transportation network around U-tapao	• Survey the amount of traffic to assess traffic condition and road efficiency for the main routes around U-tapao International Airport **Implementation area(s)** Main routes around U-tapao International Airport including • Routes inside U-tapao International Airport • Highway No. 3 • Highway No. 331 • Highway No. 332 • Highway No. 3126 **Indicator(s)** • Types of vehicles and amount of traffic (hourly) of each route used connected to the Airport **Frequency** • 24 hrs. for 2 days on weekends and weekdays. Once a year throughout the construction phase **Responsible party:** EEC **2) Traffic on routes to and from U-tapao International Airport** **Monitoring method(s)** • Record on types of vehicles and amount of traffic on routes to and from U-tapao International Airport **Implementation area(s)** • Routes to and from U-tapao International Airport **Indicator(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	the impact is expected to be moderate.	International Airport to support the increasing traffic volume and alleviate traffic congestion • Coordinate with the Department of Highways to prepare an emergency plan for traffic management in the event of an emergency and serious accidents to reduce traffic congestion, such as temporarily allowing vehicles to use the street isle as an extra lane, etc. • Once a year, gather statistical data of mass transit users who travel to U-tapao International Airport to consider implementing measures to improve and promote the use of mass transit and public transport systems, thereby reducing the number of people traveling using private cars and alleviating traffic congestion problems. In addition, EEC should collect other transport and traffic information related to areas around U-tapao International Airport from various agencies as a database for planning development policies or strategies for transportation infrastructure, in accordance with the development of U-tapao International Airport and land use in the surrounding areas **Responsible party:** EEC coordinates with relevant agencies	• Types of vehicles and amount of traffic (hourly) of each route used connected to the Airport **Frequency** • 24 hrs. for 2 days on weekends and weekdays. Once a year throughout the construction phase **Responsible party:** EEC **3) Statistical data of mass transit users who travel to U-tapao International Airport** **Monitoring method(s)** • Gather statistical data of mass transit users who travel to U-tapao International Airport **Implementation area(s)** • U-tapao International Airport **Indicator(s)** • Number of customers using mass transit and public transportation on weekends and weekdays **Frequency** • Gather data monthly and provide an annual report throughout the lifetime of the Project **Responsible party:** EEC **4) Accident occurrence** **Monitoring method(s)** • Gather data on accident occurrence on routes inside U-tapao International Airport and major routes around U-tapao International Airport **Implementation area(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			Routes inside U-tapao International Airport and major routes around U-tapao International Airport including: • Routes inside U-tapao International Airport • Highway No. 3 • Highway No. 331 • Highway No. 332 • Highway No. 3126 **Indicator(s)** • Number of traffic accidents with causes and severity **Frequency** • Daily, with a monthly report throughout the lifetime of the Project **Responsible party:** EEC
16) Public utilities and facilities Construction phase	**1) Water consumption** **Consumption of water inside U-tapao International Airport** During the construction phase among workers and supervisors can be classified as follows: **Phase 1:** Daily water consumption among construction supervisors and construction workers who come to work and rest during the day inside the Airport area is approximately 202.3 m^3/day **Phase 2**: Daily water consumption among construction supervisors and construction workers who come to work and rest during the day inside the Airport area is	• The contractor must provide sufficient drinking water and clean water for the staff and construction workers (with an average amount of drinking water 5 liters/person/day and an average of 7 0 liters of water for consumption/person/day) at the construction office and construction worker accommodation • Prepare water tanks that are able to supply water for 3 days in case of inadequate water supply at the construction office and construction worker accommodation • Use water-saving sanitary wares and encourage the workers to use water efficiently	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	approximately 61.7 m^3/day **Phase 3**: Daily water consumption among construction supervisors and construction workers who come to work and rest during the day inside the Airport area is approximately 114.4 m^3/day The Project will request water supply from East Water Company. The construction of the water supply system will be completed in 2021 to distribute water in the service area. This will also cover the construction phase of the Project. If the construction of the extended area of the Airport begins before the completion of the Project, the contractor can request water supply from the Provincial Waterworks Authority, Ban Chang Branch, which can provide sufficient water supply for the Project without affecting residents living around U-tapao International Airport. The Project will state in the contract that the contractor must prepare water tanks that are able to supply water for 3 days in case of inadequate water supply. The impact is expected to be moderate. **Outside U-tapao International Airport** The consumption of water outside U-tapao International Airport is mainly associated with the workers who stay within the worker accommodation. The projected water consumption in each phase of the construction is as follows:	• Inspect the water storage system, pipe lines, and sanitary wares and ensure that they are always in good condition. Replace immediately if any leakage or damage is found **Responsible party:** RTN and EEC instruct the contractor to follow the measures	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Phase 1: Water consumption at worker accommodation located outside the Airport is approximately 398 m^3/day **Phase 2**: Water consumption at worker accommodation located outside the Airport is approximately 112.0 m^3/day **Phase 3**: Water consumption at worker accommodation located outside the Airport is approximately 225.6 m^3/day During the construction phase, water can be purchased from the Provincial Waterworks Authority located around the Project area, namely the Provincial Waterworks Authority, Rayong Branch, Ban Chang Branch, and Pak Nam Prasae Branch. The closest water supplier is the Provincial Waterworks Authority, Ban Chang Branch. When considering the statistics related to water users and volume of production and distribution of the Provincial Waterworks Authority, branches in Rayong have higher production compared with their distribution, therefore, is sufficient for the Project to purchase water to facilitate the consumption of workers. Therefore, the impact is expected to be moderate. **2) Electricity consumption** The Project will receive electricity from B.Grimm Power Co., Ltd. As per the construction plan, the electrical system will be completed in the middle of 2022 for distributing electricity during the construction phase of the Project. If the construction of the extended area of		

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	the Airport begins before the completion of the Project, the contractor can request electricity supply from Electricity Affairs, The Royal Thai Navy Welfare Concession, which is the agency currently overseeing U-tapao International Airport area with sufficient capacity to support the growing demand of electricity among construction workers for construction activities Moreover, the duration of the construction phase is short, therefore, will not be any impact.		
16) Public utilities and facilities Operation phase	**1) Water consumption** Water consumption during the operation phase will increase as the number of passengers increases. The projected water consumption in Phase 1 (2028), Phase 2 (2038), and Phase 3 (2048) are 8,610, 13,046, and 19,333 m^3/day, respectively. Water will be supplied from the water supply system of East Water Company, which is designed to supply up to 20,000 m^3/day. The construction will be divided into 2 phases: Phase 1 (1^{st}-6^{th}) and Phase 2 (7^{th}), with each phase having a system capable of supplying up to 10,000 m^3/day, with water tanks with a capacity of 30,000 m^3. The capacity of the system will be able to supply water to U-tapao International Airport sufficiently, and will not cause any impact related to the use of water by residents living nearby **2) Electricity consumption**	-	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	The Project will receive electricity from B.Grimm Power Co., Ltd. The projected electricity consumption is at 98.58 MW. The maximum amount of electricity generated is 160 MW, which will be delivered to U-tapao International Airport. The excess electricity will be sold to Electricity Affairs, The Royal Thai Navy Welfare Concession, to strengthen the stability of the local electrical system. The supply of electricity is sufficient to meet the consumption and, therefore, has no impact on nearby areas.		
17) Water drainage and flood prevention Construction phase	Construction activities inside U-tapao International Airport include 1) area improvement work / soil-quality improvement work / soil filling works 2) road and safety area filling works around the taxiways / road surface construction 3) road layer construction / road construction work 4) excavation work, installation of support/pile cut off 5) foundation work 6) structural work 7) architectural work and system work and 8) construction work inside the station/system work and architecture work inside the train station, etc. These activities may cause soil leaching and washing off soil into the drainage canal, leading to the shallow canal and poor drainage during the construction. The Project is located near the sea, therefore, may lead to some minor negative impacts on the drainage system inside the U-tapao International Airport. To alleviate such impact, the Project must provide	• The area should be adjusted and filled as soon as possible to prevent sediment from leaching into the canal and obstructing the drainage system • Inspect the drainage canal inside U-tapao International Airport to maintain its efficiency. Silt or weeds must be removed immediately • Dredge a canal outside the Airport and a resting pool inside the Airport using the right equipment in order to maintain the cross-section of the outer canal and the capacity of the pool as designed • Install a garbage trap in the drainage channel where necessary **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**Monitoring method(s)** • Inspect the drainage canal inside U-tapao International Airport to maintain its efficiency **Implementation area(s)** • Drainage canal inside U- tapao International Airport near the construction site **Indicator(s)** • Water level, flow direction, shallowness, accumulation of silt **Frequency** • Once a month throughout the construction phase **Responsible party:** RTN and EEC **Monitoring method(s)** • Collect data related to the inspection of the drainage canal within the U-tapao International

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	measures to prevent debris from falling into the drainage system.		Airport **Implementation area(s)** • Drainage canal within the U-tapao International Airport **Indicator(s)** • Data related to the efficiency of the drainage system **Frequency** • Every 6 months, throughout the construction period **Responsible party:** RTN and EEC
17) Water drainage and flood prevention Operation phase	After the opening of the second runway and the taxiway, analyzed based on the current conditions with adjusted land use in the area, as well as the water flow rate in the Project area considering the characteristics of the basin, the concrete and asphalt area will be equal to 7,531,370.73 m^2, and the grass area will be equal to 3,578,943.56 m^2. For runoff estimation, the runoff coefficient (C) for concrete and asphalt area is 0.90, whereas the runoff coefficient (C) for the grass area is 0.40. When the average runoff coefficient is equal to 0.74. The Project has designed a drainage system to prevent the accumulation of rainwater, and to control the level of water around the second runway and the taxiway, which can be divided into 2 parts: 1) Secondary canal will convey water into 2) the primary	• Inspect the drainage canal inside U-tapao International Airport to maintain its efficiency. Silt or weeds must be removed immediately. Dredging must be carried out at least once a year before the rainy season • Dredge a canal outside the Airport and a resting pool inside the Airport using the right equipment in order to maintain the cross-section of the outer canal and the capacity of the pool as designed • Inspect and dredge out sediments in the retention ponds. This allows the ponds to be used effectively. Dredging must be carried out at least once a year before the rainy season • Maintain the water level in retention ponds inside U-tapao International Airport at a low level (-1.30 to -1.40 m. above mean sea-level according to their design values)	**Monitoring method(s)** • Collect data on water level and water flow patterns in the canal surrounding U-tapao International Airport from relevant agencies and analyze the efficiency of the canal. Submit a report on the results of and summarize the problems along with recommendations **Implementation area(s)** • Canal around U-tapao International Airport **Indicator(s)** • Water level data • Water flow pattern **Frequency** • Once a year during the rainy season, throughout the lifetime of the Project

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	canal, with a U-DITCH characteristic. Each drain of the primary and secondary can support the maximum volume of approximately 120.21 m^3/ second, which directs the water into 2 retention ponds, with a maximum capacity of 124,820 m^3 and 195,257.41 m^3, respectively. The total capacity of both retention ponds is equal to 320,077.41 m^3, which is enough to collect the excess water from the Project, which is equal to 251,691.20 m^3 In addition, the Project will build a pumping station near the first retention pond to pump out excess rainwater. A total of 4 pumps will be installed, with each of them able to pump out water at 2 m^3/ second (3 will be used, 1 kept in reserve). Up to 3 pumps will be used simultaneously, with a total pumping rate of 6 m^3/second. Staff will be controlling the pump for 24 hrs/day and ensuring that the machines are always available for use. The pumping schedule must follow the tides, while the staff must coordinate with the Meteorological Department to check the rainfall data, as well as rain forecast in advance, to estimate the amount of rainwater. The Project's drainage and flood prevention system could support the amount of rainfall without causing floods within the Project area and will not affect the surrounding areas. The Project has designed the 1st and 2nd retention ponds to be both the sedimentation ponds and the retention ponds. After the rain has	before the rainy season • Provide a backup water pumping system in case the main pumping system is damaged. In the event that the level of water is below the critical level shown on the flood barrier (+2.77 m, above MSL), the flood barrier must be strengthened using appropriate engineering principles and meet the related standards • During the rainy season, dredging the outer canal to the south of U-tapao International Airport is prohibited, as well as the 1-km. area around the canal to the north of the west and east pumping stations, to prevent sediment from being discharged to the outside during the pumping activity of U-tapao International Airport. The dredging contractor must coordinate with the pumping station staff to adjust the operational plan accordingly. Avoid dredging the canal near the pumping stations during the period. The excavated soil should not be left in the nearby area, instead, place it on the river bank to strengthen the structure of the drainage canal **Responsible party:** EEC	**Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	stopped and the water quality has been assessed, the water will then be pumped out. The impact is expected to be low.		
4. Value for quality of life			
18) Socioeconomic status Construction phase	The construction activities are expected to cause positive impacts as follows: **Economic impact**: Activities in the construction phase may lead to income distribution. During the construction, labor will be used the most in Phase 1. The number of construction workers and supervisors will be 2,890 people, 882 people, and 1,634 people per day in Phase 1, Phase 2, and Phase 3, respectively, depending on the nature of construction activities. The whole construction will take about 36 months and bring employment. Therefore, the positive impact level is moderate, temporary, and limited. **Public infrastructure and facilities**: Public infrastructures, facilities, and utilities systems will be developed to accommodate the service of U-tapao International Airport and the surrounding area. The agencies involved may include RTN, RTA, PEA, and PWA. The positive impact level is moderate, temporary, and limited. The construction activities are expected to cause negative impacts as follows: **Mental health and concerns of local people**: According to	• The contractor selects and checks the history of workers before hiring and make a report of worker profile, including photo, at the project office. When there is a problem, this will allow for immediate investigation. • Promote local workers and support local businesses. In case of migrant workers, only those with legal work permit are employed. • Provide suitable and clear place to stay. Determine measures to control workers in the construction area and the campsite to prevent them from disturbing local people such as gambling, drugs, and noisy activities. There are serious punishments for violation. • Workers are not allowed to stay in the Project area. However, stores can be guarded by not more than 5 workers at night. • Allocate security guards to check people who enter or leave the construction area. Workers can enter the construction area only when permitted. • Allocate security guards in the construction area and the campsite around the clock. The foremen shall supervise workers' behavior to relieve the concern of local people over safety such as crime and theft.	**Monitoring method(s)** • Survey the opinions of the public, agencies, and businesses in the radius of 6 km east and west and 10 km. north and south of U-tapao International Airport. • Collect complaints/ suggestions/ comments of the public reported through various channels and make a monthly summary report. • Monitor the regulations that control workers not to cause negative impact on the local communities. Determine punishments for violators at leat once a month. **Implementation area(s)** • The area in the radius of 6 km east and west and 10 km north and south of U-tapao International Airport. **Indicator(s)** Ask opinions of the public, agencies, and businesses by using a questionnaire about: • Socioeconomic status • Community environment and the current modes of transportation • Access to the Project news and information

