

Chapter 4

The Impact of the Project

4.1 The Environment, the Community and Service Users including Preventions and Solutions Measures of the Impact of the Project

The Environmental Impact Assessment (EIA) of the Study and Design of the Hat Yai-Padang Bezar Double Tracks Train Project Development has been conducted to study and assess the level of physical and biological impact from the Project, benefit on human resources and quality of life during the preparation steps of the construction, the construction period and the operation period. Analysis has been from secondary source of data and selected significant environmental issues. The projected EIA of the Project will apply the data and details from the Project and present environmental conditions in the analysis. The summary of the main aspects are shown in **Table 4.1-1**

Table 4.1-1

Summary of the Present Environmental Conditions along the Hat Yai-Padang Bezar Train Route

Environmental Factors	Summary of Present Conditions
1. Physical Conditions	
(1.1) Topography and Geography	General topographical conditions along the Train Project: Lowland area in the north, coastal plain in the east and mountains and highland in the south and west, original source of many important water sources
(1.2) Geology and Earthquake	Geological conditions along the Train Project: Plain structure, riverbed sediments: sand, powdered sand and clay, collected around the water channel and inundated area, with some sandstone. The project area is located in the earthquake-sensitive zone 1 with possible strength of III-IV Mercalli but not found in the Fault area of Thailand. Overall condition of the Project will not be affected from earthquake risks.
(1.4) Soil Resource	Types of Soil Sets along t he Project Route: 26B, 32B, 34B, 39B, 42B, 45B, 45C, 17, 17B, 22 and 6. Soil Set 34B was found the most from the area with loose soil mixed with sand, low nutrients, high acidity, good to medium drainage capacity. At present, the area is used in rubber plantation, coconuts, fruit trees and some other farming plants
(1.5) Surface Hydrological Conditions	Along the Project route, 26 crossing points with the water courses: Wa canal, No name canal, No name canal, No name canal, No name canal, Poh Mor canal, Rian canal, No name canal, Pom canal, Tang mae canal, Tong canal, No name canal, No name canal, No name canal, No name canal, Pratu canal, No name canal,U Tapao canal, No name canal,Suan Yai canal, Lang Suan canal, Wa Noi canal, No name canal

Table 4.1-1 (Cont'd)

Summary of the Present Environmental Conditions along the Hat Yai-Padang Besar Train Route

Environmental Factors	Summary of Present Conditions
1.6) Surface Hydrological Quality	Samples were collected from 6 stations: Hin Lek fai canal, Poh Mor canal, Tang Mae canal, U Tapao canal, Nga canal, Rangka canal. The water quality found was Type 5 with BOD but with DO higher than standard in some area where there are found industrial factories which might have contaminated the water.
(1.7) Air and Atmosphere	Sensitive Area within 200m.: - 3 villages: Khlong Wa, Khlong Ram, Tha Khoi - 5 religious sites: Sagkharatanaram Temple, Kopkulratanaram Temple, Phra Bat Temple, Tong Sia Siang Tang Cemetary, Budhikaram Temple - 7 schools: Charttrakankosol School, Thepchoomnoom School, Kittiwit (Ban Phru) School, Songsangwittaya School, Udomthong Municipal School, Patongwittaya Foundation School, Patongwittaya Prathankhirit School - Health stations: Tha Khoi Hospital, Chalerm Phrakiat Health Station, Patong Sub-district Samples collected from 4 stations: Choomchom Padang School, Patongwittaya School, Buddhikaram temple, Khlong Ngae Station From the results, every Parameter is within the Building Vibration Impact Standard.
(1.8) Noise level	Sensitive Area within 200m.: - 3 villages: Khlong Wa, Khlong Ram, Tha Khoi - 5 religious sites: Sagkharatanaram Temple, Kopkulratanaram Temple, Phra Bat Temple, Tong Sia Siang Tang Cemetary, Budhikaram Temple - 7 schools: Charttrakankosol School, Thepchoomnoom School, Kittiwit (Ban Phru) School, Songsangwittaya School, Udomthong Municipal School, Patongwittaya Foundation School, Patongwittaya Prathankhirit School - Health stations: Tha Khoi Hospital, Chalerm Phrakiat Health Station, Patong Sub-district Samples collected from 4 stations: Choomchom Padang School, Patongwittaya School, Buddhikaram temple, Khlong Ngae Station From the results, every Parameter is within the Building Vibration Impact Standard.
(1.9) Vibration	Sensitive Area within 200m.: - 3 villages: Khlong Wa, Khlong Ram, Tha Khoi - 5 religious sites: Sagkharatanaram Temple, Kopkulratanaram Temple, Phra Bat Temple, Tong Sia Siang Tang Cemetary, Budhikaram Temple - 7 schools: Charttrakankosol School, Thepchoomnoom School, Kittiwit (Ban Phru) School, Songsangwittaya School, Udomthong Municipal School, Patongwittaya Foundation School, Patongwittaya Prathankhirit School - Health stations: Tha Khoi Hospital, Chalerm Phrakiat Health Station, Patong Sub-district

Table 4.1-1 (Cont'd)

Summary of the Present Environmental Conditions along the Hat Yai-Padang Bezar Train Route

Environmental Factors	Summary of Present Conditions
	Samples collected from 4 stations: Choomchom Padang School, Patongwittaya School, Buddhikaram temple, Khlong Ngae Station From the results, every Parameter is within the Building Vibration Impact Standard.
2. Biological Environment	
(2.1) Aquatic Ecosystem	Along the Project route, 26 crossing points with the water course: Wa canal, No name canal, No name canal, No name canal, No name canal, Poh Mor canal, Rian canal, No name canal, Pom canal, Tang mae canal, Tong canal, No name canal, No name canal, No name canal, No name canal, Pratu canal, No name canal, U Tapao canal, No name canal, Suan Yai canal, Lang Suan canal, Wa Noi canal, No name canal. In the Study of planktons and ground living organism in the hydrological conditions along the Project Route, samples were collected from 6 stations where use of the water sources was found in the ecosystem, fishery, and aquatic animals nursery: Hin Lekfai canal, Poh canal, Tang Mae canal, U Tapao canal, Nga canal, Rangka canal. From the collected samples, it was found that the diversity factor will be higher in the rainy season than in the dry season.
(2.2) Terrestrial Ecosystem	Forestry resource and land use: Most area is used in agricultural farming of rice, corn, vegetables, fruits; economic plantation of palm oil and rubber trees; decorative plants and other fruit trees around the residential area such as teak, eucalyptus, acacia, Apocynaceae, Pterocarpus Macrocarpus, Lagerstroemia , etc. Forest habitat was no longer found but some trees of various heights still exist along the Train route. None of the economic nor endangered trees were found and those under protection are commonly found. Animals: Many species of wild animals, particularly common local birds, were found living in the Project area. Some of the birds are migrant birds while some birds were found in high number reflecting high adaptability to the environment. Not all animals have been registered under protection by any organizations, national or international, or classified as "Least Concerned". No big animals, rare animals or endangered animals have been found. From the survey, the land use has been for agriculture, residential community, industrial area and water sources. Many species of animals found in this area have high adaptability in co-existing with the new habitat and environment

Table 4.1-1 (Cont'd)

Summary of the Present Environmental Conditions along the Hat Yai-Padang Bezar Train Route

Environmental Factors	Summary of Present Conditions
3. Benefit to human use	
(3.1) Water for consumption	Use of water in the area has been supplied by 6 local public departments under the Provincial Water Authority Region 5: Songkhla, Hat Yai, Sadao, Phang Nga, Na Thawee and Ranote
(3.2) Transportation	Overall transportation in the area around the Project, both in Hat Yai and to Malaysian Border, during the weekdays, transport by cars was found to be the highest with lower than or about 7 people, while travel by motorcycles and tricycles over a short distance was the second most. From the field survey, 33 crossing points with the train tracks were found.
(3.3) Public Facilities	The area along the Train Project was mostly residential community with existing electricity, water and telephone facilities.
(3.5) Flood Control and Drainage	The Project runs through the lowland by Songkhla Lake with Khlong U Tapao as a major branch. The Consultants will conduct a field survey of the water retaining area, building blocking the drainage, flooding situation and will conduct a Hydrological Study to assess the existing drainage capacity in order to adjust the system for better suitability with the Project. From the review of the data from Department of Irrigation, it was found that after the construction of Khlong Ror 1 in 2001-2010, flooding problems and damages have been reduced.
(3.6) Agriculture	The land and water resources along the Train project has been found to be rich and suitable for agriculture. Most local people do farming: rice, fruits, perennial trees, vegetables, flowers and decorative plants. The area is mostly the plain suitable for agriculture.
(3.10) Land use	54.64% of the land is used in agriculture, 25.58% residential community particularly in Hat Yai, and 8.96% grassland and fields
4. Benefit to Quality of Life	
(4.1) Economy and Society	With the area along the Train Project suitable for agriculture, most local people do farming with considerable income
(4.2) Relocation and Land Expropriation	Land expropriation of 21.3 rai 91.6 sq.wa will take place around Thung Mor Sub-district, Sadao District from 966+200 km to 967+325 km from the total amount of 2,637,480 baht. The area has no building or construction.
(4.4) Public Health	Within 200 m. along the Project, 2 health stations are found: Tha Khoi Hospital, Chalerm Prakit Health Station, Patong Sub-district

Table 4.1-1 (Cont'd)

Summary of the Present Environmental Conditions along the Hat Yai-Padang Bezar Train Route

Environmental Factors	Summary of Present Conditions
(4.7) Accidents and safety	From the records of accidents from the National Police Bureau, Songkhla which covers the whole Project area has 202 speed accidents (2013)
(4.9) Sanitation	With residential community along the Project route, local garbage collecting is outsourced to private companies according to the set standard.
(4.13) History and Archaeology	Within 2 km. of the Project, 2 historical sites are found..
(4.14) Aesthetics	In the Project area, 11 tourist attraction sites are found.

