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Ministry of Transport
Vietnam Expressway Corporation

Final Updated Environmental Impact Assessment Report

DA NANG – QUANG NGAI EXPRESSWAY PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT

July 2013

Public Disclosure Authorized

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Abbreviations

AIDS	:	Acquired Immune Deficiency Syndrome
AP	:	Affected Person
B/D	:	Basic Design
BP	:	Beginning Point
BR	:	Bridge
CARB	:	Compensation, Assistance and Resettlement Boards
CB	:	Culvert Box
COR	:	Core Team
CP	:	Culvert Pipe
CPC	:	City People's Committee
CPCSR	:	Comprehensive Plan on Compensation, Support and Resettlement
C/S	:	Construction Supervision
CSC	:	Construction Supervision Consultant
DARD	:	Department of Agriculture and Rural Development
DC	:	Design Consultant
D/D	:	Detailed Engineering Design
DEG	:	Design Group
DMS	:	Detailed Measurement Survey
DOC	:	Document
DOFPP	:	Department of Fire Prevention and Protection
DOLA	:	Department of Land Administration
DONRE	:	Department of Natural Resources and Environment
DOT	:	Department of Transport
DOTP	:	Department of Traffic Office
DP	:	Displaced Person
DPC	:	District People's Committee
DRC	:	District Resettlement Committee
ED	:	Evaluation Department
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
ENV	:	Environmental Team
EOO	:	Expressway Operation Office
EP	:	Ending Point
ER	:	Existing Road
ESCRD	:	Environmental and Social Considerations Review Division
ETC	:	Electric Toll Collection
EVN	:	Electricity of Vietnam
FIDIC	:	International Federation of Consulting Engineers
FO	:	Flyover
F/S	:	Feasibility Study
GOVN	:	Government of Vietnam
GPS	:	Global Positioning System
HIV	:	Human Immunodeficiency Virus
IC	:	Interchange
ICB	:	International Competitive Bidding
ICD	:	Interchange Design
ICR	:	Inception Report
IDA	:	International Development Association
IMO	:	Independent Monitoring Organization
IOL	:	Inventory of Losses
I/P	:	Implementation Program

ITR	:	Interim Report
ITS	:	Intelligent Transport Systems
JBIC	:	Japan Bank for International Cooperation
JETRO	:	Japan External Trade Organization
JICA	:	Japan International Cooperation Agency
JV	:	Joint Venture
L/A	:	Loan Agreement
MEX	:	Metropolitan Expressway Co., Ltd., Japan
MLIT	:	Ministry of Land, Infrastructure, Transport and Tourism, Japan
MLS	:	Material Source Survey
MOF	:	Ministry of Finance
MOND	:	Ministry of National Defense
MONRE	:	Ministry of Natural Resources and Environment
MOPS	:	Ministry of Public Security
MOT	:	Ministry of Transport
NE	:	Nippon Engineering Consultants Co., Ltd., Japan
NEXCO	:	Nippon Expressway Company Limited, Japan
NH	:	National Highway
NK	:	Nippon Koei Co., Ltd., Japan
NTP	:	Notice to Proceed
OAM	:	Operation and Maintenance
OED	:	Operations Evaluation Department
O&M	:	Operation and Maintenance
OMI	:	Operation and Intelligent Transport Systems Team
OP	:	Overpass
ORB	:	Other River Bridge
ORSE	:	Organization for Road System Enhancement, Japan
PA	:	Parking Area
PAP	:	Project Affected People
PC	:	People's Committee
PCR	:	Project Completion Report
PIARC	:	Permanent International Association of Road Congresses
PIS	:	Project Implementation Support for Vietnam Expressway Corporation
PKG	:	Package
PM	:	Prime Minister
PM	:	Post Meridiem
PMBOK	:	Project Management Body of Knowledge
PMU	:	Project Management Unit
PPC	:	Provincial People's Committee
P/Q	:	Pre-qualification
PSMD	:	Project Site Management Department
PTC2	:	Power Transmission Company No. 2
PVD	:	Pavement Design
QACU	:	Quality Assurance and Compliance Unit
QA/QC	:	Quality Assurance and Quality Control
RAP	:	Resettlement Action Plan
RB	:	River Bridge
RC	:	Resettlement Committee
RCS	:	Replacement Cost Survey
RD	:	Roadway
RDD	:	Road Design
RES	:	Resettlement
RFP	:	Request for Proposals
RMP	:	Resettlement Monitoring Plan