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	the public opinion survey in 2020, households in the NEF ≥ 40 contour were worried about the Project development by 76.1%, and those in the NEF 30-40 contour by 14.4%. The most common concerns were their daily routines, safety in life and properties, and sufficiency of basic utilities. However, the negative impact last only temporarily in the construction phase. Therefore, the negative impact level is high, temporary, and limited. **Transportation**: The number of trucks used for transporting soil will increase the traffic volume and affect the traffic condition in the road networks around U-tapao International Airport. The existing traffic condition is relatively congested, especially at Kasemphon Intersection Pattanavech School during the rush hours. The higher number of trucks will change the traffic condition, but not abruptly. Therefore, the negative impact level is moderate, temporary, and limited. **Dust and noise from transporting construction materials:** The main source of dust and noise in the construction phase is the vehicle for transporting construction material and equipment. Land grading requires a lot of machines. Noisy activity that will have the highest impact on the public is land grading because it requires several machines to work at the same time, including tractors, trucks, and grader.	• Upon complaint about construction impact, the complaint shall be reviewed and resolved as soon as possible. • Strictly follow the environmental impact mitigation measures for transportation in the construction phase. • Coordinate with relevant agencies to improve roads and expand traffic lane and improve public utilities which will facilitate local people, even at the national level, who travel by. The service should be improved in terms of quality and quantity. • Coordinate with relevant agencies to promote community activities, such as agriculture, coastal animal farming (crab bank), community development, health promotion, education, arts and culture, tourism, and environmental conservation. • Set up an EIA Monitoring Committee to monitor the impact and seek participation from the community to assist with the monitoring within 12 months after the Project is approved by the Cabinet. The EIA Monitoring Committee will ensure that the environmental impact mitigation and monitoring measures are followed. • The EIA Monitoring Committee must consist of representatives from 3 parties: the public, government agencies, and the Project Owners. The ratio of the public representative, excluding the public agencies, shall be more than 2/3 of the entire EIA Committee. More details	• Impact from the construction • Compliance with the environmental impact mitigation in the construction phase of the Project • Comments and suggestions for the Project **Frequency** • Once a year throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Therefore, the negative impact level is moderate, temporary, and limited. **Changes in community and village conditions, expansion of community, and urbanization**: The project might cause changes to the community conditions, such as immigration and emigration, the growth of new housing estates, commerce, control of building type and size. The changes are significant, especially in the NEF ≥ 40 contour, which is expected to have high noise exposure to the degree that it is not suitable for habitation. Therefore, local authorities granting the construction permit must control the building according to the law, requirements, and the Notification of the Ministry of Transport determining the area near U-tapao International Airport as an air navigation safety zone. Therefore, the negative impact level is moderate, temporary, and the impact scope is moderate.	are described below. 1) Representatives of the public are selected from the subdistricts in the study area presented in the EHIA Report at the suitable proportion. Also, they can be procured, nominated, or any other means from the communities surrounding the Project sorted by local administrative areas and by subdistricts. - Representatives of the public who are community leaders e.g. community leaders in the subdistrict in the EHIA Report in Rayong and Chon Buri - Representatives of local people in the EHIA Report in Rayong and Chon Buri, covering people affected by the noise contours. - Representatives from NGOs in Rayong and Chon Buri (if any) 2) Representatives from relevant agencies at the central and provincial level, including ONEP, OTP, PCD, Rayong and Chon Buri Offices of Public Works and Town Planning, Rayong and Chon Buri Offices of Natural Resources and Environment, Rayong and Chon Buri Offices of Public Health, and other administrative agencies in Rayong and Chon Buri (at provincial, district, and local administration level.) 3) Representative from the Project Owners (RTN and EEC) The EIA Monitoring Committee comprising representatives	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		from 3 parties will hold a meeting to vote a chairperson, a vice chairperson, and a secretary. After the vote, the EIA Monitoring Committee will appoint them by the resolution of the meeting. The EIA Monitoring Committee who are representatives of the public should be selected as described below. 1) Local agencies allow the public to vote a representative from their subdistrict administration. 2) Local agencies present the vote results to the public and give additional comments within 15 days after the voting day. 3) Names of representatives are submitted to the Project or the EIA Monitoring Committee **Remark:** Additional comments or objections are at discretion of the EIA Monitoring Committee. Decisions of the EIA Monitoring Committee are final. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
18) Socioeconomic status Operation phase	After the change, the Project activities in the operation phase are expected to cause the following positive impacts. **Economic impacts**: The operation phase will lead to local economic expansion and employment. In the operation phase, there will be more flights/hr. and more population in the area, including users of U-tapao International Airport, airline operators, and related businesses, non-registered	• EEC must make the noise monitoring results available to the public continuously. • Strictly follow the environmental impact mitigation measures for noise in the operation phase. • Strictly follow the environmental impact mitigation measures for transportation in the operation phase. • Set up a fund to compensate for the environmental impact and improve the quality of life in order to relieve	**1) Survey the opinions of the public, community leaders, and sensitive areas using a questionnaire** **Monitoring method(s)** • Survey the public opinions using a questionnaire. • Collect the complaints/ suggestions/ comments of the public reported through various channels and make a monthly summary report. • For the sample size for people living in NEF ≥ 40,

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	workers and population. The increased population might lead to expansion of residences, both temporary and permanent, commerce, services, industries, and warehouses to accommodate the quantitative potentials. These factors contribute to employment and economic growth. The impacts are expected to be positive. The Project operation will result in more local employment, which benefits subcontractors and smaller businesses such as merchants and private businesses like restaurants, accommodation, and transportation services. Therefore, the positive impact level is low, continuous, and limited within the local area. After the change, the Project activities in the operation phase are expected to cause the following negative impacts. **Noise**: In the NEF ≥ 40 and NEF 30 – 40 contours, the major source of noise in the operation phase is aircraft. The activity that may cause noise impact is take-off and landing of aircraft. According to the noise assessment when operating the second runway and taxiway of U-tapao International Airport, the noise impact level is high. Affected people need to move away from the affected area and receive compensation for selling land and buildings to the Project Owners. Therefore, the negative impact level is high, continuous, but limited in the local area.	the impact that people may be affected by the operation of U-tapao International Airport and the impact on the environment and public health in general. • For people living near the NEF≥40 contour, such as NEF 39/38, or people affected by the Project activities, the Project has the mitigation measures by setting up the fund for the following purposes. - The Emergency Damage Insurance Fund aims to be the reserve payment for emergency compensation. In case of accident, the affected can file the case to the Foundation Management Committee. Foundation Management Committee shall hold a special meeting before the due time to consider the compensation based on the actual damage, depending on the principles, conditions, and criteria of the Fund. - The Fund for Improving the Quality of Life of the Public aims to improve the quality of life of people in the communities around the airport, conserve the nature and environment, and mitigate the damage as the primary remedy for the impact from the Project. The Fund also pays for the cost or remuneration of the Foundation Management Committee or any other working group as the Foundation Management Committee deem appropriate. • Consider hiring local people living around U-tapao International Airport who have suitable qualifications as the priority. • Coordinate with relevant agencies to promote	survey every affected household that can be monitored and are willing to give information. The sample size for people living in NEF 30-40 and people living living around U-tapao International Airport can be set as appropriate and demographically acceptable. **Implementation area(s)** • Households, community leaders, and sensitive receptors in NEF ≥ 40 • Households, community leaders, and sensitive receptors in NEF 30-40 • People living around U-tapao International Airport in the study area **Indicator(s)** Survey the public opinions using a questionnaire comprising the following data: • Socioeconomic status • Environmental condition of the environment and the current modes of transportation • Access to news and information about the Project • Impact from the Project operation • Compliance with the environmental impact mitigation measure in the operation phase of the Project • Opinions and suggestions for the Project **Frequency** • At least once a year throughout the lifetime of the

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Mental health and concerns of local people: Based on group meetings / group discussions as part of the Public Consultation Meeting 2 , local fishing groups were concerned about their career. When the construction is completed, workers who move into this area may still live and work here, probably in the fishing industry. Local fishermen are concerned about the impact on the ecosystem and lower income. There are also concerns over public health services. It was found that 10 – 20 % of local people were facing low quality public health services, particularly caused by a large number of service users in contrast with insufficient public health staff. Therefore, the negative impact level is low, temporary, and limited in the local area. **Transportation and inconvenience of road users**: When both runways are operated concurrently, the traffic volume will increase considerably. During the rush hours, the traffic will be congested and the traffic lanes overloaded. The roads accessing U-tapao International Airport still have good mobility rates. Therefore, the negative impact level is low, continuous, and limited in the local area.	community activities, such as agriculture, coastal animal farming (crab bank), community development, health promotion, education, arts and culture, tourism, and environmental conservation. • Set up the EIA Monitoring Committee by allowing the community to engage in the monitoring process. **Responsible party:** EEC coordinates with relevant agencies	Project **Responsible party:** EEC **2) Setting up the Fund for Compensating the Environmental Impact and Improving the Quality of Life** **Monitoring method(s)** • Report the implementation of the Fund for Compensating the Environmental Impact and Improving the Quality of Life to monitor the implementation to compensate for environmental impact and public health. **Implementation area(s)** • Around U-tapao International Airport **Indicator(s)** • In case the Fund establishment is in the process: Report the progress of establishing the Fund • In case the Fund has been established: Report the operation results of the Fund **Frequency** • Report the progress of the Fund establishment every 6 months. • Report the operation results of the Fund every year throughout the lifetime of the Project. **Frequency** • Throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
19) Relocation and compensation for properties Construction phase	The construction activities of the second runway and taxiway is part of the EEC development under the infrastructure development under the responsibility of EEC Policy Committee Office (EEC). The construction will take place in U-tapao International Airport, which is in the premises of RTN. The construction activities include 1) land clearing/ soil hardening/ land reclamation, 2) reclamation of runway and taxiway strip/ construction of the runway surface structure, 3) the structure and surface of the runway, 4) excavation, installation of supports/ pile cutting, and the roof the tunnel under the runway, 5) foundation, 6) structure, 7) architecture and utilities, and 8) construction in the station/ utilities, and architecture in the railway station. It also requires transportation of construction materials and machines. These activities will occur inside U-tapao International Airport. The Project will not move building and structures of residents living around U-tapao International Airport. Therefore, the Project has a low impact on relocation.	• Strictly follow the environmental impact mitigation measures for noise and land use in the construction phase of the Project. • Coordinate and support data to local authorities to notify the public about the air navigation safety zone and the areas affected by noise from the Project development. **Responsible party:** RTN and EEC instruct the contractor to follow the measures.	-
19) Relocation and compensation for properties Operation phase	Based on the impact of aircraft noise from the forecast in 2048, the sensitive areas and communities in the NEF ≥ 40 and NEF 30 – 40 contours are listed below. - NEF ≥ 40 ▪ 5 sensitive places 1) 2 schools: Song La Early Childhood	• Strictly follow the environmental impact mitigation measures for noise and land use in the operation phase of the Proejct. **Responsible party:** EEC	**Monitoring method(s)** • Collect and study statistics of construction permission application around U-tapao International Airport from local agencies. • Survey land use in the field to see the trend of change of land use and apply the data to improve the environmental impact mitigation measures for