The details of the environmental impact, prevention and solutions measures are as follow:

4.1.1 Topographical Conditions

Impact from the Project: During the Construction Period As the construction of the new Train Route will be on the same ground level as that of the existing one, the topographical conditions will not be affected while the construction on the high slope, adjustment of the gradient slope might affect some topographical conditions. However, the Project Design of the route has already avoided the high slope area and the new route is only 6 meters away from the present tracks, the existing slope area will remain the same and the impact will then be of a low

The Operation Period The Project will not have any activities that may affect the topographical conditions.

Prevention and Solutions to the Environmental Impact: Concrete Specifications of the construction area and supervision of the contractors will be clearly made in the construction area.

4.1.2 Soil Resources

The Impact from the Project: During the Construction Period The construction activities particularly top soil striping, digging, land filling and the construction of the elevated carriageway, will reduce soil clumping so in case of rain, soil will be easily dispersed. With the nature of soil being loose or mixed with sand, it can be washed down into the surrounding area or nearby water sources. At the construction of the bridge across the water course, the train bridge or the drainage system, land digging may be needed to widen the water course thus causing loss of soil resource. For example, without effective planning and management, leaving the pile of soil too near the water course which can be then easily washed into the waterway. However, these are temporary impact and can be controlled, the erosion impact on the soil resource is considered low.

The Operation Period the completion of the construction, the station area will be found with buildings and landscape such as trees and small park, that can prevent more soil collapse. On the slope of the carriageway, prevention of erosion and land collapse will be made. For the construction activities of the bridge piling near the waterway that may require land digging or land filling, concrete

will be used to Applied to the area to prevent erosion and soil collapse. Therefore the Project Operation will not have any impact on the soil resource or soil collapse.

Prevention and Solutions to the Environmental Impact: During the Construction Period In general, stripping of top soil will not be operated at the same time but only sectional as needed and land compressing will be used to prevent erosion particularly during the rainy season. If necessarily needed, trees are allowed to be cut down to reduce the rain affected area. The open area must be covered with gravel or ground covering plants, trees and green area as set in the Landscape Design.

The Operation Period Regular inspection and maintenance of the slope structure, the planted trees at the Station and replanting if needed.

4.1.3 Surface Hydrological Conditions and Drainage

Impact from the Project: The Construction Period In the construction of the new carriageway with new curve radius and the construction of the train bridge and the drainage system in the water source or running stream with all year flow, detours of the main course will be needed and could block the running stream. This could affect the hydrological conditions and cause flooding in the area and nearby in case of heavy rain during the monsoon season. This will only be temporary during the construction so the impact will be low.

The Operation Period In the Design of the Train Route, considerations have been made on the train track parallel with the existing one with 6 m. apart. In the design of the bridge and the drainage structure for the new Train Route, the drainage area will not be smaller than at present. For the piling structure of the bridge, the Project has positioned the new piles not far from the existing ones with no impact on the surface hydrological conditions of the Project and nearby area.

Prevention and Solutions to the Environmental Impact: The Construction Period If land preparation causes changes in the existing drainage conditions, a new drainage system must be constructed so the drainage conditions will not be affected. Piling of construction materials, equipment or machinery must be orderly managed to prevent blocking the draining. In transporting debris or construction materials out of the location, prevention of any fall into the water course must be made. After the completion of th construction, the contractor must work with related units in clearing the water course into the original condition. If flooding occurs around the construction site, the contractor must be responsible in promptly pumping the water out of the area and paying compensation for their damage from flooding.

The Operation Period Regular inspection and clearing of the drainage system so not to have blocked the drainage condition. Monitoring of the collected sediments and weed in the drainage furrow along the tracks and in the pipes and removal of the sediment and weed must be promptly made by setting up a Sump for the pipes in the easily flooded area and coordinating with the local administrative unit in locating and setting up pumps to drain the water out promptly in the case of rain. The local administrative unit should be responsible for the management and maintenance of the

water pumps in cooperation with Songkhla Irrigation Unit, Songkhla Civil Works and City Planning and Local Disaster Prevention and Relief Unit. These units should be informed of the Project operation and can plan Flood Prevention Measures effectively. RAT must coordinate with Local Administrative units and related offices such as Provincial Irrigation Project, Provincial Civil Works and City Planning, etc. in moving with solutions and planning measures for long term solutions.

4.1.4 Quality of Surface Water and Aquatic Ecosystem

Impact from the Project: The Construction Period The surface water source along the Train Route and nearby area may be affected by the construction in the following ways: murkiness of the water from the construction of the bridge and sediments washed into the water course, falling of debris and construction materials into the water particularly when there is land digging to widen the water channel. Contamination could occur from equipment and machine oil or sewage from the construction workers' sheds. This impact is temporary during the construction of the Project and can be prevented and solved. So, the impact level is considered Low.

The Operation Period The surface water source along the Route and its vicinity may be affected as follow: impact on the quality of water from sewage discharge from the trains and garbage thrown out into the water source, impact on the quality of water from sewage discharge from toilets at the stations. Although the draining might not be directly discharged in to the water course but into public drainage system, the quality of water can still affected from washed sediments from the old carriageway and repair and maintenance of the carriageway and tracks. The impact can be short-term and quite rare so the impact level is considered Low.

Prevention and Solutions to the Environmental Impact: The Construction Period Any construction that takes place over the water course must have protective nets to prevent falling objects. No disposal of rubbish or construction materials and cleaning of equipment and tools in the water course. Piles of construction materials such as soil, sand, etc. must be fully covered and placed at least 10m away from the water source. Activities near the water source should be conducted in the dry season and within a minimal period to prevent sediment getting washed into the water. Sufficient sanitary toilets must be set up for the workers at a ratio of 20 persons:1 toilet and they must be places at least 20 m. from the water source. Proper sewage treatment from the office and workers' sheds must be set up before discharge. Wastewater tanks and sediment pools must be provided to collect sediments from wastewater from construction activities on location, the workers; sheds and the office before discharge into drainage system or water source.

The Operation Period Sanitary toilets must be provided for staff at the Station including passengers. The ON Site System and the Septic and Contact Aeration System must be sufficiently set up at every station with efficiency and standard according to Standards of Wastewater Drainage System from the Building Type C. Provision of staff knowledgeable of the Wastewater Drainage System must be set to inspect and maintain the system regularly. If found with damage, repairs must be promptly made. Pumping of septic tanks must be regularly made to ensure the efficiency of the drainage system. Signs

must be posted by SRT on “No toilet use during train parking”. Sufficient water supply on the train must be provided throughout the train service.

SRT must improve waste disposal and waste treatment system on the train. SRT must consider obtaining or improving the sewage disposal system for the train toilets according to the sanitation measures.

4.1.5 Air Quality

Impact from the Project: The Construction Period From the assessment using the Box Model, it was found that the construction activities that cause disperse of dust particles of 0.0077 mg./cub m. which could increase small dust particles in the atmosphere up to 0.0327-0.0740 mg/cub m. which is still not higher than the safety standard of 0.12 mg/cub m over an average of 24 hours. As the area is mostly agricultural farming or unoccupied, the impact is considered Low. However, the area within and nearby the Project is still prone to dust disperse.

The Operation Period When the Train Operation starts, the number of trips of the Diesel Trains will increase and more exhaust pollution will also be increased from the trains and the vehicles going to the train station with more passengers and freight transport. However, as the station is in the open area with good ventilation, the impact on the local community along the train route will be Low. As the Project will provide convenience, speed and punctuality of travel and transport, more passengers will change their travel mode to rail transport and this will reduce road transport. Pollution from car exhaust will be reduced and boost the quality of air. The impact from the Project is considered Low.

Prevention and Solutions to the Environmental Impact: The Construction Period Solid fencing of a minimal height of 2 m. must be built around the construction area to prevent disperse of dust from top soil stripping, dismantling of buildings, digging, concrete mixing, etc. into the community or impact-sensitive area. Spraying water is required two times a day on the dust-prone area and piles of construction materials and trucks transporting construction materials must be fully covered with canvas. Truck wheels must be washed daily before leaving the site. Machinery and engine must be regularly checked for efficiency and not emitting toxic pollution above the allowed standard. Road conditions must be in good condition during the construction. Information of the Project and the construction activities, transport routes of construction materials and complaint channel must be provided to the public with responsible officers at the Office on site or the station handling the complaints of any problem from the construction and processing solutions promptly.

The Operation Period Cleaning staff must be regularly provided at the Station and the compound to prevent collection of dust and provide facilities at the station. Speed and traffic signs and ample parking must be set up including pick-up /send-off area for passengers not blocking traffic and also a sign “Stop engine running while parking” to ask for cooperation. Maintenance and repair of the locomotive must be regularly inspected to reduce exhaust pollution.

4.1.6 Noise

Impact from the Project: The Construction Period On the noise from machinery and equipment, the worst level has been found from the piling process. The sensitive area of 20-100 m. from the construction site includes schools, temples and local community. The highest noise level was found at 84.6-98.6 decibels which is not higher than the standard of 11.5 decibels. The construction of the piling structure for elevated tracks and U Turns road over the train tracks will require at most 15 days. So, the noise impact will be considered Low. To prevent and reduce the impact, the project will build solid wall of at least 2 meters around the site and nearby sensitive areas.