RNIP	:	Road Network Improvement Program
ROW	:	Right of Way
RP	:	Resettlement Plan
RRD	:	Revetment and River Bed Protection Design
SAE	:	Social and Environmental
SB	:	Stream Bridge
SED	:	Section Design
SES	:	Socio-economic Survey
SG	:	Soft ground
SPG	:	Supporting Group
SPT	:	Standard Penetration Test
T/A	:	Technical Assistance
TB	:	Toll Barrier
TEC	:	Thai Engineering Consultants Co., Ltd., Thailand
TEDI	:	Transport Engineering Design Incorporated
TFD	:	Bridge Temporary Facility Design
TG	:	Toll Gate
TMC	:	Traffic Management Center
TOR	:	Terms of Reference
TPO	:	Toll Plaza Office
TRG	:	Training Team
USD	:	United States Dollars
VAT	:	Value Added Tax
VEC	:	Vietnam Expressway Corporation
VD	:	Viaduct
VICS	:	Vehicle Information and Communication System
VIETTEL	:	Vietnam Military Electronic and Telecommunications Corporation
VND	:	Vietnamese Dong
WB	:	The World Bank
WT	:	Waterway

A. Executive Summary

The Da Nang - Quang Ngai Expressway Project (DQEP) is planned to start from the intersection with National Highway 14B in Tuy Loan Town (Hoa Nhon Commune, Hoa Vang District, Da Nang City), and end at the connecting point with the planned City Ring Road at existing National Highway 1A in the West of Quang Ngai City. The Expressway is planned to pass through territories of Da Nang City, Quang Nam Province, and Quang Ngai Province.

The total extension of the Expressway is about 131.5 km, and the extension of the new road linking the Expressway with NH1A is 8.02 km. There are four large bridges crossing Thu Bon River, Ba Ren River, Tra Bong River, and Tra Khuc River, a tunnel passing the Ngang Mountain.

The DQEP is designed to meet the standard for a 6-lane expressway (4 lanes will be built in the first stage) with travel speed of 120 km/h. The road has access restricted at the interchanges.

The alignment was carefully planned with attempt to avoid as much as possible affects to urban areas, industrial zones, cultivated lands, irrigational dams, military areas, high voltage electric poles, etc.

EIA Study during D/D Stage

EIA Report for the Project was approved by Ministry of Natural Resources and Environment (MONRE) by the Decision No. 2378/QD-BTNMT dated November 12, 2008. And a supplementary EIA Report was approved by MONRE by Decision No. 2046/QD-BTNMT dated October 29, 2010. However, during the D/D stage, a supplementary EIA study was carried out with aim to: (a) Evaluation of the adequacy/shortcomings in the choice of the alignment, and whether the alternatives and the alignment were evaluated and selected with adequate detailed engineering design, appropriate scale topographical maps and other information; (b) Assessment of the best way to finalize the comparative options for selecting the remaining short segments of the alignment, the adequacy of the proposed mitigation measures, and how best to incorporate the mitigation measures in the EA reports, the engineering design and the contract documents; (c) Review of the TOR for updating EIA Report and EMP, and in case of necessity, present proposals on the modifications of the TOR and resources allocated to remediate/modify the above deficiencies and how best to proceed with updating the final EAs.

This Updated EIA Report and the associated Updated Environmental Management Plan were prepared to summarize results of the supplementary EIA study carried out in D/D stage.

Dissemination of Information and Public Consultation

The Da Nang – Quang Ngai Expressway is planned to pass through more than 40 communes in 13 districts of Da Nang City, Quang Nam Province, and Quang Ngai

Province. During the D/D stage, public consultation meetings had been organized in all project-affected communes. Participants to these meetings were local stakeholders including: PAPs, leaders of the hamlets/communities, representatives of mass organizations, NGOs, etc. During these meetings, PAPs had raised many questions, opinions, and comments on the issues such as: compensation price, resettlement, living condition and livelihood, impacts caused by construction works, etc. Information collected during these public consultation meetings had been summarized and reported to the road/bridge design teams, PMUs, VEC, and other relevant authorities for considering during the project planning and design process (Chapter 6).

And in order to diffuse information on the Project to local people, the followings materials have been prepared and distributed to the local authorities and PAPs during public consultation: (1) a Project Brochure describes outlines of the Project, major impacts on natural environment, local communities, and recommended mitigation measures, land acquisition policies, compensation and support policies, resettlement policies, etc.; (2) a Project Booklet (A4 size, 24 pages, 7,000 copies, distributing widely to local people in the Project area) consists of the following information: outlines of the Project, tentative implementation schedule, technical specification and major structures, Environmental Management Plan, legal framework for compensation, support, and resettlement, resettlement site arrangement, livelihood restoration program, special supports to vulnerable people affected by the Project, tentative schedule for implementation of compensation, support, resettlement, opinions and complaints receiving and redressing mechanism, contact addresses of concerned agencies/entities.