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Development Center 3 and Wat Sa Kaeo School 2) 2 religious places: Wat Sa Kaeo and Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion) 3) 1 hospital : Ban Sa Kaeo Health Promotion Hospital ▪ 93 buildings in the community - NEF 30 - 40 ▪ 17 sensitive places 1) 6 schools : Pattanavechsueksa School, Pattanavech Technological College, Wat Somburanaram School (Temrat Anuson), Samnak Thon Subdistrict Municipality Early Childhood Development Centerin Wat Somburanaram School, Ban Samnak Thon Early Childhood Development Center and Wat Samnak Thon School 2) 9 religious places: Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument, Naval Aviation Museum, King Taksin the Great Monument (1st Anti-Aircraft Division), Somdet Ong Prathom (1st Anti-Aircraft Division), Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (1 st Anti-Aircraft Division), Phra		land use. **Implementation area(s)** • Areas around U-tapao International Airport at 6 km to the east and the west and 10 km to the north and the south of the airport. **Indicator(s)** • Data of permission for construction and patterns of land use. **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion, Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion), Wat Somburanaram, and Wat Samnak Thon. 3) 2 hospitals: Ban Khlong Bang Phai Subdistrict Helath Promotion Hospital and Ban Khao Khrok Subdistrict Helath Promotion Hospital ▪ 2,466 households in the community area of Samnak Thon Subdistrict (2,358 households) and Phlu Ta Luang (68 households) and Huai Yai Subdistrict (40 households). Households or buildings in the NEF ≥ 40 will be negotiated for purchase to minimize the noise impact. Households or buildings in the NEF 30 – 40 will get the compensation cost for renovating their buildings to minimize the noise impact. This measure will result in relocation and compensation of properties. Therefore, the impact level is high.		
20) Personal health and public health Construction phase	**Impact on people in local communities:** The assessment was based on the relationship between environmental factors and health. The expected impacts are summarized below. **1) Noise**: Noise in the construction activities is generated from machines and equipment used for land reclamation and construction of the second	**1) Noise** • Follow the environmental impact mitigation measures for noise in the construction phase.	**1) Noise** • Follow the environmental impact mitigation measures for noise in the construction phase.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	runway, taxiway, and other elements. The noise might affect people living near the construction area. The construction of the second runway and taxiway currently does not have the equipment maintenance plan. It is a concern among stakeholders. Therefore, the impact level on local communities is moderate.	• Notify local public authorities about the activities, the number of workers, and working period. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
	2) Dust: Opening the soil surface, land grading, and construction of the airport elements might cause dust dispersion and affect people living near the construction area and around U-tapao International Airport. Dust may cause irritation and the risk for respiratory diseases, affect visibility, and may lead to accident. Although the maximum concentration from the mathematical model forecast did not exceed the standard, the Project does not have a standard operating procedure to control dust from the construction. It is a concern of stakeholders. Therefore, the impact level on local communities is moderate.	**2) Dust** • Follow the environmental impact mitigation measures for air quality in the construction phase. • Notify local public authorities about the activities, the number of workers, and working period. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**2) Dust** • Follow the environmental impact mitigation measures for air quality in the construction phase.
	3) Vibration: Vibration in the construction activities is generated from machines and equipment used for land reclamation and construction. The vibration might affect people living near the construction area because currently the Project does not have a standard operating procedure to control vibration of machines and equipment. It is a concern among stakeholders.	**3) Vibration** • Follow the environmental impact mitigation measures for vibration in the construction phase. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to	**3) Vibration** • Follow the environmental impact mitigation measures for vibration in the construction phase.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Therefore, the impact level on local communities is moderate.	follow the measures	
	4) Adequacy of public utilities (water for consumption): The construction activities lead to more water consumption. A shortage of water may lead to waterborne disease. However, a private company (East Water) has a water management plan that can supply water to consumer adequately. Still, there will be higher cost for managing and finding raw water and every group has a chance to be affected. Therefore, the impact level on local communities is moderate.	**4) Adequacy of public utilities (water for consumption)** • Follow the environmental impact mitigation measures for public infrastructure and utilities in the construction phase. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**4) Adequacy of public utilities (water for consumption)** • Follow the environmental impact mitigation measures for public infrastructure and utilities in the construction phase.
	5) Ease of travel (traffic mobility): The transportation of construction materials, machines, equipment, and workers may cause traffic congestion in certain sections of the road network. Based on the assessment, Highways No. 3, 331, 332, and 3126 will have a higher V/C ratio. The traffic forecast in the 3-year construction period from 2021 – 2023 showed that every road will have a slight increase in traffic due to transportation of construction materials and workers. The impact is relatively low. The service level of each highway will remain at Level A with high mobility. However, the transportation of construction materials and workers cause concerns among the main stakeholders, who are working adults and people living near the transportation routes. It may affect the	**5) Ease of travel (traffic mobility)** • Follow the environmental impact mitigation measures for transportation and socioeconomic status in the construction phase. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**5) Ease of travel (traffic mobility)** • Follow the environmental impact mitigation measures for transportation in the construction phase.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	budget of local authorities to manage traffic in case of road damage caused by the Project activities. Therefore, the impact level on local communities is moderate.		
	6) Social network of the community/ safety in life and properties: When non-locals come to work in this area, they have different lifestyles and share public utilities. This may lead to conflicts, arguments, concerns, panic, and fear for loss of life and properties. Besides, there is no clear practices to control construction workers as the worker campsite is located in the community area. Therefore, the impact level on local communities is moderate.	**6) Social network of the community/ safety in life and properties** • Follow the environmental impact mitigation measures for transportation and socioeconomic status in the construction phase. • The contractor submits the name and history of workers to local authorities before they start working. The names shall be monitored and reviewed once a year. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	**6) Social network of the community/ safety in life and properties** • Follow the environmental impact mitigation measures for transportation and socioeconomic status in the construction phase. **Monitoring method(s)** • Collect the list of workers and their work history **Implementation area(s)** • The worker campsite and construction control office of the Project **Indicator(s)** • The list of workers and their work history **Frequency** • Once a year throughout the construction phase **Responsible party:** RTN and EEC
	7) Sanitation (Waste and wastewater): Without good sanitation management, the construction area and worker campsite might be the sources of diseases and carriers of disease to nearby area. Gastro-intestinal diseases might even increase the illness rates and affect public health budget. The increase of public health budget will affect the public health service and	**7) Sanitation (Waste and wastewater)** • Follow the environmental impact mitigation measures for waste and wastewater management, for occupational and safety in terms of sanitation of the worker campsite, and for socioeconomic status in the construction phase in terms of appropriate accommodation for construction workers and maintaining orders in the construction area	**7) Sanitation (Waste and wastewater)** • Follow the environmental impact mitigation measures for waste and wastewater management, occupational and safety, and socioeconomic status in the construction phase.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	all groups of population. Therefore, the impact level on local communities is moderate.	and worker campsite. Establish an EIA Monitoring Committee and engage the community into the monitoring process. • Notify local public authorities about the activities, the number of workers, and working period. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
	8) Common communicable disease (The main disease group that causes illness/ Water- and food-mediated diseases, respiratory disease, including viral epidemics such as the COVID-19): Immigration of non-local workers may bring communicable diseases to local communities. Without proper management at the worker campsite, it might be the source of water-mediated and food-mediated diseases or acute respiratory diseases such as SARS and COVID-19. These sicknesses will also increase the illness rate and severity, affecting public health budget and other related public health services. This may affect every group of population. Therefore, the impact level of local communities is moderate.	**8) Common communicable disease (The main disease group that causes illness/ Water- and food-mediated diseases, respiratory disease, including viral epidemics such as the COVID-19)** • Follow the environmental impact mitigation measures for waste and wastewater management, occupational health and safety, and socioeconomic status in the construction phase. • Set up the rules for sanitation management at the worker campsite, waste and sewage management, prevention and control of pest. Ensure strict enforcement. • Provide health examination and make a list of workers along with their health records before they can start working. The data shall be submitted to local public health authorities. • Ensure that the contractor instruct and advise workers	**8) Common communicable disease (The main disease group that causes illness/ Water- and food-mediated diseases, respiratory disease, including viral epidemics such as the COVID-19)** • Follow the environmental impact mitigation measures for waste and wastewater management in the construction phase • Follow the environmental impact mitigation measures for occupational health and safety (sanitation in the worker campsite) in the construction phase.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		about good practices of sanitation, hygiene, disease prevention. Seek assistance from local public health facilities, such as hospital and public health center. This process should be done at the beginning of the construction phase. • Ensure that the contractor follows relevant laws, notifications, and regulations about disease control and prevention, including the Public Health Act, the Communicable Disease Act, and public health measures to control urgent diseases such as SARS-CoV, Covid-19, avian flu, and swine flu pandemic (2009). National and international laws and regulations shall be strictly followed, including (1) the Communicable Disease Act, B.E. 2558, (2) Notification of the Department of Health on Criteria, Methods, and Measures for Risk Prevention from coronavirus disease (COVID-19) for government agencies, private offices, and private businesses B.E. 2563, (3) Notification of the Department of Health on Criteria, Methods, and Measures for Risk Prevention from coronavirus disease (COVID-19) for public transportation businesses B.E. 2563, (4))Suspected communicable disease universal precaution Kit (IATA, 2017), and (5) Communicable disease surveillance and response systems: Guide to monitoring and evaluating (WHO, 2006). • The contractor shall make a communicable disease surveillance and prevention plan at the worker campsite	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		and submit the plan to RTN and EEC. • RTN and EEC coordinate with local public health authorities to plan the environmental and health impact mitigation measures in the worker campsite of the Project. • Notify local public authorities about the activities, the number of workers, and working period. • Prepare the media and the channels for contacting RTN and EEC to forward the data for local public health authorities to acknowledge the data and record activities about public health support activities. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
	9) Accident: The increased number of vehicles for transporting the construction materials might cause more accident to local people, resulting in loss of life and properties. The higher accident rate may also contribute to higher illness and injuries, requiring medical and public health demands for medical supplies, and ultimately the sufficiency of medical staff. Therefore, the impact level on local communities is moderate.	**9) Accident** • Follow the environmental impact mitigation measures for transportation and socioeconomic status in the construction phase. • Set up the guideline for the contractor and subcontractor to monitor the implementation. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** RTN and EEC instruct the contractor to	**9) Accident** • Follow the environmental impact mitigation measures for transportation in the construction phase **Monitoring method(s)** • Collect complaints/ suggestions/ comments of the public reported through various channels, analyze them, and make a monthly summary report. **Implementation area(s)** • Communities around the Project area

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		follow the measures	**Indicator(s)** • Record of transportation accident complaint **Frequency** • Every month throughout the construction phase **Responsible party:** RTN and EEC
	10) Access to health services and adequacy of medical staff and medical supplies: Immigration of non-local workers may demand public health services and share the services with local people. If local public health authorities are unable to prepare or provide efficient services, it will have negative impact on local people and the budget for procuring medical devices for patients. Therefore, the impact level on local communities is moderate.	**10) Access to health services and adequacy of medical staff and medical supplies** • RTN and EEC coordinate with local public health authorities to plan the environmental and health impact mitigation measures in the construction area and worker campsite. • Conduct CSR (corporate social responsibility) activities by supporting subdistrict health promotion hospitals around the Project area • RTN and EEC provide or identify medical facilities or public health systems for the contractor without increasing the burden for the public health services that local people use. • RTN and EEC provide the channels for local public health authorities to contact and support them in terms of medical facilities and potential of medical staff. • Make a list of health service facilities and public health authorities near the Project area, along with the contact person and contact information in order to communicate them about the activity details. • Prepare media and the channels to contact with RTN and	**10) Access to health services and adequacy of medical staff and medical supplies** **Monitoring method(s)** • Collect the data and summarize the activities that coordinate with public health authorities. **Implementation area(s)** • Public health authorities near the construction area **Indicator(s)** • Details of activities that coordinate with public health authorities **Frequency** • Throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		EEC to provide data to public health authorities and record the data about public health authority supports. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
20) Personal health and public health Operation phase	**Impact on people in local communities:** The assessment was based on the relationship between environmental factors and health. The expected impacts are summarized below. **1) Noise pollution**: Noise from aircraft might affect hearing ability of people living around the airport. Aircraft noise causes more disturbance than noise from land vehicles. Noise in the living environment can lead to a lack of sleep for a certain period of time and wake people too early in the morning when they have not had enough sleep. The pathological study indicated that prolonged exposure to loud noise can cause high blood pressure and even cardiovascular diseases. Being disturbed while sleeping may lead to hormonal changes and negative impact on the metabolism (including enzyme and functionality of cells). The long-term effects could be cardiovascular diseases. The variation between day and night also affects the immune system and causes hypersensitivity, which may cause the heart muscle to become thicker and larger in size. Although the polysomnography has not been proven to be a direct cause of cardiovascular diseases, it is an indicator for a	**1) Noise pollution** • Follow the environmental impact mitigation measures for noise and socioeconomic status in the operation phase. • Monitor noise continuously. • Set up a fund to compensate for the environmental impact and improve the quality of life in order to relieve the impact that people may be affected by the operation of U-tapao International Airport and the impact on the environment and public health in general. • Coordinate and collaborate with local public health authorities to monitor hearing ability of people affected by noise caused by the operation of U-tapao International Airport • Promote the capacity of noise pollution monitoring of public health authorities and volunteer groups. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms.	**1) Noise pollution** • Follow the environmental impact mitigation measures for noise and socioeconomic status in the operation phase. **Monitoring method(s) :** Noise monitoring • Monitor noise based on the indicators presented in the Noise and Vibration topic • Analyze and make a monthly summary report along with the results of the solutions. **Implementation area(s)** • The areas as per the environmental measures for noise (details as per the Noise topic) **Indicator(s)** • The number public complaints received via various channels of the Project **Frequency** • The same period as the environmental impact monitoring for noise