The Operation Period With the Project development, more trains will be passing the area. From the assessment of noise level from the trains according to the Federal Transit Administration, it was found that in 2037, those within 20-300 m. from the train tracks will be exposed to 43,7-65.3 decibels (on an average of 24 hours). When considering the noise level from the Project at present, it was found that in an average of 24 hours, the increase is minimal with 49.4-65.8 decibels which is not above the standard allowed.

Prevention and Solutions to the Environmental Impact: The Construction Period The construction activities that create noise such as drilling, digging, piling, etc. must be operated during the daytime only. Solid walls of at least 2 m. must be built to block the site from the community or impact-sensitive area during the construction period. Maintenance and repair of the machinery and engine must be regularly checked for efficiency and not causing noise. In case there will be noise from the construction activities affecting the nearby sensitive area of the construction of the elevated road or U Turns, the contractors must do the following:

- Reducing the noise level by keeping the equipment in good conditions; choosing machinery, equipment and construction methods that cause the least noise such as installing noise reduction equipment with the equipment
- For the machinery making constant noise such as electricity generator, the machinery must be covered or set up in a location furthest from the sensitive area or build temporary wall
- In case of complaints, investigation must be conducted and temporary solid walls of at least 2 m. with noise absorption materials must be built to block the site from the sensitive area . If the site is close to schools, contact and time arrangement with the school should be sought after to avoid causing noise during class hours. Information of the Project and the construction activities, transport routes of construction materials and complaint channel must be provided to the public with responsible officers at the Office on site or the station handling the complaints of any problem from the construction and processing solutions promptly.

The Operation Period Solid walls must be built to allow only the noise level of 10 decibels to reach the areas of Chartrakankosol School, Kittiwit (Ban Phru) School, Songsang wittaya School, Songsang Panitchayakan School, Udomthong Municipal School, Patongwittaya Foundation School.

4.1.7 Vibration

Impact from the Project: The Construction Period Vibration during the piling construction (the worst case) could cause damage to the building within 15 km from the construction site. However, the impact will be short term so the impact is expected to be Low.

The Operation Period With the train project development, the number of trains passing the area will be increasing, From the assessment of vibration according to FTA, the level of vibration from the trains will not affect any building or property but will impact the residents within 50 m, from the train line. Songkhla residents feel concerned of the impact of vibration from the train might affect the Viharn at Don Tang Temple. The impact is considered Low.

Prevention and Solutions to the Environmental Impact: The Construction Period The construction activities that create vibration such as drilling, digging, piling, etc. must be operated during the daytime only. Reduction of vibration can be made by using low vibration machinery and equipment or installing vibration-reduction equipment as recommended by the manufacturers of each equipment. The construction activities such as piling, ground breaking with large machinery, dismantling building structures, etc. must be operated at least 15 m. away from the nearby buildings and 50 m. from the historical sites. In case work operation is needed within the allowed distance, equipment and building methods with low vibration should be used under close supervision, for example; drilling the piles instead of hammering, etc. If metal sheets are needed to cover road surface, thick metal sheets will be used and laid on the road surface without bump and supported with noise and vibration absorption rubber. Any activity that may cause vibration such as pouring materials, transporting materials, concrete mixing process or any other construction activity must be operated at least 10 m. away from the buildings and 15m. from the historical sites. If the activity causes lower vibration level, it can be operated within the shorter specified distance. If the site is close to schools, contact and time arrangement with the school should be sought after to avoid causing vibration during class hours. If close to the religious sites, vibration-causing activities should stop on religious days. Information of the Project and the construction activities, transport routes of construction materials and complaint channel must be provided to the public particularly those who live near the Project site, road users and train passengers.

The Operation Period Regular inspection and maintenance of the train tracks and road surface at the Station to avoid causing vibration from the train operation and other vehicles and specify weight limit for vehicles using the station compound.

4.1.8 Transportation

Impact from the Project : The Construction Period Transport od construction materials into the site will cause more traffic on the road. Construction of the underpass/elevated road over the crossing point of the tracks could create traffic inconvenience and accidents but the local public can still use the route connecting both sides of the tracks. The impact is considered Low.

The Operation Period The Project Development will increase traffic on the connecting roads of the Station particularly at the Station with Container Yard. The impact on the transportation around the area is considered to be Low and besides, it will be positive as the Project will solve crossing points between the roads and the tracks. The Project Development will provide more options in transportation and freight transport resulting on less traffic on the roads. As for traffic condition at the stations and the stops, the Design of the Project has planned a clockwise traffic circulation for effective exit out of the station. Areas for passenger pick-up and send-off will be provided along with parking for public transportation. This will ease traffic congestion at the Station and the surrounding area.

Prevention and Solutions to the Environmental Impact: The Construction Period For the construction of the track system, the number of the construction team of the track infrastructure must be sufficient so the work continues smoothly and continuously as planned and will not pose problem to the rail transport.

Co-operation must be made with Local Administration, local Police Station and other related offices to plan effective transportation of construction materials and traffic plan near the Project site and also facilitation in case of accidents.

Traffic system at the construction and the entrance/exit area must be effectively managed with posting of signs and warning lights for safety of the road users and accident prevention. In case of the new positioning of the underpass or overpass coincides with the current one, a nearby temporary detour must be provided and listed in the Contract Appendix. In case closing or blocking of the roadway is needed, a temporary detour and clear “Detour” signs must be set up daytime and nighttime for convenience of travel and safety. The detour and signs must be regularly maintained for effective use. All signs and warning lights must meet the Travel Safety Standards by Office of Policy and Planning of Transportation and Traffic. Information on the construction activities and detours must be provided publicly in advance. Truck drivers must receive proper training and follow traffic regulations strictly. Weight control limit to prevent road damage must be enforced and officers or representatives from the local community must monitor the activities along the project Route. If any truck is found with overweight load, Highway Police or local police must be informed to issue warning and coordinate with the related units to repair the road surface damage.

The Operation Period Traffic around the Station must be effectively managed for traffic flow along with provision of ample parking for station users.

Staff must be assigned to facilitate station users at the entrance/exit area and parking area especially at the large and extra- large stations such as Khlong Ngae Station and Padang Bezar 2 Station, and the station with Container Yard.

4.1.9 Public Utilities and Facilities

Impact from the Project: The Construction Period In the construction of the Project, removal of the existing public utilities from the Project site or nearby area may be required such as telephone

lines, water pipelines, etc. Co-ordination with the related offices must be contact for the removal. The impact is considered Low. As for the power supply used in the Project activities, the Project will ask permit from the related PEA office. For the heavy machinery and equipment that needs high power voltage, mobile electricity generators will be used. Therefore, the impact of the power supply use on the community is considered Low. The water supply mostly needed is for use and consumption: 16 cub.m/day at the workers' shed with a maximum of 80 workers and other construction activities, 5 cub.m/day at the Construction Office with 34 staff, and 6.48 cub.m/day at the rest area for the workers. The contractor will apply for water service from PWA and the use of the water supply will not have any impact on the local community.

The Operation Period The use of electricity at the station and the setting of lighting system at the underpass or overpass pedestrian bridge in the community or risk area at night may cause more demand of the electricity. However, the impact is considered Low. The Train Project Development will increase train passengers resulting in more use of water at the station but the PWA is highly capable with sufficient service so there is no impact on the local community from the Project use of the water except at Ban Krud Station which is expected to receive Medium impact. At the station, the Design has provided facilities for the disabled and the elderly with slopes, toilets and parking area with proper signs.

Prevention and Solutions to the Environmental Impact: The Construction Period Before the construction begins, coordination with the related offices of Public Utilities and Facilities concerning the removal or installing of the system.

The local community must be informed of the impact from the removal of public utilities at least one week in advance.

Use of sanitation appliances with water saving technology is recommended and the workers are encouraged to save water by installing water tanks for 3 days use at the workers' sheds and the Office.

Regular inspection and maintenance of the water keeping system, pipes and sanitation appliances. If leaking or damage is found prompt repair is needed.

The Operation Period Energy saving campaigns should be set up with the staff at the station in turning off the unused lights and unplugging the electrical appliances not in use, choosing water-saving sanitation appliances. The campaign should be extended to the passengers and the staff at the station to use water economically.

Regular inspection and maintenance of the water collecting system, pipes and appliances. If leaking or damage is found prompt repair is needed. Water Tanks enough for 3 days use should be provided at the Station.

4.1.10 Land Use

Impact from the Project: The Construction Period Most construction will be carried out along the current train tracks except the area for curve radius adjustment which needs additional land for the new track. Besides, the construction of the overpass crossing point will need additional land expropriation and change in the use of land into the roadway. The impact is expected to be Low.

The Operation Period The Development of the road network connecting with the Train Station may affect the use of land around the old station from local residential community and semi-urban community to higher residential density. Commercial and facilities area will be needed to accommodate and service the public and train users. As for the fenced area along the train tracks, there will not be much use of land so the impact will be Low. However, there will be changes in the use of land along the train route between stations, particularly large stations and tourism-based stations and the station with Container Yard. More residential and commercial use will be found along the road.

Prevention and Solutions to the Environmental Impact: The Construction Period Specific construction area must be clearly set and construction activities must be confined only within the set compound to decrease use of land next to the construction area.