Alternative Analysis

Several alignment alternatives for the Da Nang – Quang Ngai Expressway had been examined, reviewed and modified in the past.

In macro-level planning (2003~2009), two alignment alternatives were examined in the F/S in 2005, and the alignment alternative which runs through the low plain areas was considered as the optimum alternative. This selection is considered reasonable due to its geometric aspect, avoidance of cutting and digging of the rocky mountains, avoidance of impacts to military areas, etc. The alignment planning at this macro level had taken into consideration the following three major control points: (a) Ho Nuoc Mountain (km27-km29), (b) Phu Ninh Lake and Hon Ro Mountain (km70-km75), and (c) Hang Ba Mountain, Ga Cao Mountain, Son Tra Mountain (km93-km100). Avoidance of these three control points is considered indispensable for all alignment alternatives. Although the alignment planning was done based on topographic maps with scale of 1/50000 and 1/25000, the planning process is considered valid at macro level before F/S 2010.

In micro-level planning (2010 ~ present time), with the use of topographic maps in scale of 1/1000, various design controls (schools, temples, graves, memorial monuments, etc. which could not be identified on 1/25000 topographic maps or satellite images) have been identified. Site investigations were also carried out to confirm these design controls, and several sections of alignment were modified. As a result, affect to about 17 environmentally-sensitive spots/structures were avoided (Table 2-8). In addition, supplementary topographic survey (with survey range extended to 250 meters from each side of the proposed alignment) had been carried out at 24 specified populous residential areas located along the alignment (Table 2.9). Intensive field surveys had been carried at these populous residential areas to assess the validities of the proposed alignment. Based on result of these surveys, it came to conclude that the proposed alignment is likely the optimum alignment for the Project.

Major Environmental Impacts

Major adverse impacts during pre-construction phase, or construction phase, or operation phase of the Project are described in Chapter 4 (Anticipated Environmental Impacts), and are summarized as shown in the following table. Mitigation measures for impacts of land acquisition, resettlement, living and livelihood of affected people are described in the Updated Resettlement Action Plans. Measures to avoid/minimize other impacts are described in Chapter 5 (Impact Mitigation Measures) and are summarized as followings.

Impacts on Ambient Air Quality

Construction phase: the major air pollution sources during construction phase are (1) flying dust produced from mixing lime and soil, (2) material stock grounds, (3) leakage/spillover of materials/spoils during transportation, (4) dust from temporary roads and unpaved road surfaces, the construction site, unpaved road, material stockpile sites, and access roads, (5) exhausted gas from the construction equipment. Recommended measures to mitigate impacts on ambient air in construction phase are described in Section 5.2.1, and the Updated EMP.

Operation phase: according to result of the Simulation of Air Pollutants Diffusion (Minutes of Discussions on the North-South Expressway Construction Project between JICA and the GOV, October 21, 2010), the predicted concentrations of CO, SO_2 and TSP satisfy the Vietnamese standard. The maximum predicted concentration of NO_x at 20m from the centerline is 353μg/m^3 and it exceeds the Vietnamese standard (200μg/m^3: QCVN05:2009). However, most international standards including Japanese standard and WHO standard (200μg/m^3) are set for NO_2. Considering the ratio of NO_x to NO_2 (less than 50% of NO_x is NO_2), the predicted concentration of NO_2 satisfies the international standards. Therefore, impact caused by the Expressway on ambient air quality in the short and medium term is assessed insignificant. However, with increased traffic flow expected in the long term, NO_2 concentration may exceed the standard in the areas near the Expressway. Ordinary mitigation measures such as tree planting and adoption of cleaner technology and fuel shall be considered (Section 5.3.2).