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	long-term risk. Regarding high blood pressure, loud noise can trigger the stress hormones, such as epinephrine and norepinephrine. These substances affect the function of endothelium. This change may lead to arteriosclerosis. However, previous studies cannot conclude that noise is a direct cause of high blood pressure or cardiovascular diseases. More precisely, noise may be a factor for such chronic diseases and affect vulnerable groups, such as people aged over 35, those with Type 2 diabetes, the overweight, those who do not exercise, drinkers, smokers, and people who eat fatty diets. Moreover, prolonged exposure to loud noise can cause a loss of hearing. Therefore, the impact level on local communities is moderate.	**Responsible party:** EEC coordinates with relevant agencies	**Responsible party:** EEC **Monitoring method(s):** Audiometry testing for the public • Monitor hearing ability of people living around U-tapao International Airport to cover all people affected by noise • Analyze and make a summary report **Implementation area(s)** • People in the area with noise impact from the operation of U-tapao International Airport **Indicator(s)** • Audiometry test results of the public **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC **Monitoring method(s) :** Fund establishment • Make a report of the implementation results of the fund to compensate for the environmental impact and improve the quality of life in order to monitor the mitigation results for environmental and health impact. • Inspect the plan and public communication report to supervise the overall environmental and health issues so that the public can participate in giving opinions in making the plan with the Project or activities, and to monitor the implementation results. **Implementation area(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			• Around U-tapao International Airport **Indicator(s)** • In case the Fund establishment is in the process: Report the progress of establishing the Fund • In case the Fund has been established: Report the operation results of the Fund • The plan and public communication report to supervise overall environmental and health issues **Frequency** • Report the progress of the Fund establishment every 6 months • Report the operation results of the Fund every year throughout the lifetime of the Project • Report the results of the public communication every 6 months **Responsible party:** EEC
	2) vibration: Vibration from aircraft along the flight route might cause objects to fall due to the aircraft and wake vortex. This poses the risk for people living around U-tapao International Airport, especially along the flight routes. People may become worried and stressful for this incident. If it happens, it will damage their properties and affect local budget or even cause a loss of life, injuries, increase sickness rates, fatality, and the administration budget. When it occurs, it will demand medical needs, public health services,	**2) vibration** • Follow the environmental impact mitigation measures for vibration, mitigation measures for aircraft thrust or fallen objects from aircraft, and mitigation measures for socioeconomic status in the operation phase. • EEC coordinates with local public health authorities to plan and implement the environmental and health impact mitigation measures for communities around U-tapao International Airport. • Promote and support the capacity of emergency management	**2) vibration** **Monitoring method(s)** • Collect the record of complaints/ suggestions/ opinions of the public regarding the damage from vibration of aircraft reported via various channels, analyze them, and make a monthly summary report that includes the mitigation results. **Implementation area(s)** • Communities around the Project area **Indicator(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	medical supplies, and medical staff. Therefore, the impact level is moderate.	of public health and security agencies and volunteer groups. **Responsible party:** EEC coordinates with relevant agencies	• The data of complaints caused by aircraft vibration **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC
	3) Adequacy of public utilities (water for consumption): A shortage of water may lead to waterborne disease. However, a private company (East Water) has a water management plan that can supply water to consumer adequately. Therefore, access and adequacy are not significant issues. Still, there will be higher cost for managing and finding raw water and every group has a chance to be affected. Therefore, the impact level on local communities is moderate.	**2) Adequacy of public utilities (water for consumption)** • Follow the environmental impact mitigation measures for public infrastructure and utilities in the operation phase. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** EEC coordinates with relevant agencies	**3) Adequacy of public utilities (water for consumption)** • Follow the environmental impact mitigation measures for public infrastructure and utilities in the operation phase. **Responsible party:** EEC
	4) Ease of travel (traffic mobility): The operation of the second runway and taxiway may cause traffic congestion in certain sections of the road network. Based on the traffic forecast for 2048, Highways No. 3, 331, 332, and 3126 will be highly congested. The service level will become Level F (nearly paralyzed traffic with V/C ratio lower than 1). It is necessary to expand traffic lanes of every road. Therefore, the impact level on local communities is moderate.	**4) Ease of travel (traffic mobility)** • Follow the environmental impact mitigation measures for transportation in the operation phase. • Determine the guideline practice for all vehicles entering and leaving the area. Establish a traffic system that can accommodate good mobility inside U-tapao International Airport. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** EEC coordinates with relevant agencies	**4) Ease of travel (traffic mobility)** **Monitoring method(s)** • The methods as per the environmental impact monitoring measures for transportation in the operation phase. • Collect the record of complaints/ suggestions/ opinions of the public regarding the traffic problems reported via various channels, analyze them, and make a monthly summary report that includes the mitigation results. **Implementation area(s)** • Communities around the Project area **Indicator(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			• Data of complaint channels and complaint data arisen from traffic problems in the community area or in the operation area **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC
	5) Common communicable disease (The main disease group that causes illness and respiratory disease, including viral epidemics such as the COVID-19): Immigration of non-local workers and tourists may bring communicable diseases to local communities. Without proper screening at the airport, an outbreak may occur. The infectious diseases, particularly those caused by microbes of acute respiratory symptoms will increase the overall sickness rates, the budget for health services, medical supplies, and other public health plans. This may affect every group of population. Therefore, the impact level of local communities is moderate.	**5) Common communicable disease (The main disease group that causes illness and respiratory disease, including viral epidemics such as the COVID-19)** • Follow public health measures to control urgent diseases such as SARS-CoV, Covid-19, avian flu, and swine flu pandemic (2009). National and international laws and regulations shall be strictly followed, including (1) the Communicable Disease Act, B.E. 2558, (2) Notification of the Department of Health on Criteria, Methods, and Measures for Risk Prevention from coronavirus disease (COVID-19) for government agencies, private offices, and private businesses B.E. 2563, (3) Notification of the Department of Health on Criteria, Methods, and Measures for Risk Prevention from coronavirus disease (COVID-19) for public transportation businesses B.E. 2563, (4) Operational considerations for managing COVID-19 cases or outbreak in aviation (WHO, 2020), (5) Aircraft cleaning and disinfection during and post pandemic (IATA, 2020); (6) Preventing spread of disease on commercial aircraft: Guidance for cabin crew (CDC, 2020); (7) Suspected communicable	**5) Common communicable disease (The main disease group that causes illness and respiratory disease, including viral epidemics such as the COVID-19)** **Monitoring method(s)** • Collect statistics of the most common diseases that cause sickness for local people. **Implementation area(s)** • Local public health authorities near the Project area **Indicator(s)** • The most common diseases that cause sickness for local people. **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		disease universal precaution Kit (IATA, 2017); (8) ICAO Guidelines for managing communicable disease in aviation; (9) Communicable disease surveillance and response systems: Guide to monitoring and evaluating (WHO, 2006). • EEC coordinates with local public health authorities to plan and implement the environmental and health mitigation meuasres for communities around U-tapao International Airport. • EEC provides channels for local public health authorities to contact and supports them in terms of public health facilities and capacity of staff. • Notify and invite local public health authorities to join activites for emergency management, such as emergency response drills about communicable diseases and quarantine. • Follow the emergency plan of aircraft regarding Public Health Emergency. • The monitoring of respiratory diseases due to the pandemic of COVID-19 requires airport licensees to instruct their employees and airlines to strictly comply with the Emergency Decree on Public Administration in Emergency Situations B.E. 2548 to cope with the COVID-19 pandemic. They are required to follow the policy and recommendations for the places that are still offering services and certain activities, personal practices, preventive measures for the disease, medical service preparation, and other related measures such as the facial mask, sanitization, disinfection, and waste management.	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		• Notify and invite local communities to join the emergency drills, particularly those about communicable diseases and quarantine. • Support and promote emergency management of public health authorities and volunteer groups. • Record the public communication plan and emergency management plan, particularly those about communicable diseases and quarantine. • Open complaint channels such as PR website of U-tapao International Airport, website of RTN and EEC, and other online media platforms. **Responsible party:** EEC coordinates with relevant agencies	
	6) Public safety (land and air accident): When the second runway and taxiway are operated in 2018, there will be more traffic, which require improvement of traffic lanes. It is more likely to have accidents while using roads. Although the Project has performed risk assessment and made the air traffic accident preventive plan, unplanned incidents may still occur in aviation industry. If an accident occurs, the impact magnitude is extensive and increase injuries and fatalities. These factors will increase the administration budget and the current public health capacity. Moreover, there is currently no accident response plan for the airport. All relevant sectors have not participated in the emergency drills regularly. Therefore, the impact level is moderate.	**6) Public safety (land and air accident)** • Follow the environmental impact mitigation measures for noise, vibration, air quality, and transportation in the operation phase, particularly the management and compensation measures. • Inform local public health authorities about management plan and invite them to participate in emergency management activities, such as planning and emergency response drills. • Inform the communities and invite tem to join the emergency drills. • Require airlines and pilots to the Notification of CAAT. They must follow the Notice of Airmen (NOTAM) according to the general procedure of ICAO standard to	**6) Public safety (land and air accident)** **Monitoring method(s)** • Perform the basic analysis and summarize the disaster response drills with the community. • Collect a record of complaints, suggestions, and opinions of the public in terms of public safety reported via various channels, analyze and make a monthly summary report, along with the mitigation results. • Keep the disaster mitigation plan up-to-date. **Implementation area(s)** • Communities around the Project area **Indicator(s)**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		prevent accidents caused by wake vortex turbulences. • Promote and support the capacity of emergency management of public health and safety agencies and volunteer groups. • Record the data of public communication and emergency management plan. • Collect the disaster mitigation plan from relevant agencies. **Responsible party:** EEC coordinates with relevant agencies	• Data of public safety issues **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC
	7) Sanitation (Wastewater and waste management): The Project provides the wastewater treatment system and waste management system for wastewater and waste generated in U-tapao International Airport despite the increased volume of waste and wastewater due to more passengers. The chance that U-tapao International Airport fails to handle with waste and wastewater is low. However, there are still public concerns that, without proper sanitation management, there could be an outbreak of gastro-intestinal diseases, which increase the sickness rates and the public health budget. The budget might need to be adjusted to deal with public health issues. These problems have negative impacts on all groups of population. Therefore, the impact level is low.	**7) Sanitation (Wastewater and waste management)** • Follow the environmental impact mitigation measures for waste and waste management in the operation phase. • Open complaint channels such as PR website of U-tapao International Airport, website of EEC, and other online media platforms. **Responsible party:** EEC coordinates with relevant agencies	**7) Sanitation (Wastewater and waste management)** • Follow the environmental impact monitoring measures for waste and wastewater management in the operation phase.
	8) Adequacy and access to public health services, medical staff, and medical supplies: The increased	**8) Adequacy and access to public health services, medical**	**8) Adequacy and access to public health services, medical staff, and medical supplies**