The Operation Period Local Administration must be informed of the Project Development so planning of the development of land around the station will be effectively set in accordance with Land Use Planning under Department of Civil Works and City Planning. SRT should assign officers to monitor encroachment of SRT property. If any trespassing is found, legal charges must be made according to Code 12 (2) in 6th SRT Act (1992) which authorizes SRT Director or the Assigned to order evacuation or dismantling of the building from the SRT premise within a reasonable time period, of anybody who has illegally built any structure within 40 m. on both sides of the train tracks, inside the SRT property. If the order is not complied with, the Director or the Assigned with the legal rights, can dismantle or demolish such building or structure and that person does not have any right to file claim but in fact, has to be responsible for the dismantling costs.

4.1.11 The Economic and Social Conditions

Impact from the Project: The Pre- Construction Period Those affected from the adjustment of the curve radius of the new Train Tracks are concerned with land expropriation, dismantling of the building and crop harvesting. Those who have used the SRT land, with or without the lease, are concerned with the relocation of their property and residence, particularly the low income group who has no other housing or land and with no relatives nearby. The impact on the worry factor will be considered Low and of short term.

The Construction Period Disturbances from noise, dust and vibration from the construction which has been expected to be negative were found to be of a medium level and temporary. The impact, expected to be negative, on travel on the construction-related roads especially at the crossing points with the tracks in the densely populated area were found in the low level and

temporary. As there will be a large number of hired labor and mostly from the local community, this will help boost economy and local employment and will yield positive impact in the macro-economics aspect at a medium level and temporary. However, employment of non-local and alien labor may cause social problem. However, the Project will draw Terms and Conditions in the Employment Contract that close supervision of the labor will be administered. Therefore, the impact will be Low and temporary. The workers' spending in the area will have a positive impact on the local retail shops near the Project site. The impact will be Low and temporary.

The Operation Period With the Project Development, there will be a development of Transport Network around the station resulting in expense saving, energy saving from other modes of transport and solving traffic congestion. This benefits the overall quality of life of the people around the Project and nearby area. The impact is expected to be Positive at a Medium level and long term. The Project Development will boost Freight Transport Network between major centers in the South to other regions and provide freight transport option to target groups in other regions. This will help with transport cost saving and yield Positive impact at a Medium level and long term. The Project has solved problems from track crossing points suitable with the location and function for the local residents for travel safety and reducing accidents. The impact is expected to be Positive at a Medium level and long term. The Project Development will give travel and transport more flexibility helping with growth of business, tourism and investment in the area. The impact is expected to be Positive at a Medium level and long term.

The Project Development will affect the use of land and the land cost near the Project Train Route. The land with high potential may change into residential property, business, services and commercial sites particularly around the Station compound. This will benefit the economic development so the impact is expected to be Positive at a Medium level and long term. Fencing and closing of the same level crossing points will make the local commuters change their route. Transport of agricultural produce may lose transport time and cost more from increased fuel as it has to go through the designed underpass tunnel of 2.5 m. height. The impact is expected to be Negative and at a Low level.

Prevention and Solutions to the Environmental Impact: The Construction Period Continuous Press release of the Project through various media to the concerned public, information on the construction plan and transport routes of the construction materials, environmental measures so they will be informed of the facts which will help reduce their worry and concern. Local Administration and related local offices must be informed of the construction plan and activities particularly the transport routes of the construction materials so they may help in the PR work. In case of the new positioning of the underpass or overpass coincides with the current one, a nearby temporary detour must be provided and listed in the Contract Appendix. In the Employment Contract, local labor should be hired at a reasonable proportion and if local labor is qualified for the job, total hiring should be made from the local labor. Hiring of alien labor should be screened and legally checked for their records.

Rules must be set for labor control at their accommodation and punishment be made if violations occur. Staff responsible for handling complaints on problems for impact from the construction of the Project must be assigned and stationed at the Office or at the nearby Train station. Prompt action must be made to solve the problems. Different channel may be provided to the community to voice their complaints; for example, names and telephone number of the responsible people for direct contact, complaint box can be set in front of the construction site or other important places such as the Local Administrative Office, local government offices or shopping center, etc. Website or Hot Line can be set up to receive complaints and to report them to the public.

Committee should be set up comprising of representatives from various sectors such as the public, the Press, Independent Organization, etc. to monitor the actions according to the measures. Strict and clear punishment must be enforced if measures are not met. Monitoring of complaints must be regularly checked to identify problem or damage that needs prompt action in handling the problem.

The Operation Period Complaint Boxes should be set up at the Information Counter at the station to receive problems and suggestions for further action or improvement.

Committee must be set up comprising of various sectors such as representative from SRT, Office of Policy and Planning on Traffic and Transport, Office of Policy and Planning on Natural resources and Environment, Department of Pollution Control, NGO on the environment, Private development Organization and several Honorary members, etc. including representatives from the Public Sector and the Press. The Committee will monitor and inspect any activity abided by the Measures and will enforce punishment if violation is found. They will also monitor complaints and if damage is detected, prompt action must be followed.

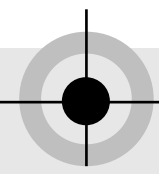
4.1.12 Relocation and Property Compensations

Impact from the Project: The Pre-Construction Period The new Route may need property expropriation (land, building structures, crop), however, in specifying the Project Route and structure of the underpasses and overpasses at the track crossing points, the Project has fully avoided expropriation. As a result, a small number of expropriation will occur and reasonable compensations will be legally made resulting in Low impact. Dismantling of the building structure or removal of the crop on the SRT property has already been made so the impact is considered Low.

Prevention and Solutions to the Environmental Impact: The Pre-Construction Period

- Expropriation Measures

The expropriation process has been conducted under the Property Expropriation Act 1987 and compensations are justly made according to the legal requirements fair to the concerned party.



Information must be publicly dispersed to those concerned of expropriation steps and their legal rights.

Provision of information, complaints or appeals and time period of compensation payment must be made to the concerned party including the case when compensations cannot be made within the time limit.

Notification of the time for evacuation must be sent to the evacuees at least one year in advance so they can find new residential location. Notifications must be periodically and clearly made to the residents in the area.

- Relocation and Dismantling of Building Structures on the Premise

The renters of the SRT property must be informed of the Planning, expropriation steps and dismantling of the building structures including scheduled evacuation time at least 6 months in advance.

Considerations should be made on the previous renters if new rent will be offered along with new renters to prevent monopoly.

Prevention and Solution Measures to the Impact from Relocation and Compensations.

The Area under the Operation:

- The Train route where the curve radius needs to be made out of the Train boundary
- The area where an overpass will be built over the tracks to solve the same level crossing points
- The area along the Project Train Route belonging to SRT property

The Operation Steps:

1) For the land and building structures subjected to expropriation as a result of the new route adjustment and construction of an overpass over the train tracks crossing points, compensations must be fully made according to Property Expropriation Act 1987, Property Management for Mass Transportation Act 1997 and Guidelines on Property Expropriation, Ministry of Transportation. The main coverage includes: land compensations, building/structures compensations, and compensations on trees.

For buildings/structures, the co-ordination steps in the relocation are:

- (1) Survey of the number of buildings to be relocated
- (2) Survey of the needs and assistance the property occupants may seek
- (3) Survey of the types of the building structures whether they are for residential or commercial use
- (4) In case the property occupants may require compensations from expropriation, compensation payment must be fully made according to Property Expropriation Act 1987, Property

Management for Mass Transportation Act 1997 and Guidelines on Property Expropriation, Ministry of Transportation. In case the property occupant is a government office, negotiations may be made with the land owner to continue using the land and paying a substantial amount of compensations. SRT, as the Project owner, will make negotiations with the land owner while compensations of the building structure will be made with reference to Property Expropriation Guidelines on Compensations but the starting amount of compensations will not be required to be officially set by the Committee.

2) Inspection must be made if the building structures located on the SRT property have lease agreements. If there is a lease, SRT must make compensations according to Code 18 (5), Property Expropriation Act 1987 but if there is no lease, dismantling of the building structures will be made and the property occupants will not be legally compensated. However, for humanity consideration, SRT may propose to SRT Committee asking for some relocation financial support and act in accordance with Property Expropriation Guidelines, Ministry of Transportation.

4.1.13 Separation

Impact from the Project: The Construction Period During the construction, the local residents can still commute between the two sides of the train tracks and continue their business by using the road parallel to the tracks and the current same-level crossing points. The impact will be considered Low.

The Operation Period The Project will close all existing track crossing points and put up fencing along the train route for safety of the train operation by providing new underpasses or overpasses near the previous locations so the local residents can continue their commuting and business as usual but with some inconvenience. The impact will be Low.

Prevention and Solutions to the Environmental Impact: The Construction Period Piling and storing of equipment and materials must not block public traffic particularly at the construction site of the present track crossing points.

Signs and signaling lights of the construction site and the construction at the track crossing points must be clearly set up daytime and nighttime.ตัว

In case of the new positioning of the underpass or overpass coincides with the current crossing points, a nearby temporary detour must be provided and added in the Contract Appendix.

The Operation Period Overpass pedestrian bridge must be provided at a suitable location. At the station and highly populated community area along the Train Route, overpass bridges and slope must be provided for pedestrians and motorcyclists with lightings and CCTV (if necessary) for safety. Information of the track crossing roadways must be publicized to the public for travel convenience between the two sides of the train tracks.