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	number of airport users and people who work supporting industry at the airport, such as servicers and merchants. It is possible that, when they get sick, they will go to public health facilities. They may share public health services, resulting in less convenience and quality of the medical care. These factors will affect the public budget allocation as it has other consequences, such as local budget for procuring medical devices for public health services. Changes in budget allocation may lead to shortage, inconvenience, and limited access to public health services. Therefore, the impact level on the community is moderate.	**staff, and medical supplies** • Notify local public health agencies about the Project activities, management results, and environmental and health impact monitoring results. • Conduct CSR (Corporate Social Responsibility) activities by supporting subdistrict health promotion hospitals around the Project area. • EEC provides the contact channels for local public health authorities to communicate with, and support local public health authorities to be prepared in terms of medical services and capacity of staff. **Responsible party:** EEC coordinates with relevant agencies	**Monitoring method(s)** • Collect data and summarize the details of activities coordinated with public health authorities. **Implementation area(s)** • Public health authorities near the Project area **Indicator(s)** • Summary of activities coordinated with public health authorities. **Frequency** • Once a year throughout the lifetime of the Project **Responsible party:** EEC
	9) Dust and air pollution: The Project assessed health risk from air pollutants exposed via the respiratory system. The risk was compared to referenced values, namely (1) the non-cancer risk based on the HQ, HI, and cancer risk by exposure too 4 forecast VOCs, namely acrolein, benzene, 1 ,3 - Butadiene, formaldehyde, (2) the risk level compared to the environmental impact standards for other air pollutants, namely nitrogen dioxide (NO_2), sulfur dioxide, (SO_2), dust particulate (PM2.5 and PM10). The HQ assessment result of every pollutant is lower than 1, except for acrolein with HQ value higher than 1 by 1- 5 times at the community area in the north and the east of U-tapao International Airport. This risk does not	**9) Dust and air pollution** • Follow the environmental impact mitigation measures for air quality in the operation phase. • Monitor air pollution regularly, especially in the areas at the risk of air pollution. • Coordinate and collaborate with public health agencies to montor health of the vulnerable groups. Analyze the data and report the environmental impact monitoring results to public health authorities continuously. This is to review health impact that may affect the vulnterable groups when the Project is operated. Find the appropriate solutions for the situation. • Support and promote the capacity for monitoring air pollution of public health agencies and volunteer groups.	**9) Dust and air pollution** **Monitoring method(s)** • Monitor the air pollutant indicators determined in the Air Quality topic. • Collect a record of complaints, suggestions, and opinions of the public in terms of air pollution reported via various channels, analyze and make a monthly summary report, along with the mitigation results. **Implementation area(s)** • The areas shown in the environmental measures on air quality **Indicator(s)** • Monitoring results of air quality in the community area

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	require emergency evacuation of people since the concentration of acrolein in the area is not more than the maximum concentration that is immediately dangerous to life or health (IDLH). Regarding the cumulative risk, the HI risk values of the blood and reproduction systems are lower than 1 while the value of the respiratory system is higher than 1 due to acrolein concentration. Based on the cancer risk assessment for exposure to the maximum limits, there are 2-4 per 10 million people for benzene, 3 per million people for 1,3-Butadiene, and 7 per million people for formaldehyde. The risk of nitrogen dioxide, sulfur dioxide, PM2.5 and PM10 at the maximum concentrations was lower than the standard. The further distance away from U-tapao International Airport is, the lower the risk becomes. In summary, pollutants from aircraft increase the risk for respiratory diseases in local people, where these diseases are already the main cause of sickness. Therefore, the impact level on the community is moderate.	• Open complaint channels such as PR website of U-tapao International Airport, website of EEC, and other online media platforms. **Responsible party:** EEC coordinates with relevant agencies	• The number of complaints from the public received via various channels **Frequency** • The same frequency as that in the environmental impact monitoring measures for air quality (details shown in the Air Quality topic). **Responsible party:** EEC
21) Occupational health and safety Construction phase	Estimated impacts on workers of the project **1) Sanitation at the worker campsite :** If the worker campsite outside U-tapao International Airport area is not well managed and unsanitary, workers will be sick due to disease carriers and outbreaks in the worker	**1) Sanitation at the worker campsite** • The employment agreement requires the contractor to provide accommodation for workers based on the Standard Elemental Construction Cost Code for Building 1010-34.	**1) Sanitation at the worker campsite** **Monitoring method(s)** • Collect training records of sanitation, disease prevention, non-disturbance, drugs, and occupational safety.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	campsite. This situation can cause problems in health services. Therefore, the impact level is moderate.	• The contractor shall educate workers about hygiene and disease prevention, good behavior, and no disturbance. Drugs will be tested every 6 months. Provide workers with safety documents to give them knowledge and establish awareness of occupational safety. • Set up the regulations for preventing and destroying disease carriers for the worker campsite and outbreaks of communicable diseases. The regulations must be strictly enforced. • Inspect sanitation of the worker campsite regularly by collaborating with local public health authorities and local administrative organizations. • Cooperate with vaccination campaigns and destroy carriers when there is an outbreak or when requested by public health authorities. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	• Collect the inspection records of accommodation sanitation. • Collect the record of accidents, incidents, severity of accidents, accident causes, and solutions. **Implementation area(s)** • The construction area of the Project **Indicator(s)** • Records of sanitation, disease prevention, non-disturbance, drugs, and occupational safety • Records of inspecting the sanitation of accommodation in terms of waste and wastewater • Record of accidents, incidents, severity of accidents, accident causes, and solutions **Frequency** • 2 times/year throughout the construction phase **Responsible party:** RTN and EEC
	2) Working environment (loud noise) : Workers are likely to experience loud noise while working both from operating machines and any activities of U-tapao International Airport, which may affect hearing ability, sickness, and hearing loss caused by noise. Since a private contractor operates the runway construction site, workers' illness is under the contractor's care, which may not be strictly supervised as per the occupational health and safety laws. Moreover, PPE	**2) Working environment (loud noise)** • Strictly follow the environmental impact measures and occupational health and safety measures. • Follow the environmental impact mitigation measuresfor noise in the construction phase - Provide PPE for construction workers, such as ear plugs or ear muffs. - Limit the working period of workers operating in the noisy area according to law, e.g., not more than 8	**2) Working environment (loud noise)** • Strictly follow the environmental impact monitoring measures for noise and occupational health and safety measures.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	cannot be provided adequately to reduce noise exposure. Therefore, the noise impact level on workers is moderate.	hours in area with noise level exceeding 90 dB(A). - Prepare the area that can reduce noise aircraft during the break. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
	3) Occupational accidents: Accidents from work from unsafe action and working conditions can increase the rate of sickness and break from work or affect the operation of workers and employees. It may also cause the loss of life and properties. Since a private contractor operates the runway construction site, workers' illness is under the contractor's care, which may not be strictly supervised as per the occupational health and safety laws. Moreover, PPE cannot be provided adequately to reduce noise exposure. Therefore, the impact level on workers is moderate.	**3) Occupational accidents** • Strictly follow the environmental impact measures and occupational health and safety measures. • Require the contractor to comply with occupational health and safety laws and working environment laws, such as: - Occupational Safety, Health, and Environment at Work Act B.E. 2554 - Notification of the Department of Labor Protection and Welfare re: determing the standard of personal protective equipment B.E. 2554 - The Labour Protection Act B.E. 2541 - Ministerial Regulation re: the standard of occupational health, safety, and environment management (No. 2) B.E. 2553 - Ministerial Regulation re: the standard of occupational health, safety, and environment management for construction work B.E. 2551 - Notification of the Department of Labor Protection and Welfare re: types of construction machines and	**3) Occupational accidents** **Monitoring method(s)** • Collect the data of implementing occupational health, safety, and working environment for the annual report preparation. **Implementation area(s)** • Operation area **Indicator(s)** • Summary of implementation of occupational health, safety, and working environment **Frequency** • Once a year throughout the construction phase **Responsible party:** RTN and EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		equipment that require annual certification B.E. 2554 - Ministerial Regulation re: the standard of occupational health, safety, and environment management B.E. 2549, or the latest notification • There must be accident report and statistics. • Accident cause must be investigated and the mitigation measures be formulated. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	
21) Occupational health and safety Operation phase	Estimated impacts on the Project's employees **1) Working environment (loud noise):** Loud noise pollution can increase the sickness of employees, they may change the job because of this problem. From the previous information, U-tapao International Airport does did not perform the noise monitoring in the airside area. However, after conducting a hearing test for 20 employees in the airside area in 2019, four of them were found to be hearing impaired, but no employees were sent to re-examine the cause of sickness in detail. And there is no information showing the clear management systems and preventive measures. So, the issue of the loudness from working is categorized in moderate effect. Therefore, the impact level of working in noisy environment is moderate.	**1) Working environment (loud noise)** • Increase personal noise exposure monitoring, especially operators in the airside area or the vulnerable groups. • Conduct hearing ability test every year. • Analyze the relationship between noise exposure and hearing ability to predict the likelihood of hearing loss. • In abnormal cases, there must be mitigation plans, such as reducing noise exposure level and exposure duration. • Introduce the hearing protection campaign. **Responsible party:** EEC	**1) Working environment (loud noise)** **Monitoring method(s)** • Monitor the personal noise exposure level • Analyze the relationship between noise exposure and hearing ability to predict the likelihood of hearing loss and create the statistics. • Monitor and improve the management plan regularly when abnormal cases are found. • Monitor the results of the hearing protection campaign. **Implementation area(s)** • Operation area in the airside and other areas in U-tapao International Airport **Indicator(s)** • Report of hearing test • Report of personal noise exposure results,

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			especially those of operators in the airside area • The relationship analysis of noise exposure and hearing ability • Management plan for abnormal cases • Summary report of the implementation of the hearing protection campaign **Frequency** • Once a year throughout the lifetime of the Project **Responsible party** • EEC follows the measures and instruct operators in the airside area and in U-tapao International Airport to follow the measures.
	2) Chemicals in working atmosphere: Employees who are working in the airside area may have a chance to contact with chemicals caused by fuel burning. This situation will increase the sickness rate, leave from work or poor performance. There is no information showing the measurement of chemicals in the working atmosphere in the airside area and have no risk-based health surveillance for employees. Therefore, the impact level of chemical exposure in the working atmosphere is moderate.	**2) Chemicals in working atmosphere** • Increase personal chemical exposure monitoring, especially operators in the airside area or the vulnerable groups. • Risk-based health examination • Analyze the relationship between chemical exposure and health to predict the health impact from chemical exposure. • In case of contractor, the Project must supervise the contractor to submit the physical examination report of employees once a year. **Responsible party:** EEC	**2) Chemicals in working atmosphere** **Monitoring method(s)** • Personal chemical exposure monitoring in the working area • Analyze the relationship between chemical exposure and health of employees to predict the health impact from chemical exposure. • Require the contractor to submit the physical examination report of employees to EEC every year. **Implementation area(s)** • Operation area in the airside and other areas in U-tapao International Airport **Indicator(s)** • Report of personal chemical exposure results,

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
			especially those of operators in the airside area • Report of risk-based physical examination • Analysis results of the relationship between chemical exposure and health • Submission of the annual physical examination report of contractor employees **Frequency** • Once a year throughout the lifetime of the Project **Responsible party** • EEC follows the measures and instruct operators in the airside area and in U-tapao International Airport to follow the measures.
	3) Occupational accidents : Accidents from work will increase the sickness rate, leave from work or poor performance of workers and employees who are working in U-tapao International Airport. the impact level of accident from work for employees is moderate.	**3) Occupational accidents** • Analyze the cause of accident, prepare the accident statistics, and analyze the trend of accident in order to find appropriate preventive measures. • Prepare the occupational accident prevention and mitigation plan • Follow the Occupational Safety, Health, and Environment at Work • Set up a safety committee • Assign safety staff • The occupational health and safety plan must include risk assessment and identification of risky areas, such as confined area - How work, the area with exceeding noise level, or	**3) Occupational accidents** **Monitoring method(s) :** Accident • Analyze the cause of accidents • Prepare the statistics of accidents • Analyze the trend of accidents to find appropriate preventive measures • Instruct the contractor to submit accident statistics to EEC every year. **Implementation area(s)** • Operation area in the airside and other areas in U-tapao International Airport **Indicator(s)** • The accident cause analysis report

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
		operation areas with the risk of chemical exposure in the working environment - Monitoring plan for working environment - Physical examination and risk-based examination - Health promotion plan - Occupational accident prevention and monitoring plan - Emergency response plan • The occupational health and safety plan must be presented with its implementation results for the safety committee to consider and review the measures at least once a year. **Responsible party:** EEC	• Statistical report of accident and trend analysis of accidents • Occupational accident prevention and monitoring plan • Risk-Based Health Examination Report **Frequency** • Once a year throughout the lifetime of the Project **Respinsible party** • EEC follows the measures and instruct operators in the airside area and in U-tapao International Airport to follow the measures. **Monitoring method(s) :** Management • Collect data and make the summary report of occupational health, safety, and working environment every year **Implementation area(s)** • Operation area in U-tapao International Airport **Indicator(s)** • Summary of the implementation of the occupational health, safety, and working environment plan **Frequency** • Once a year throughout the lifetime of the Project **Responsible party** • EEC follows the measures and instruct operators in the airside area and in U-tapao International Airport to follow the measures.

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
22) Tourism and scenery Construction phase	During the construction in U-tapao International Airport, many tourist attractions nearby the airport are expected to be affected. During the construction phase, it is expected that the construction materials, equipment, tools, and workers from the outside sources will be transported and moved throughout the period of the construction which increase the traffic volume on various routes especially in Highways No. 3, 331, 332 and 3126, causing traffic congestion and slowdowns, especially during holidays. This situation reduces the convenience of accessing various tourist attractions compared to the situation before the construction of the Project development. Therefore, the impact level is low. For the visual impact on the transportation of construction machines/ equipment and construction materials, piles of soil and rocks placed in the construction area and the dispersion of dust, construction activities area will affect the scenery in the construction area, creating an unsightly and unattractive view. Trees and plants in the area will be cut down or moved away. But it affects only the construction site and happens only during construction. Anyway, it may affect the feelings of people. However, the resulting effect does not cause any harm. Due to the nature of the Project, it is a horizontal construction and there is no vertical	• Build fences or walls around the construction area to block the view of construction activities which are unsightly and untidy. Thses walls can also reduce dust dispersion during the construction. • Design the construction layout according to the construction process, such as the transportation routes, clear entrace/exit, and stocking area of construction materials. • Strictly follow the mitigation measures for transportation to minimize the impact on access to tourist attractions. • Communicate with the public about the Project operation, construction plans and activities, transportation routes of construction materials. Inform the public about the complaint channels for people who live near the Project and passers-by via various channels, suchas PR web board of U-tapao International Airport. This is to allow road users to avoid such routes or traveling during such times. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	structure. So, the impact level is low.		
22) Tourism and scenery Operation phase	When the second runway and taxiway are opened for service, they will not cause problems in accessing tourist attractions in the study area and other nearby areas. Because this project is an air transport service, tourists can travel more conveniently. As a result, there will be more tourists traveling in this area. In addition, there will be a road and rail communication network to connect to U-Tapao International Airport in the future which makes people access to tourist attractions conveniently. It is expected that there will be a positive impact on tourism in the province and the region around the project area. Therefore, the result of the project development is considered to be a high level of positive impact. U-Tapao International Airport has a beautiful natural scenery. The geography in the north is mountains and forest area. The south side is nearby the sea. The east side, next to the intercity highway. (Motorway) and the west next to Khlong Bang Phai, highways, and naval bases. With the structure of the second runway and taxiway, U-Tapao International Airport is not elevated from the original ground. Therefore, it does not affect the scenery to those who use the service at the airport and people living near the project area. Moreover, the landscape around the airport is being improved which does not affect to the scenery.	-	-
	The Project assessed the air quality for the	• Strictly follow the environmental impact mitigation measures for	-

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
23) Archaeological and historic site Construction phase	construction of the second runway, taxiway, tunnel under the runway, Terminal 3, ATC tower, roads, offices/ stores, air navigation supporting area, and high-speed railway station (subway). These activities may affect 69 places with significant historical and archaeological values in the Project study area. These places are located at the distance of 40 – 13,170 meters away from the fence line of the construction area. The assessment results of air quality, noise, and vibration can be summarized below. **Air quality:** The sources of pollution are the opening of soil surface and emission of pollutants from construction machines. The monitoring results of all monitoring stations were within the ambient air standard. It is expected that the impact of pollutants from the construction material on historic and archaeological sites will be low. **Noise:** The noise from construction has the 24-hr average ranging from 65.0-85.6 dB(A), most of which were within the standard of general sound as per the Notification of the National Environmental Board No. 15 (B.E. 2540) determining the 24-hr noise not higher than 70 dB(A). However, the 24-hr noise value at 3 historic and religious places exceeded the standard, namely Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), Admiral Phrachao Boromwongse Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion), and	noise, air quality, and vibration in the construction phase. **Responsible party:** RTN and EEC instruct the contractor to follow the measures	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion), which are at the distance of 40 meters, 90 meters, and 180 meters from the Project area, respectively. However, these 3 places are not resided by people, but they are used for religious ceremonies occasionally. Therefore, the impact is short-term and lasts only in the construction phase, and the noise impact level is low. The Project assessed the impact of noise from transporting construction materials on historic and archaeological sites and religious places located at the radius of 500 meters along the transportation routes. Among the 26 places, the noise intensity from transporting construction materials at the receptor points (Highways No. 3, 3126, 332, and 3376) at the distance of 32 – 441 meters ranged from 37.3-53.9 dB(A), and the background sound (the sound at the existing environment) of 65 dB(A), making a total noise level of 65.0 - 65.3 dB(A). It is concluded that all the noise values passed the standard of general sound according to the Notification of the National Environmental Board No. 15 (B.E. 2540) determining that the 24-hr noise must not be more than 70 dB(A). It is, therefore, estimated that the impact of noise from transportation of construction material is low.		
	vibration: It is estimated that vibration from the construction activities at historic and archaeological sites at the distance of 40 – 13,710 meters from the Project fence line (69 places) will have the maximum particle speed from	• Before the construction, RTN and EEC shall coordinate with and submit a letter to the Fine Arts Department/ Fine Arts Office 5 Prachinburi about the Project activities, including the time. The Project shall also seek assistance	

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	using the bore piling machine ranging from 0.0000 - 0.0610 inches/sec (0.0003-1.5501 mm/sec). The impact on local people is almost insensible. There is no impact on building structures. Therefore, the impact level is low.	of archaeologists from the Fine Arts Department to inspect the area if archaeological objects are found when digging into the soil layers in the construction area, land grading, or deep-layer excavation for foundation. (The EHIA Report of the Project regarding the impact on historic and archaeological sites, the environmental impact mitigation measures for historic and archaeological sites that have been approved by NEB shall be attached with this submission.)	
	Destruction of archaeological sites : The survey of impact on historic and archaeological sites and religious places in the Project study area was conducted only at the surface level. The construction, however, involves readjustment of surface, digging, and deep-layer excavation for foundation. These activities may affect archaeological evidence that may be buried in the soil in the construction area.	• To minimize the impact of archaeological evidence in the construction site during the construction phase, if any archaeological evidence is found while readjusting the surface and deep-layer excavation, the contractor is required to stop the operation at the spot immediately. The contractor must record photographic evidence and coordinate with the Fine Arts Bureau 5 Prachin Buri to inspect the area and collect the archaeological evidence (if any) before the contractor can resume with the construction activities. **Responsible party:** RTN and EEC coordinate with relevant agencies and instruct the contractor to follow the measures.	
23) Archaeological and historic site Operation phase	**Air quality:** The pollutant dispersion forecast for ambient air quality consisted of carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM10, and PM2.5. By using AERMOD model, the maximum concentration Cmax) of 1-hr and 8-hr carbon monoxide, 1-year nitrogen dioxide, Cmax	• Strictly follow the environmental impact mitigation measures for noise, air quality, and vibration in the construction phase. • Follow the environmental impact mitigation measures on occupational health and safety in the operation phase. **Responsible party:** EEC instructs the contractor to follow	• Strictly follow the environmental impact monitoring measures for noise and air quality in the operation phase. • Strictly follow the environmental impact monitoring measures for occupational health and

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	24-hr and 1-year sulfur dioxide (SO_2), Cmax 24-hr and 1-year PM10, and Cmax 24-hr and 1-year PM2.5 in every scenario did not exceed the ambient air quality standard. The assessment of VOCs compared the surveillance value from the Notification of the Pollution Control Department determining the surveillance value for volatile organic compounds in ambient air in 24 hours. It was found that 24-hr benzene and 1,3-Butadiene did not exceed the surveillance values. The 24-hr acrolein exceeded the surveillance value. The maximum concentration (Cmax) outside the airport was 3.261 µg/m3, which was higher than the surveillance value of not higher than 0.55 µg/m3. The concentrations were found to exceed the surveillance value at 4 historic, archaeological sites and religious places in the Project study area, namely Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (1st Anti-Aircraft Division), Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion), Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), and Phra Siam Thevathirat Shrine (Anti Aircraft Artillery Battalion). Although these places are used for religious ceremonies only occasionally by military officers and they are not resided by people, there might be some impact on people who perform religious ceremonies. **Noise:** The Project activities involve flying aircraft. Based on	the measures.	safety in the operation phase. **Responsible party:** EEC

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	noise impact assessment, 9 places with historical and archaeological significance and religious places are not suitable for land use as per the criteria for land use around U-tapao International Airport determined by the Pollution Control Department. The 9 places include Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion) and Wat Sa Kaeo in the NEF ≥ 40 contour (Ldn > 75 dB(A)), and Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument, Naval Aviation Museum, King Taksin the Great Monument (1st Anti-Aircraft Division), Somdet Ong Prathom (1st Anti-Aircraft Division), Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), Wat Somburanaram and Wat Samnak Thon in the NEF 30-40 contour (Ldn = 65 -75 dB(A)). These places are expected to be affected by aircraft noise, particularly religious ceremonies. Other 58 places with historical and archaeological significance and religious places are located outside the NEF 30 contour (Ldn < 65 dB(A)) are of suitable land use. Therefore, there is no impact from aircraft noise.		
	Vibration : Take-off and landing are expected to cause wingtip vortex. It was estimated that 11 religious places may be affected, namely Admiral Phrachao Boromwongtheo Krom Luang Chumphon Khet Udomsak Monument (Anti Aircraft Artillery Battalion), Phra Phuttha Nawikapiban Hall (Anti Aircraft Artillery Battalion), Phra Siam Thevathirat	• Before the operation, coordinate with head monks and people who take care of religious places in the areas that could be affected by wingtip vortex of aircraft in order to inspect the current condition and durability of their buildings. Old buildings shall be renovated (if needed, especially the ancient ordination hall at Wat	• If there are complaints about damage of old buildings and other important buildings in the 11 religious places, the Project shall inspect the damage. If the damage is caused by aircraft take-off or landing, the buildings must be renovated and strengthened as needed and appropriate. This

Table 5.1-1 Summary of environmental impact, environmental impact mitigation measures, and environmental impact monitoring measures

Environmental factors and values	Significant environmental impact	Environmental mitigation measures	Environmental monitoring measures
	Shrine (Anti Aircraft Artillery Battalion), Wat Sa Kaeo, Wat Somburanaram, Abundant Grace Church Ban Chang, Wat Samnak Thon, Wat Suwan Rangsan, Wat Nong Bot, Shrine of Luang Tia Chak Mak, and Wat Chak Mak. The nature of impact is the falling or dislocation of roof materials. It should be noted that, Wat Somburanaram and Wat Chak Mak, despite not being registered ancient sites or awaiting registration by the Fine Arts Department, they are highly severed and ancient. More precisely, Wat Somburanaram is dated since the King Rama V (with renovated ordination hall) and Wat Chak Mak marked the reign of King Rama VI (renovated ordination hall with some damaged roof tiles and ancient wooden monk residence. The wooden building is too worn-out and not used any more). Considering the current conditions of these buildings, without proper renovation before the Project operation, they may be affected by wingtip vortex turbulence. Therefore, the impact in the operation phase may be moderate to high, especially at Wat Chak Mak.	Somburanaram, the old ordination hall and monk residence at Wat Chak Mak). • Strictly follow the environmental impact mitigation measures for vibration (caused by wingtip vortex). **Responsible party:** RTN and EEC coordinate with relevant agencies and instruct the contractor to follow the measures. • Before the operation, coordinate with head monks and people who take care of religious places in the areas that could be affected by wingtip vortex of aircraft in order to inspect the current condition and durability of their buildings. Old buildings shall be renovated as needed and as appropriate. **Responsible party:** RTN and EEC coordinate and instruct the contractor to follow the measures.	effort must be carried out throughout the lifetime of the Project. **Responsible party:** EEC