4.1.14 Public Health/ Sanitation and Safety

Impact from the Project: The Construction Period

Impact on the local residents near the Project area

Dust from the construction may affect respiratory system while noise and vibration may cause upsetting disturbance and stress. The local residents may be infected with the disease from the workers who come into the area such as diarrhea or disease associated with alien workers. This could affect public health services of the local health units. The impact is considered to be Low.

Impact on the construction workers

The impact could be from sanitation and safety: hazard from unsafe work operation and work conditions such as loud noise at the work site and heat could cause certain diseases. The impact could be from food safety, environmental care at the work site. However, measures have been planned so the impact is expected to be Low.

The Operation Period

Impact on the local residents near the Project area

Impact can be from noise and vibration from the high speed trains and the increased running frequency. The Project also cause increasing traffic on the road network with the station particularly the stations with Container Yard. The impact is expected to be Low.

Impact on the train staff

The Project has planned for the improvement and development of the train operation, public utilities, facilities, safety system and other related systems at the train station so, the train staff and the station staff should not be affected.

Prevention and Solutions to the Environmental Impact : The Construction Period

Safety measures at the work site

The employee must strictly follow Preventions and Solutions Measures of Quality of Air, Noise and Vibration during the construction period.

The employee must act in accordance with related Law of Sanitation Health and Safety such as Announcement of Welfare and Labor Protection, Ministerial regulations under Safety, sanitation and Work Environment Act 2011, and Labor Protection Act 1998:

- Ministerial Code on Standards of Management of Safety, Sanitation Health and Workplace Environment related to Construction Operation 2008

- Ministerial Code Standards of Management of Safety, Sanitation Health and Workplace Environment related to Working with Machinery, Cranes and Boilers 2009
- Ministerial Code Standards of Management of Safety, Sanitation Health and Workplace Environment related to Electrical Operation 2011
- Ministerial Code Standards of Management of Safety, Sanitation Health and Workplace Environment related to Workplace 2006
- Ministerial Code Standards of Management of Safety, Sanitation Health and Workplace Environment related to Working with Heat, Lights and Noise 2006
- Announcement of Welfare and Labor Protection Department on Standards of Personal Protective Equipment 2011
- Announcement of Welfare and Labor Protection Department on Hazards Warning Signs, Safety Signs. Sanitation Health and Workplace Environment and Clauses listing Rights and Responsibilities of Employers and Employees 2011
- Announcement of Welfare and Labor Protection Department on Criteria on Safety Plan for the Construction Workers 2009

The contractor must provide sanitation health at the construction site, the workers' lodge and the Office in the followings:

- Providing clean drinking water and water for use sufficient for the staff and workers (average of 5 liters/person/day for drinking water, 200 liters/person/day for usable water for the workers at their sheds, 5 liters/person/day for the workers during day break at the Office rest area, and 70 liters/person/day for the staff at the Office)
- Water storing tanks for at least 3 days of use incase of water shortage
- Sanitary toilets (not flushing toilets) enough for the staff and construction workers (20 person: 1 toilet) to prevent spreading disease
- Sufficient garbage collectibles of good conditions with lids and regular garbage disposal to prevent breeding of insects and other carriers
- Effective wastewater management to prevent breeding of disease carriers.

The contractors must build shelters for the construction workers and the Construction Supervision Office according to the Standards and Plan of Temporary Shelter for Construction Workers, Thailand Association of Engineering (TAE Standard 1010-34).

The contractors must provide a covered rest area during the day break for the workers at the Office por near the construction site and if located at the construction site, mobile toilet units must be provided at least 8 toilets/location.

The contractors must check the condition of the fire extinguishers to be ready for us and if damaged or not working, repair or replacement must be done promptly,

The contractors must post use instruction of use of the fire extinguishers where the equipment is placed

The contractors must organize training for the construction workers on the use and maintenance of machinery and equipment. Responsible officers must be assigned to monitor and inspect the machinery and equipment for work efficiency. If damage is found, repair must be immediately made to prevent accident.

The contractors must provide personal hazard protective equipment and require the workers to wear it at all time on their job.

Safety Measures for road users and nearby community

The contractors must strictly follow Preventions and Solutions Measures of Quality of Air, Noise and Vibration during the construction.

The contractors must ensure that the drivers strictly follow traffic regulations and speed limit of not higher than 30 km/hr is enforced when passing the residential community.

The contractors must provide traffic facilitation officers around the highly populated community, schools or any accident-risk area.

The contractors must post clear signs indicating the construction site and inform the road users in advance if road closing is necessary and prepare detour route to prevent accident.

Safety Measures for The Station Users

For the construction of a new train station if it is not located where the existing one is, the Project will complete the construction of the new station before canceling the use of the old one and finding new activities for it. In some case, the old station may be relocated to a new location with new activities. If the new station is built where the old one is, the Project will have to build a temporary station building nearby before the dismantling of the old one takes place and then the new station can then be built.

Fencing around the construction site must be built with clear sign of “Construction Site: No Trespassing”

At the hazardous area at the construction site, signs must be posted: “Hazardous Construction Area” along with red signal lights clearly seen at nighttime and any one entering the site must wear protective helmet.

No entry to the construction site or hazardous area is allowed to people with no business or duty concerned.

The Operation Period Prevention and Solution Measures of Quality of Air, Noise, Vibration and Transportation must be strictly observed. Training related with safety operations must be organized for responsible officers and the staff must strictly follow Safety Measures.

4.1.15 Safety of the Society

Impact from the Project: Construction Period Hiring of alien workers may cause risk to safety of the community as the alien workers may cause disturbances to the local residents. As the Project will break the construction into 2 sections (in the Contract), each of which will be found with two workers’ shelters and a maximum of 80 workers at each shelter. This number is still manageable for orderliness. The contractors are required to hire local labor of a reasonable number. Rules and regulations must be set for the workers at their shelter. The impact is expected to be Low.

The Operation Period With the Project Development, more people will be traveling into the area and safety of the society may be reduced. However, local offices responsible for safety in the area and local Police stations have been informed of the Project Development, so the impact is expected to be Low.

Prevention and Solutions to the Environmental Impact: The Construction Period Prevention and Solution Measures of the Economic and Social Impact must be strictly followed.

The Operation Period Safety surveillance at the Train Station must be provided for the train users to ease concern of their safety and security. Efficient CCTV system must be set up at the station and if found damaged, repair must be promptly made.

Complaints/Suggestion Box should be set at the Information counter at the Station for further action and improvement.

Local Police units must be informed of the Project development so action plans and preparation will be made to handle changes or problems.

Coordination with Local Administration Unit is needed to install lights at the underpass or overpass with a large number of people, the residential area and risk areas for crime.

Request for cooperation from local Police unit should be made for patrol unit around the station and underpass in the risk areas for crime.

4.1.16 Sanitation

Impact from the Project: The Construction Period

Garbage Management

Garbage from the construction activities will be sorted and some will be saved for reuse or sold. Garbage that cannot be reused will be stored to be removed for disposal. Garbage and waste from the workers' shelter amounts to about 68 kg./day/location and garbage from the staff and workers at the Office amounts to 46.5 kg.day/location. All garbage will be collected in receptacle containers to be taken out by local responsible unit with no garbage remaining on site or let out outside the Project site. The impact is considered to be Low.

Wastewater Management

Wastewater from the workers' shelter amounts to 12,8 cub.m/day /location and wastewater from the Office is 2.6 cub.m/day/location. This will be treated in a prefab wastewater treatment tank big enough for the amount of wastewater. The impact is considered Low.

The Operation Period With the Project development, more people is expected to use the train station resulting in increasing garbage and wastewater.

Garbage Management

If not properly managed, garbage from the construction site may spill out and contaminate the environment or turn into breeding ground for disease carriers. There is no unit responsible for garbage collection at Thung Lung Station and Padang Bezar 2 Station. Some local Administrative Unit may not have the capacity to do so. The impact is expected to be Medium.

Wastewater Treatment

Wastewater from toilets at the station may affect sanitation at a low level as the Project will provide ready-made wastewater treatment vacuum tank for wastewater treatment before discharge or reuse, from toilets at the station according to Standards of Wastewater Treatment in the Building Type C.

Prevention and Solutions to the Environmental Impact: The Construction Period Strict observation of Prevention and Solution Measures on Quality of Surface Hydrological Conditions and Aquatic Ecosystem and Public Health/Sanitation Health.ⓐ

The contractors must require the construction workers to sort garbage by keeping some for reuse and collect garbage that cannot be reused for further disposal.

The contractors must provide garbage receptacles with lids at various points at the construction site, the workers' shelter and the Office and maintain the conditions for efficiency.

Sanitary garbage collecting area must be provided at the workers' shelter and the Office with sufficient space for 3 days of garbage and located where garbage collecting vehicles can have easy access.

Coordination with local units must be made on regular garbage collecting and disposal and the contractors must store collected garbage at a location with easy access for garbage trucks.

Regular care and maintenance must be made on the sanitation of toilets. Septic tanks when full must be emptied by requesting responsible local units to undertake the task promptly. Wastewater treatment from the Office and the workers' shelter must be properly done before discharge to the outside.

The Operation Period Publicize and promote among the business operators/sellers the use of natural materials and not using foam or plastic food containers, both on the train and at the station to reduce non-biodegradable garbage.

Provide sufficient garbage receptacles at the station and on the train and inform the passengers to dispose garbage at the prepared location. Garbage collectibles for sorted types of garbage should be used at the station in the early stage of the Project Operation.

Regular garbage collecting from the stations and the trains must be done.