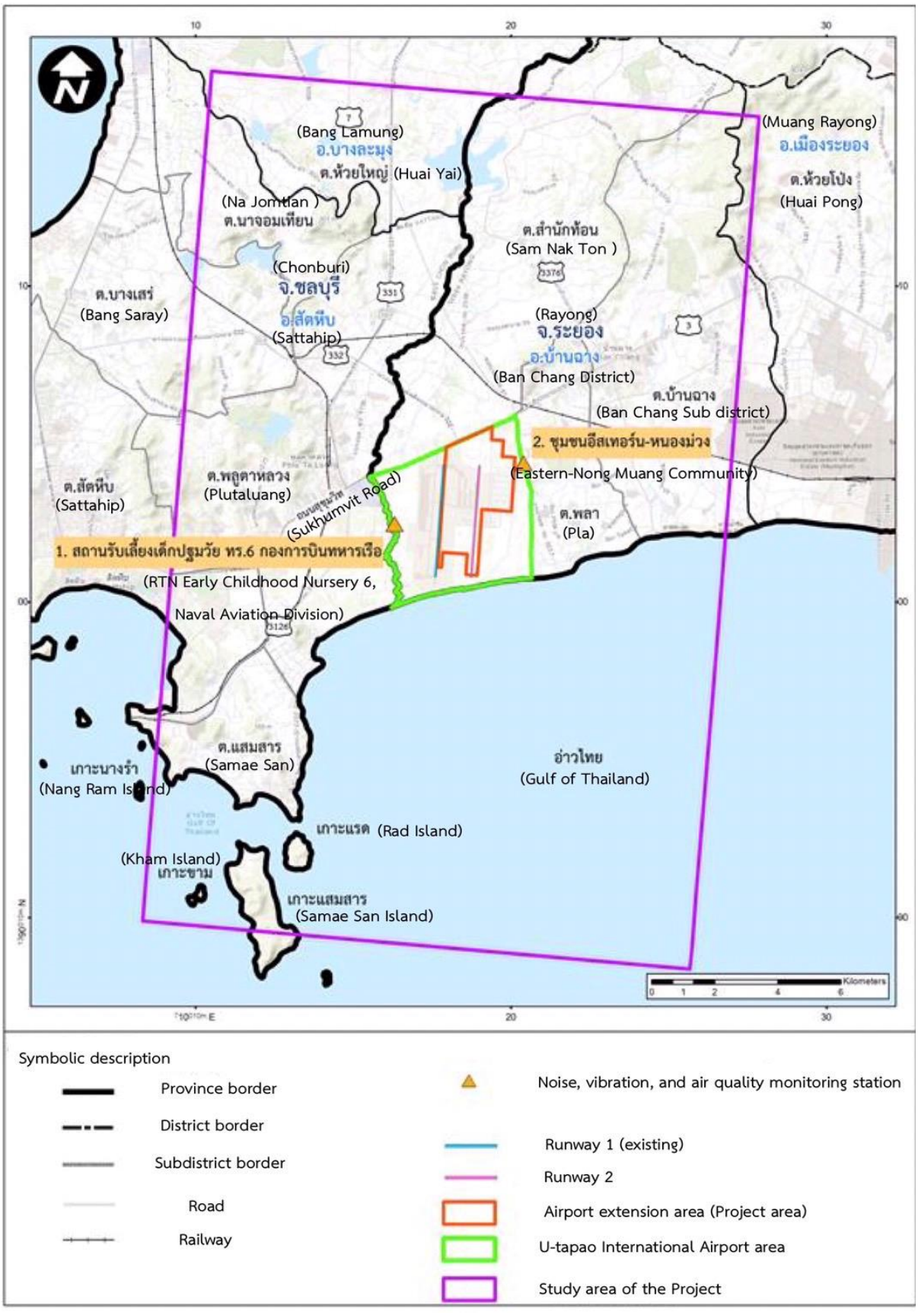


Figure 5.1-1 Noise, vibration, and air quality monitoring stations (Construction phase)

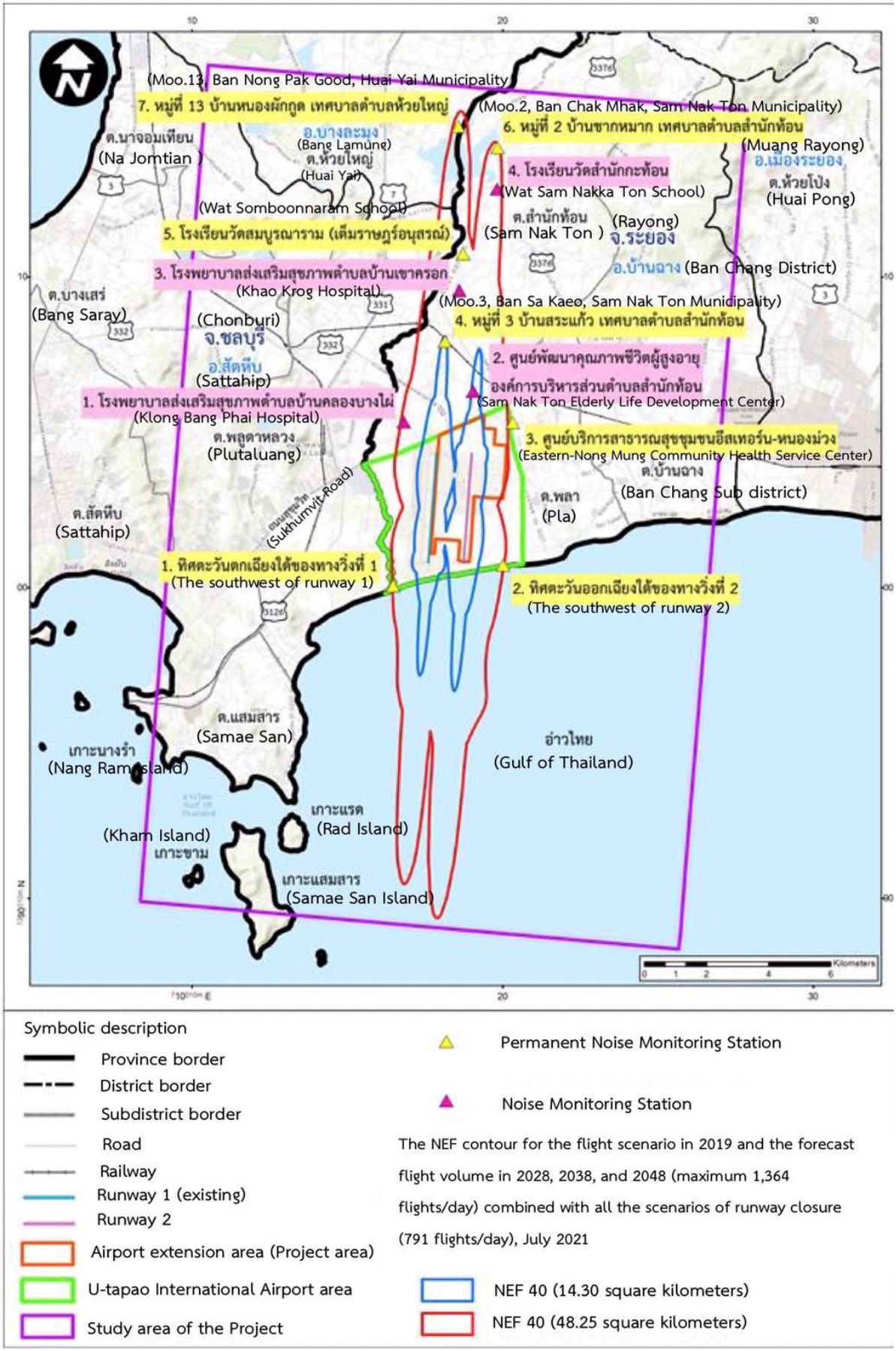


Figure 5.1-2 Noise monitoring stations (Operation phase)

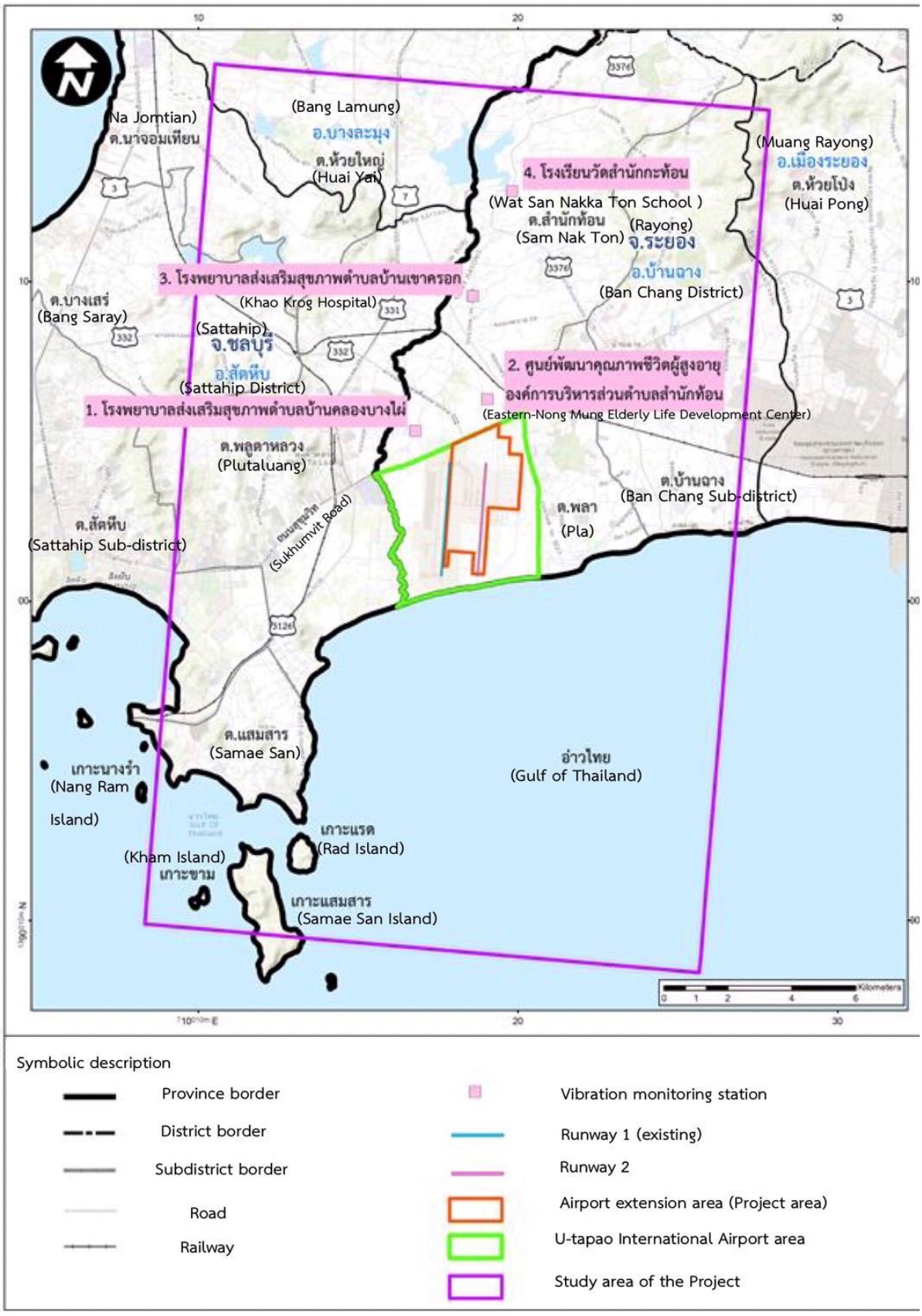


Figure 5.1-3 Vibration monitoring stations (Operation phase)

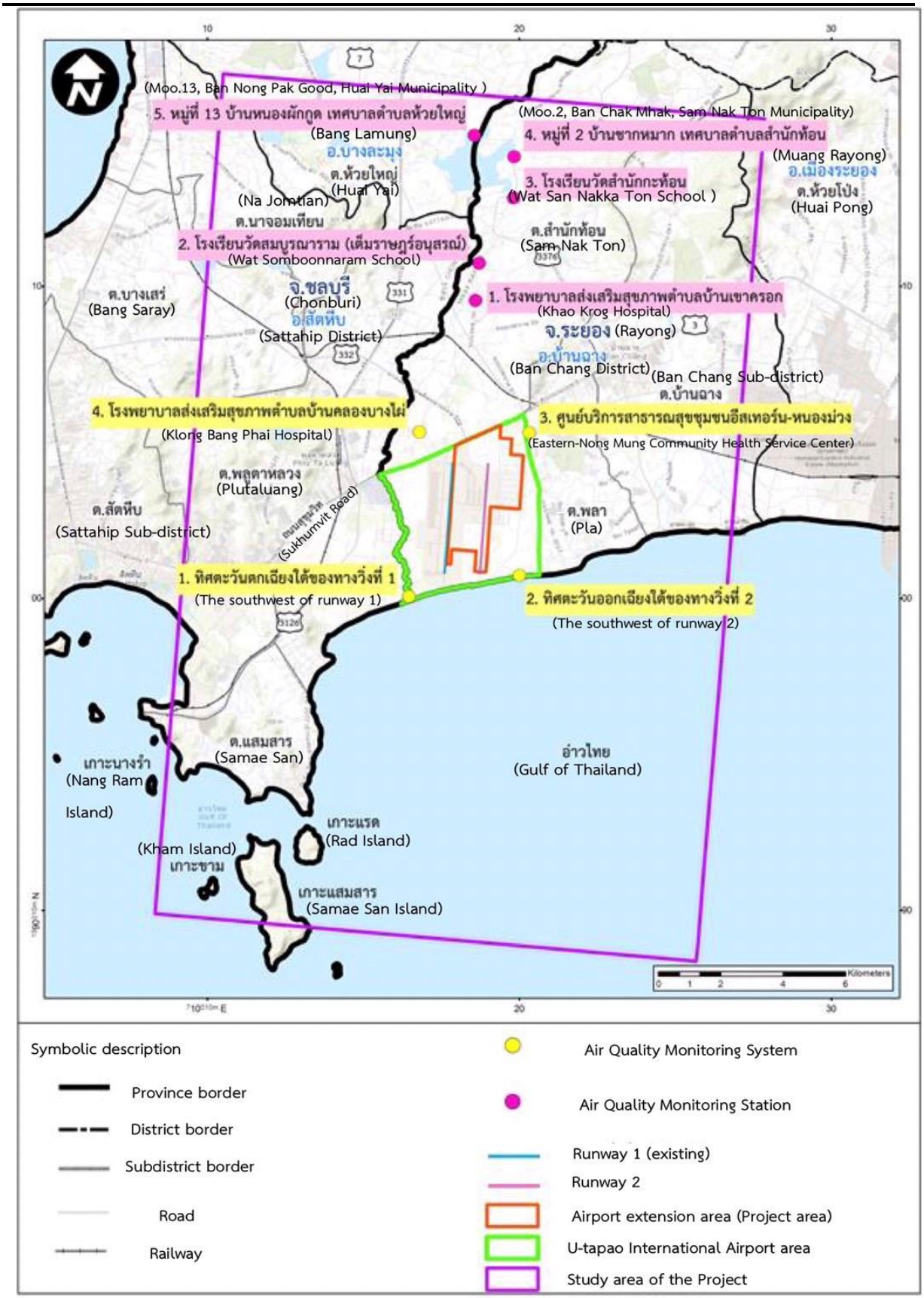


Figure 5.1-4 Air quality monitoring stations (Operation phase)

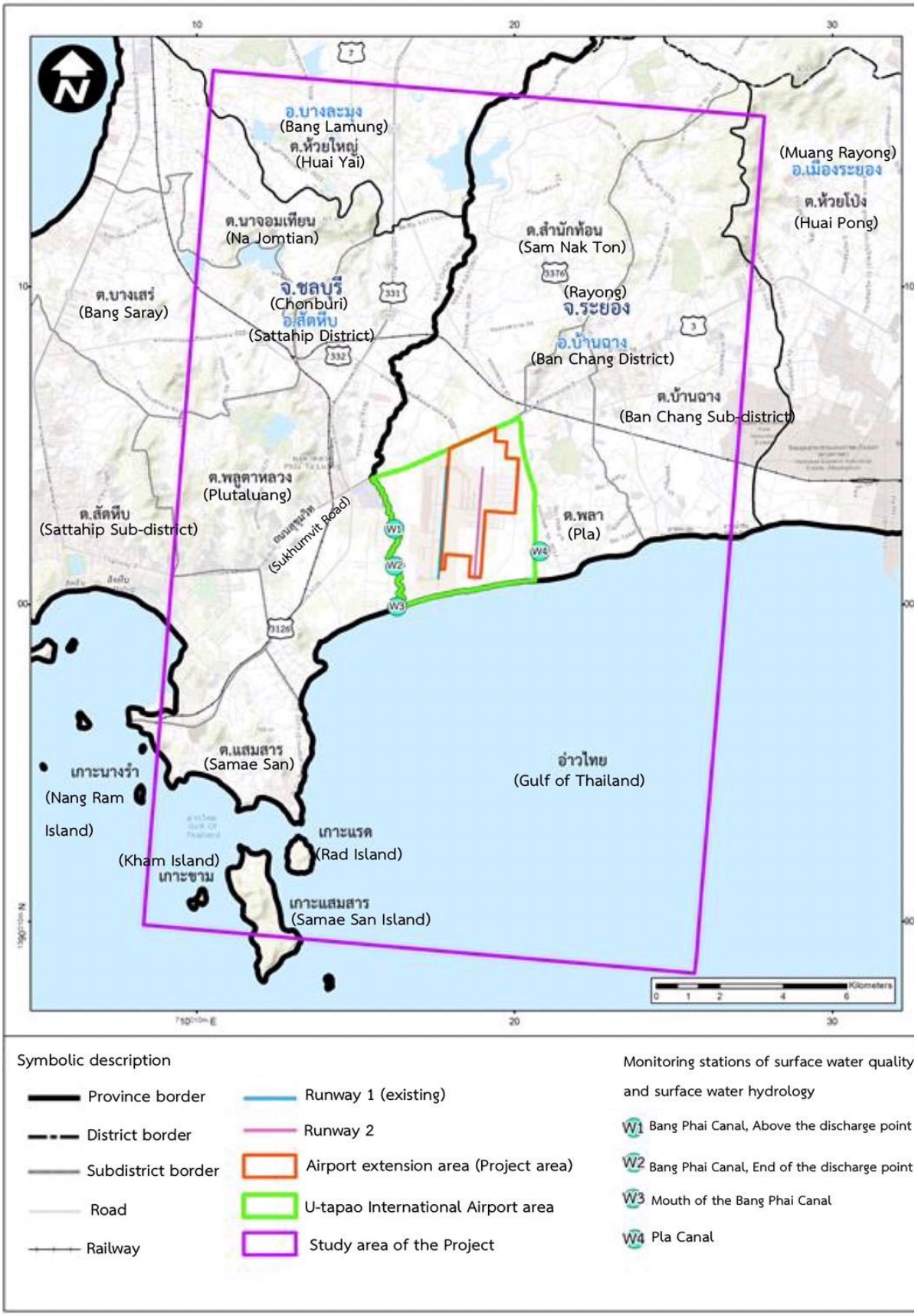


Figure 5.1-5 Monitoring stations of surface water quality and surface water hydrology (Construction phase and Operation phase)

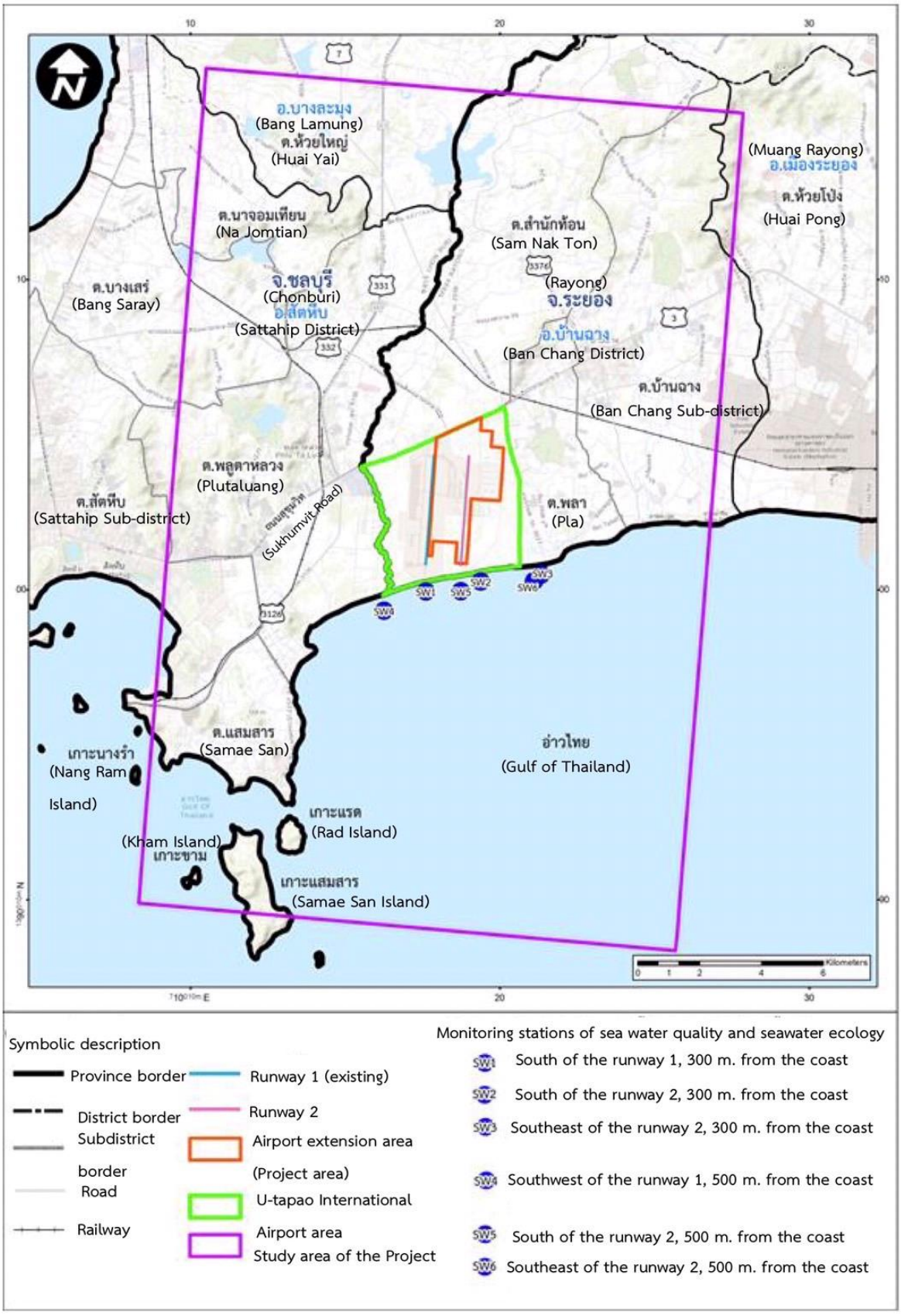


Figure 5.1-6 Monitoring stations of seawater quality and marine ecology (Construction phase and Operation phase)

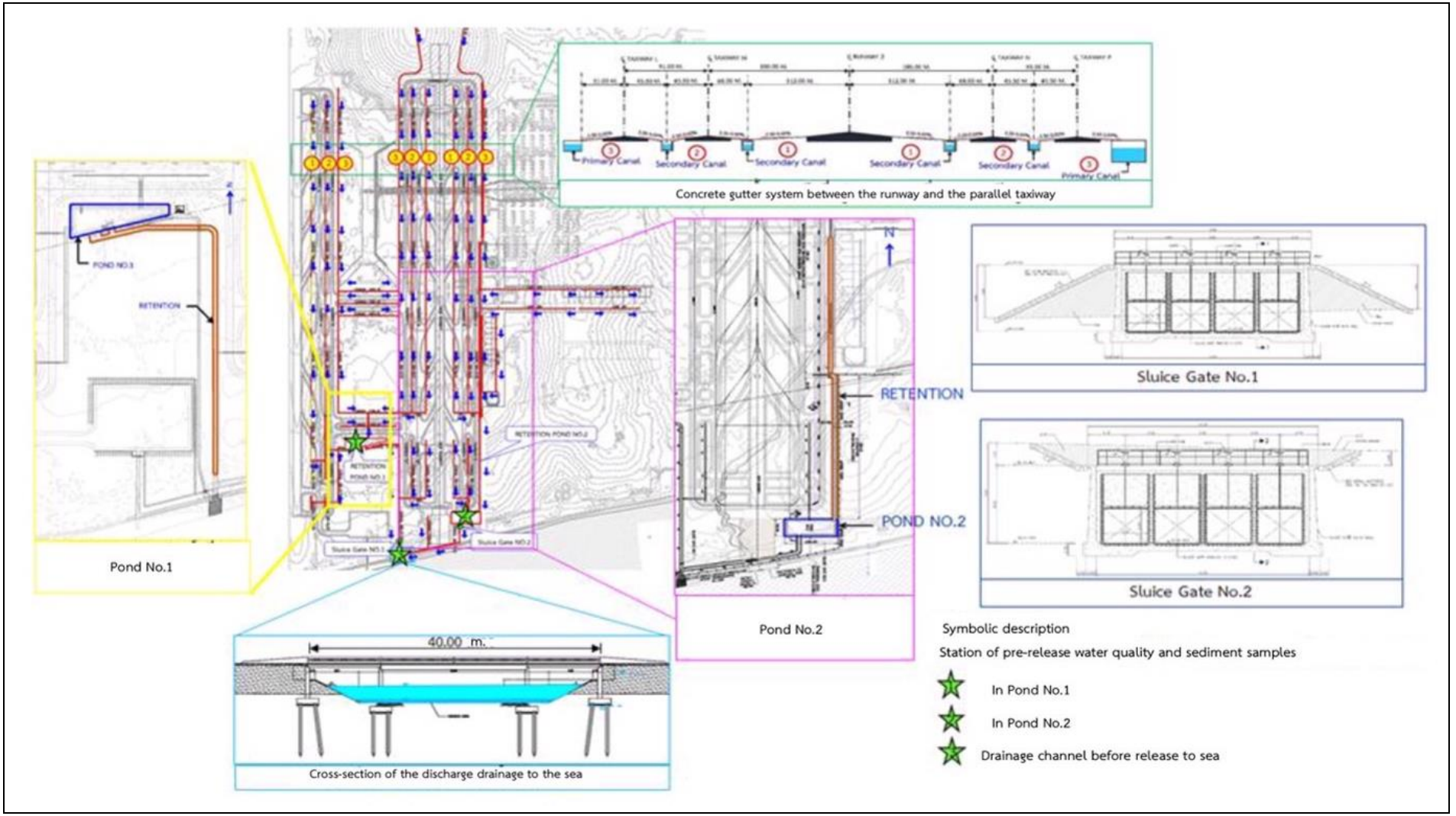


Figure 5.1-7 Monitoring stations for quality of treated wastewater before draining to the sea and sludge samples (Operation phase)