Provision of garbage collecting area at each station with sanitation standards and sufficient space for 3 days of garbage with easy access to garbage trucks.

Coordination with local garbage disposal unit to collect and dispose garbage from the station on a daily basis before transferring to setting pond and discharge to the public draining channel.

SRT must post a sign “No toilet use during train parking”

SRT should provide sufficient water for use in the toilets on the train throughout the trip.

4.1.17 Aesthetics and Tourism

Impact of the Project: The Construction Period

Impact on Scenery

The construction site may not look orderly or clean especially from the high perspective but the impact will be temporary during the construction and can be managed. The impact is considered Low.

Impact on Tourism

The construction of the train and the track crossing points will affect tourism. Traffic route o tourist destinations may be blocked and the unpleasant view of the construction site and nearby may ruin the aesthetic beauty of the tourist places. However, the impact will be temporary and considered Low.

Operation Period

Impact on Scenery

The new subgrade will be on the same level with the old one with clear fences along both sides of the train tracks not to block the scenery and view. The station building has been designed to preserve the original architectural design with improved attractive landscape. However, the Project Development will change the use of land with development potentials for tourism and service. The impact could be negative toward th scenery if not properly managed. In sum, the impact will be Low.

Impact on Tourism

The Project Operation will yield positive impact of a Medium level on tourism as transportation will be faster and give incentives to tourists in traveling to the tourist destinations.

Prevention and Solutions to the Environmental Impact: The Construction Period As written in the Contract, the contractors must follow Prevention and Solution Measures of the Environmental Impact such as cleanliness, orderliness at the construction site, spraying water to suppress dust disperse, piling of construction materials not blocking traffic, garbage management, construction of detours to reach tourist destinations, etc.

4.2 Impact on Politics and the National Security

The Double Tracks Electric Train Project promotes development factors of the manufacturing sector and boosts competitiveness and economic strength in the manufacturing sector to be ready for changes and external threats which can affect the national security. As found In the 11th National Economic and Social Development Plan (2012-2016), Guidelines on Infrastructure Development have been set. In the past, the State has played a leading role in the development of Infrastructure to boost the competitiveness of the country. The Development has been focused on the infrastructure of land, water and air transportation with a ratio of 78.0% of domestic passenger road transport, 21.0% rail transport and 3.0% air transport. As for freight transport, 82.0% has been via road transport, 15.0% via water transport and 3.0 via rail transport. Although the infrastructure development has been successful in terms of quantity in the past, improvement of quality and more participation from other sectors must be made. Moreover, limitations and regulations of Ministry of Finance are still not conforming or suitable with the present situation resulting in slow Infrastructure development and pose as obstacle to the national economic growth in the long run. At present, the need for use of energy in Thailand has been increasing and depending on large import of energy from overseas.

- Boosting Multi-Modal Transportation development by changing to other transport modes with low transport cost and effective use of energy; development of infrastructure and multi-modal transportation management linking with road, rail, water and air transportation domestically and internationally to boost efficiency and standards of freight transport in terms of time, safety and punctuality; promotion of economic development under the regional framework and development of efficient freight management to lower logistics cost of the country.
- Improvement of logistics management by producing professional logistics personnel, developing freight transport network and logistics to cover the demand chain and revising related law and regulations; development of logistics innovations and facilitation of trading and freight transport across the border such as development of national Single Window, Cargo Distribution Center and border trading checking points, etc.; improvement of the efficiency of transport management and the roles and functions of Airport Authority of Thailand and major seaports to reduce freight transport cost and to boost Thailand long term competitiveness.
- Development of Rail Transport by improving the train tracks and crossing points between the tracks and the roads for safety and service; improvement of signaling system to increase the capacity of passenger and freight transport service; improvement of the train route.
- Promoting the private sector's participation in the investment of Infrastructure Development and Basic Services by improving related law and regulations, procedures and forms of joint investment in the infrastructure and public service projects such as education and public

health, etc. with appropriate forms to each enterprise; commitment to transparency of the operation; clear distribution of risk between the State and private sector

To reach the objectives and goals of networking with the neighboring countries in the region and for the National security of economics and society as set in the 5 years Plan in the 11th National Development Plan, the best benefit should be reaped from the AEC merge in 2015 which will move forward with the Master Plan on ASEAN Networking and the sub-region co-operation. This will provide dynamics to all related aspects resulting in the expansion of trading and investment, within the sub-region, between the sub-region and ASEAN, and the networking Potentials with other nearby sub-regions and extended to other regions such as Asia-Pacific region. The operation guidelines on Economic and Social Networking Development with the sub-region, the region and Asia-Pacific are:

- 1) Networking with the countries in the region for the National economic and social security by setting up transport and logistics network under the Sub-Region Cooperation Framework particularly the Economic Development Plan of the Greater Mekhong Sub-Region (GMS) , Strategies on Economic Cooperation of Irawaddi-Chao Phraya-Mekhong (ACMES), Trilateral Economic Development Plan between Indonesia, Malaysia and Thailand (IMT-GT). Potentials to networking with other countries out of ASEAN such as South Asia as in Cooperation Framework of Bengal on Academics and Economics (BIMSTEC). Thailand-Malaysia on Joint Development Strategy for Border Areas (JDS). These will provide facilitations convenience and lower logistics cost by:
 - 1.1) Developing transport and logistics service up to the International Standard especially the transport by road, rail, double tracks train, high speed train and water/coastal transport; developing customs border check points, Border Trading Center and efficient process which will help increase energy; developing transport and logistics business network and the supply chain in the region to share resources and knowledge to lower business cost and to increase transport network efficiency and convenience in travel and transport across borders; effective integration of strategies and basic infrastructure along the economic zone in the country and those in the sub-region and between the sub-regions in ASEAN according to the ASEAN Transport and Logistics Development Master Plan; investment initiated by the State in strategic development projects in the economic zone and promoting joint investment between the State and private sector.
 - 1.2) Training staff and personnel in transport and logistics business to boost the potentials of Thai private sector in foreign language skills and logistics management to help the business operators to be able to run their transport and logistics business and the supply chain both domestically and internationally; developing the business potentials of the medium and small business owners to connect with the neighboring countries, to benefit from export business along the economic zone and to develop their business into international level; as development partners, providing academic cooperation to the neighboring countries in development projects for their personnel and staff in transport and logistics business.

- 1.3) Linking the economic development along the border and the economic zone; linking the manufacturing sector in Thailand with the transport network to efficiently connect the supply chain with the export Gateway; building economic network with the large economic development area in the neighboring countries with the economic zone in Thailand through the main Coordinating Centers between Thailand and the neighboring countries along the border.
- 1.4) The development of the investment base by boosting competitiveness among the sub-regions and the ASEAN region should focus on cooperation among the countries in setting up manufacturing base along the potential economic development zone as planned in the Development Strategies; linking and developing the areas in the regions in Thailand with the neighboring countries and ASEAN as a manufacturing base of agricultural industry and processed produce, and as tourist destinations with awareness of the Superpower nations' foreign investment policy in this region; focusing on the GMS and IMT-GT development zones with high potentials in diverse networking channels and options; discussions between related government offices and private sector in setting the national investment plan and discussions with the State and private sector in the neighboring countries within the State/Private Cooperation Framework with consideration of the economic and social impact of every country ; setting mutual prevention and solution measures and fair benefit to all countries while keeping their cultural identity for future competition; Sufficient Economy Policy must be adhered to with development of local agricultural produce for its quality and acceptance into the regional market; developing the border economic zones, both old and new, into the economic Gateway linking with the neighboring countries; developing transportation and logistics system with standards of service and convenience at border crossing points; developing business ability potentials of the personnel and local business operators to support trading, investment and tourism with concern of overall impact from migrant workers, drug trafficking across the borders; sensitivity to the potentials in physical, economic, social and cultural aspects of the location; integration of management and development of labor among the countries under the Cooperation Framework of the Sub-Regions and conformity to the Infrastructure Development Plan between the neighboring countries according to the ASEAN Master Plan and Strategies.

Conclusion From the Study of Impact from the Hat Yai- Padang Bezar Double Tracks Electric Train Project, it was found that the Project Operation will promote economic growth and stability, increase competitive potentials of the country economic strength and prepare for changes and external threats. Moreover, the Project will support the National Policy on Infrastructure Development for improved quality of life and competitive edge of the country and also support the policy on energy conservation. So, this Project will yield Positive impact to the country politics and security.

4.3 Long Term Impact on the Project Operation of the Project Operator

4.3.1 Financial Status

To conduct the Study of Long Term Impact on the Project Operation of the Project Operator, the Consultants will collect previous financial data from SRT and analyse the financial status of SRT whether there will be any problems or obstacles in the Project operation. Moreover, the Study will look into SRT's policy and measures towards solving problems. Studies of operation plans, solution measures of the financial problem will be conducted along with the study of financial impact of the Project.

1) The Results of SRT Operation

The Results of SRT operation from the 2010 Accounting Period to 2013 Accounting Period are shown in **Table 4.3-1** below:

Table 4.3-1 The Results of the Operation and the Financial Status

Unit: million baht

Details	2010	2011	2012	2013
1. Operation Results Report				
Revenue	13,318.07	13,412.34	13,753.18	15,871.86
Revenue from the Operation	8,944.72	9,223.41	8,701.04	9,937.67
Support from the State Budget	3,742.28	3,726.82	4,596.84	5,474.19
Other revenues	631.07	462.11	455.3	460
Expenses	21,176.29	22,506.79	25,226.37	27,057.22
Operation costs	11,974.98	12,998.84	14,094.49	14,872.10
Depreciation costs	2,017.33	1,991.99	1,992.02	2,178.82
Loan interests	2,201.83	2,345.74	2,697.31	2,889.04
Others	4,982.15	5,170.22	6,442.55	7,117.26
Net Profit (Loss)	-7,858.22	-9,094.45	-11,473.19	-11,185.36
2. Financial Status Report				
Total Assets	124,890.04	134,393.06	133,158.18	173,733.80
Current Assets	7,305.53	9,724.21	6,732.71	7,840.54
Land, Buildings, Equipment	82,915.84	88,395.62	90,159.29	129,627.07
Others	34,668.67	36,273.23	36,266.18	36,266.19
Total Liabilities	85,838.88	88,916.42	89,676.21	106,373.22
Current Liabilities	11,590.01	13,546.33	7,601.48	5,687.31
Long-Term Loan	49,835.97	49,753.91	58,077.28	76,678.46
Others	24,412.90	25,616.18	23,997.45	24,007.45
Shareholders	39,051.16	45,476.64	43,481.97	67,360.58

Source: The National Budget Bureau, Office of the Prime Minister

From the Results of SRT Operations and the fund support from the State budget as shown above, it could be seen that SRT has been facing a continuous loss from SRT financial responsibilities in the costs of development and maintenance of the train network across the country, which requires a substantial amount of budget. At the same time, as SRT is socially committed to serving train passengers, financial losses have been constant over the past years. Although the State may have to legally compensate and support for the losses, the reimbursement takes a long time resulting in cash flow shortage. SRT has been taking out investment loans for the Infrastructure Development and cash flow solution. As the accumulated debts and continuous loss have aggravated the financial situations, SRT has to develop a long term solution plan to handle financial problems. This will be discussed later in this report.

4.3.2 The Business Plan of Passenger and Freight Transport Service

According to the Business Plan of SRT 2013-2016 on Passenger and Freight Transport and Services, the goals are:

1. Increasing revenue from freight transport as follow:

Commercial passenger service	5.35%/year
Socially-committed passenger service	4.65%/year
All types of freight transport	4.75%/year
2. Better service (Users' satisfaction, speed of travel and transport, punctuality, accidents)

From the advantage of lower cost of fuel than other transport modes and fixed routes, SRT has used these strengths as

incentives to increase passengers and freight transport to meet the set Revenue goal. This could be a new direction in increasing the revenue. The Business Plan in Passengers and Freight Transport and Service has become very significant in restoring the financial status of SRT in the next 5 years.

At the same time, although increasing revenue is a significant target, in order to reach that target, SRT has to consider variables and factors in increasing number of passengers which are: safety, punctuality and customers; satisfaction. Efficient and prompt strategies to restore confidence from customers must be planned.

The 3 main objectives in following the Business Plan are:

1. To increase service efficiency to serve more travel and transportation in the future
2. To increase revenue from train service
3. To provide linkage of passengers and freight transport

Objective 1: To improve service efficiency and safety to serve future increase of transportation The strategies are:

- Strategy on increasing punctuality and safety of passenger trains and freight trains according to types of service
- Strategy on increasing efficiency in service and safety to serve future increase of transportation

Objective 2: To increase revenue from train service

- To improve and increase train fleet to serve various types of transport: commercial passenger transport, freight trains
- To keep current group of customers
- To open new market
- To adjust an increase of fare and fees in relation to higher cost

- More customer relations work
- Concrete marketing development to identify service needs
- To support and increase cargo transfer (ICD, CY)

Objective 3: To provide transit linkage and network for passengers and freight domestically and with the neighboring Countries

- Efficient linkage and networking of passenger and freight transport domestically and with the neighboring countries

At present, as SRT has planned transit linkage with the neighboring countries particularly for freight transport, Marketing plan must be mutually laid out among our allies. Besides, there are also Plan in Facilities Development towards Multi-Modal Transportation at the train stations and freight transfer. To reach the set goals in the next 5 years, the Business Department must have an effective marketing plan to serve future service. Under these strategies, the service work is at the end of the line while the development of the tracks and the locomotives and the infrastructure are crucially at the starting point of the strategies. The plan must consider the efficiency of the maintenance and repair personnel along with sufficient number of trains and tracks to accommodate future transport service. At the same time, in the next 5 years when future construction and improvement of the new tracks will take place, to follow the set Strategies, assessment of the target customers and adjustment of the marketing plan must be considered. The main aspects for considerations are:

1. Short-Term Planning: To gain revenues of train service from current and old customers, incentives must be planned to keep those customers and freight transport with better quality and service before the new locomotives will be operated.
2. Mid-term Planning: SRT must be able to cut loss of market share and retain the customer base by improving service quality and train operation to meet the customers' needs of train scheduling and cancelling overlapping train routes.
3. Long-Term Planning: After the Double Tracks Train Project and the renovation of Bang Sue Station are completed, the train operation will be more punctual and the service quality will be much improved. Particularly with the new station conveniently linking with public transportation, this will be SRT strength in its competition with other transport modes.

The indicators for Planning/Project achievement of the three Objectives can be classified into 4 indicators as follow:

1. Punctuality classified by types of service
2. Revenue growth rate
3. Volume of passengers and freight transport classified by types
4. Ability to complete Transit Point Construction Planning as planned

From the Study of Business Plan of Passenger and Freight Train Service, Objectives, Strategies and Indicators, it can be seen that the Double Tracks Train Development Project has Positive impact on the financial status of SRT because the Project Development will support the Objective in increasing the efficiency of service to serve future increase of transportation. This will result in the increase of revenue from train service and convenient linkage of travel and transport will also bring more revenue to SRT in the future.

4.3.3 Long-Term Impact on Management of the Organization and Personnel of SRT

(Source: The Business Plan, SRT 2013-2016)

4.3.3.1 Long-Term Planning of SRT Management and Development

Increasing capability and efficiency of the organization is one significant objective to be committed to as the working environment is always dynamic and continuously changing such as the competition in the industry, behavior of the consumers, the State policy, expectations from the public or outside units or organization. The organization will therefore have to step up with their adaptation to the situation and be alert and ready to seize an opportunity or any benefit from the situation, and even take up any challenge from internal or external factor.

To achieve the above, SRT must immediately improve their capability in development and management, both quantitatively and qualitatively, using the following aspects as direction indicators:

- 1) Overall production of the Organization has been at a low level continuously and over a long period of time
- 2) Several rules, regulations and operation process have not been beneficial to the Organization
- 3) Problems and obstacles in integration of work from several departments
- 4) Ability to apply new technology in management to increase productivity of the Organization
- 5) Restructuring of the Organization according to the State Policy and re-engineering the management suitable to the new structure
- 6) Building up confidence to stakeholders
- 7) Management of Organizational Behavior to meet the short-term and long-term changes

The main goals of the Organization are crucial in determining the strategies and action plan and they must be related to and synchronized with the internal and external environment to move the Organization forward to the right direction.

1) The Organization must have flexibility to adapt and change toward business competition.

The strategies are:

1.1 Develop the management system and work process up to international standard focusing on continuously improving operation.

1.2 Create unity, flexibility and integration of work for success of the 176,808 m. baht Project

2) Promote new technology of management suitable with the needs of the Organization to reduce redundancy and to increase overall efficiency of work and management system. The strategies are:

2.1 Strategies on Information Technology and Telecommunications Development of SRT

3) Support the Organization in setting up business units with suitable management system so the units can integrate work and build unity among themselves to move forward toward the same direction as set in the Strategies.

3.1 Promotion of the development of the management system and operation process that support the concept of business units consistent with the mission of the Organization

4) Build up the Organization image of transparency, accountability and confidence for stakeholders with the following strategies:

4.1 Build up Good Governance of the Organization

4.2 Promote progressive PR to improve the image and understanding of the Organization to target groups, offices or the public

4.3 Develop the integrated risk management system for the Organization

5) Ability to receive and understand the role of participation and acceptance of the personnel at all levels of the Organization so they can be the dynamic force to move the Organization toward the goals by:

5.1 Build up leadership and promote development of organizational behavior

4.3.3.2 Management and Development Plan of SRT Personnel

From SRT Business Plan, it was found that at present SRT is facing with employee shortage and SRT must set guidelines in solving this problem, short-term and long-term solutions, to increase efficiency of their operation as listed as the main objective. As a result of the work environment which is changing continuously in competition in the industry, behavior of the customers, the State Policy and expectations from the outsiders, public or organizations, personnel who are the key factor of success of the Organization must be able to adapt themselves with the changing situation and be alert for any opportunity or benefit, and be able to take up new challenges from internal or external factors. To be able to achieve the above, SRT must immediately improve their capability in development and management, both quantitatively and qualitatively, using the following aspects as direction indicators:

- 1) Overall production of the Organization has been at a low level continuously and over a long period of time
- 2) The Organization is facing personnel shortage now and in the near future, both quantitatively and qualitatively.
- 3) The main reason for the problem above is in the next 5 years, there will be a number of retirees who are of high caliber in both knowledge and capacity of great benefit to the Organization. Besides, according to the Cabinet's decision as of 28th July 1998, the Organization cannot hire sufficient number of staff for its needs causing great impact to all sections of the Organization
- 4) Increasing the capacity in the management and development of personnel in all aspects to meet the restructuring of the business Unit and to increase their capacity for competition
- 5) The ability to apply new technology in work management to increase productivity of personnel development and management

The main objectives are crucial in determining Strategies and Action Plan so they must be related and synchronized with the internal and external environment of the personnel management and development so the Organization can move forward in the right direction. They are:

1) Increasing the capacity of the Personnel Management Department so they become Strategic Partners of the Organization with the following Strategies:

1.1 Promoting change of the image and repositioning of the unit focusing on strategic operation

2) Increasing or extending new and efficient technology to personnel development and management with the following strategies:

2.1 Creating or promoting the use of Information Technological system to increase the efficiency of personnel development and management

3) To be able to place qualified personnel suitable with the need of each business unit considering both quantity and quality aspect, the strategy is:

3.1 Planning of the personnel placement with precision, balance and suitability

4) To develop personnel to be the sustainable force for the Organization and to encourage the personnel to seek knowledge and continuously develop their organization, the strategies are:

4.1 Promote the ability of each personnel in relevance to the Organization's needs

4.2 Promote Knowledge Management

5) To create incentives and keep quality personnel, the strategy is:

5.1 Support management of the operation achievement with remunerations, promotion and other incentives based on ability and work achievement.

4.3.3.3 Impact on Management of the Organization and Personnel

From the study of the Structure of the Organization and Personnel of SRT as discussed above, it was found that although SRT is having personnel shortage problem, SRT has already laid out solutions plan, both short-term and long-term, and included them in the planning guidelines of all projects in terms of management development, restructuring of the Organization and personnel development.

The Double Tracks Train Project, if operated with the business system that has effective management , accounting system and assessment of operation results that meet the customers' needs and satisfaction with efficiency and speed, the operation will substantially increase SRT Revenue and reduce the State expenses. Therefore, This Project will provide a significant incentive to restructure the Organization as set in the related projects and plans. It can then be concluded that the long-term impact of the Project on the Organization and Personnel Management of SRT will be Positive because of the integrated Objectives that yield effective achievements.

4.3.4 Long-Term Operation Plan

4.3.4.1 SRT Continuous Investment Plans

1. Mass Rail Transit Project in Bangkok and its suburb: Bang Sue – Talingchan 2013-2016 of 15,551.38 million baht
2. Mass Rail Transit Project in Bangkok and its suburb: Bang Sue - Rangsit 2009-2016 of 69,305 million baht
3. Route Improvement Project: 5th Phase 2011-2014 of 8,264.70 million baht
4. Route Improvement Project: 6th Phase 2011-2014 of 6,717.45 million baht

New Projects

1. The Double Tracks Train Project along the Eastern Coastline: Chachoengsao - Khlong Sip Kao- Kang Khoi 2013-2015 of 11,348.35 million baht
2. The Double Tracks Train Project: Lopburi-Pak Nam Pho 2013-2017 of 19,332 million baht
3. The Double Tracks Train Project: Map Kabao-Jira Depot 2013-2017 of 27,974 million baht
4. The Double Tracks Train Project: Nakhon Pathom-Hua Hin 2013-2017 of 27,223 million baht
5. The Double Tracks Train Project: Nakhon ratchasima (Jira Road)-Khon Kaen 2013-2016 of 28,290 million baht
6. The Double Tracks Train Project: Prachuap Khirikhan-Choomporn 2013-2016 of 16,545 million baht
7. Mass Rail Transit Project in Bangkok and its suburb: Talingchan-Siriraj 2013-2015 of 4,290 million baht
8. Mass Rail Transit Project in Bangkok and its suburb: Bang Sue-Phya Thai – Makkasan 2013-2016 of 39,885 million baht
9. The Extended Suvarnaphumi Airport Rail Link Project: Phya Thai-Don Muang 2013-2017 of

40,216 million baht

10. Mass Rail Transit Project in Bangkok and its suburb: Rangsit-Thammasat (Rangsit) 2013-2015 of 3,896 million baht

11. Mass Rail Transit Project in Bangkok and its suburb: Talingchan-Salaya 2013-2015 Of 3,363.20 million baht

12. The Construction of the Denchai-Chiangrai-Chiang Khong Train Route 2013-2015 of 47,755 million baht

13. The Telecommunication Network across the Country Project 2013-2014 of 2,144 million baht

14. The High Speed Rail Project: Bangkok-Chiang Mai 2013-2016 of 208,499 million baht

15. The High Speed rail Project: Bangkok- Nakhon Ratchasima 2013-2016 of 92,916 million baht

16. The High Speed rail Project: Bangkok-Hua Hin 2013-2016 of 55,071 million baht

4.3.4.2 Summary of The Impact on Long-Term Operation Plan of SRT

From the Study of the Long-Term Operation Plan of SRT including the Investment Plan of Rail Infrastructure Development approved by the Cabinet on April 27th 2010 and the Rail Network Plan of SRT, the impact has been found to be Positive to the long-term operation of SRT. With the support and green light from the State, the Project will generate a substantial increase in SRT revenue from passenger and freight transport. Moreover, in the development of the Project, funding resource has been provided by the State. With the Cabinet's approval of the Project, Ministry of Transportation will discuss with Ministry of Finance in allocating budget or funding resource for the Project development. Besides, if SRT intends to seek joint investment with the private sector, this could be done by following the procedures under Private Partnership Act 2013.

4.4 Impact from Complying with Law and Regulations besides Private Partnership in the State Enterprise Act 2013 and other related Law and Regulations

4.4.1 The operation under Private Partnership in the State Enterprise Act 1992

4.4.2 Complying with other related Law and regulations

The Double Tracks Train Project is linked with other Projects under several organizations which have to act upon Law and regulations suitable for each type of work. Therefore, the operation of this Project will act in relevance with the Law and regulation to achieve efficiency in its operation. The related Law and Regulations are:

- 1) Ministerial Code (1994) under Private Partnership in the State Enterprise 1992

In the Ministerial Code (1994) under Private Partnership in the State Enterprise 1992 issued by Ministry of Finance, it has stated the main issues to be included in the Bidding Announcement asking the interested entrepreneurs to propose terms and conditions in forming partnership with the State. The

rationale behind this Ministerial Code is that in Code 15 of Private Partnership Act 1992, it has been stated that calls for partnership must be announced along with the screening methods and in this case bidding process will be used with bank guarantee and collateral requirement. These have to be provided as required in the Ministerial Code so the Project owner and the Screening Committee can proceed accordingly.

2) National Economic and Social development Act issued on August 14th 1978 The rationale for the issuing of this Act was: there is a need to revise the law on the National Committee of Economic Development in order to move forward with the economic and social development of the country. In this Act, it has specified the definition of the economic and social development project, development of planning and state enterprise, etc. Moreover, it has specified the composition of the National Economic and Social development Committee, and the responsibilities of the Committee members and the Committee's.

3) Legal Act and Related Law

The Operation of this Project must conform with Promotion and Conservation of National Environment Act (1992) including other related law and regulations:

- Ministry of Science and Technology Announcement on Types and Sizes of the Project and other activities under the State, the State Enterprise or Private Sector that requires EIA Report (24 August 1992)
- Ministry of Science and Technology Announcement on Criteria, Requirements and Guidelines on EIA Report Preparation (24 August 1992)

According to Act of Expressway or other similar systems with the nature of an expressway or mass rail transit system, the Expressway system has been included in the Announcement of Ministry of Science and Technology as mentioned above and it requires submission of EIA Report to Office of Policy and Planning of the Environment. The Report must include the component of the environment, the main impact, preventions and solutions measures of the environmental impact and monitoring measures of the impact during the construction period, and the operation period of the responsible organization, public or private. The Committee on Economic and Social Development has also specified the main topics of the presentation of the results of Report and Analysis focusing on the analysis of the impact on the environment, the community and the service users. The Report of the Study and the Analysis of the Project must be prepared according to Clause 2 Section 7 of Private Partnership Act 1992 which requires the submission of the Report for the Cabinet approval on Private Partnership and Operation in the State Enterprise.

4) Announcement of the National Economic and Social Development Committee on topics for presentation of the Study and Analysis Results of the Project, 13 January 1993.

In relevance to Section 6 of Private Partnership in the State Enterprise 1992, the National Economic and Social Development Committee has specified that the responsible Project operator who requests

private partnership in any project must conduct the Preliminary Study and Analysis on the following topics:

- (1) The Conformity of the Project
 - (2) The Feasibility of the Project
 - (3) The Impact from the Project
 - (4) The Role of Private Sector
- 5) Other Law and Regulations Related to the Project Development

As this Project Development will concern architectural work, civil engineering and structural engineering work, the operations mentioned earlier must act complying with the rules and regulations under the Law such as:

- (1) City Planning Act (1975)
- (2) Building Control Act (1979)

Besides, the procedures must follow all rules and regulations later revised and any regulations of Bangkok Metropolitan Administration (1982) issued on 22 July 1982.

- 6) Assets Expropriation Act (1987)

From the Study and Analysis of the Project, it was found that some land expropriation is needed and that must be in accordance with Assets Expropriation Act (1987) and any other revised rules and regulations. Moreover, the procedures must be legally bound under “Assets Expropriation Act (1987) which comprises of 4 sections:

- Section 1 Assets Expropriation
- Section 2 Compensations
- Section 3 Assets Expropriation
- Section 4 Miscellaneous

The rationale in the Enactment of Assets Expropriation Act (1987) is that most Assets Expropriation Law has been used for a long time and some of the regulations have become obsolete and thus need revision to facilitate expropriation of assets more efficiently and fairly.