Environmental Impacts	Evaluation			Remark
	Pre-construction phase	Construction phase	Operation phase	(Cause of impacts)
Pollution				
Air pollution	-	A	B	- Exhaust gases and dust from construction equipment - Exhaust gases and dust form vehicles bringing construction materials and excavated soil - Exhaust gases and dust from vehicles using the expressway (operation phase)
Surface water pollution	-	A	B	- Contamination/toxic materials from construction sites/camps - Polluted runoff water from road surface, leakage of toxic materials caused by traffic accident, etc. (operation phase) - Waste water from the management centers, service areas, parking areas, toll offices, etc. (operation phase)
Spoil, waste	-	A	B	- Transportation and disposal of spoils/construction wastes generated from the demolition of structures, and construction of road, tunnel, bridges, etc. - Solid wastes generated from construction yards/sites, worker camps, etc. - Solid wastes generated from service areas, parking areas, etc. (operation phase)
Noise	-	A	A	- Noise generated by construction equipment - Noise from vehicles bringing construction materials and spoils - Noise generated by vehicles using the expressway in operation phase
Natural Environment				
Hydrological situation	-	A	A	-River flows in the project area may be affected by the road embankment, especially in case of flood
Topography and soil erosion	-	A	C	- Excavation works or banking of soil
Social Environment				
Land acquisition and resettlement	A	C	-	-Large area of land would be acquired to make land for road, service areas, parking areas, etc.
Living and livelihood (including economic activities)	A	A	B	- Loss of residential land/cultivated land, - Interruption of production, interruption of schooling, - Relocation of houses/graves, relocation of public utilities, - Split of land, split of community, etc.
Heritage, Cultural / Archaeological Properties	-	A	O	- There is no any heritage existing in the project sites - Champa ruins (in Duy Trinh Commune, Km22+000) may be encroached
Traffic (congestion and accident) and public facility	-	A	B	- Vehicles involving in construction works may cause traffic congestion and accident on the access roads - Increased traffic volume on linking roads may cause more traffic congestion and accident on these roads (operation phase)
Split of community	-	A	A	- Split of land/ community, communication impendence, etc. (in construction phase and operation phase)
Hazard	-	A	A	- Damage of flood may be more severe due to the highly-embarked road - Accidents involving trucks transporting hazardous materials on the bridges may pollute the river water

Note *A: serious negative impact is expected*
B: negative impact is expected to some extent
C: limited impact / negligible impact
O: To be assessed together with other items

Impacts on Surface Water

Construction phase: Watercourses along the planned Expressway may be polluted by : (1) wastewater from the construction of bridge foundation, (2) soil erosion/flush away from uncovered stockpiling sites, uncovered excavation site, unprotected slope surfaces, etc. (3) wastewater from construction equipment, worker camps, etc. The construction of a large number of bridges, drainage culverts, roads, etc. will cause strong turmoil of bottom sediment and pollution at the rivers, construction sites, especially downstream of the four large bridges over the Thu Bon, Ba Ren, Tra Bong, and Tra Khuc Rivers. Measures to mitigate impact on water quality of these four rivers should be duly implemented (Section 5.2.2).However, impacts on surface water will occur during a short time, and can be minimized by implementing measures stated in the Updated EMP.

Operation phase: The watercourses along the Expressway may be polluted mainly by: (1) runoff from the bridge surface, (2) wastewater from the auxiliary facilities along the Expressway (traffic management centers, expressway operation offices, parking areas, service areas, toll offices, etc.), (3) hazardous materials leaked from the trucks transporting these materials when there occurs accident involving these trucks on the bridges.

Occurrence of traffic accident involving the trucks hauling hazardous materials on the bridges over the rivers of Thu Bon, Ba Ren, Tam Ky, Tra Bong, and Tra Khuc would cause spillage of hazardous materials to the river, and pollute water being supplied to the urban areas and agricultural lands in the river downstream. To mitigate this impact, the bridges over these rivers are specially designed with two tanks installed at two ends of the bridge to temporarily collect the spilled hazardous materials when accident happens. However, to prevent the hazardous materials flushing into the river from these tanks during raining day, it suggests that a monitoring and quick-response system should be installed at these large bridges. In short term, each of these bridges should be regularly guarded by one or two staff of the Expressway Management Company. When accident occurs, these staff would promptly take proper actions to prevent hazardous materials flushing into the river. In long term, these bridges would be guarded by the remote-control monitoring and response systems to enable quick response to accidents occurred on the bridge.

Impacts of Spoil, Waste

Construction phase: Construction of roads, bridges, tunnel, etc. will generate a large quantity of excavated waste soils, construction/demolition wastes, etc. It is estimated that about 3.4 million m^3 of excavated soil would be generated from the road foundation construction work (removal of the upper soil 0.5m from the existing land surface), of which 2.2 million m^3 may be reused in filling the low areas along the Expressway or filling the opened areas around the interchanges, or utilized by the third parties. The estimated volume of waste soils remaining after being reused is about 1.2 million m^3. These waste soils would cause significant impact on ambient air quality and surface water quality, if without proper mitigation measures.

During the D/D Study, attempts were made to maximize the reuse of waste soils in filling the areas within the land acquisition demarcation lines (GPMB lines) along both sides of the Expressway where tree planting is possible to mitigate impacts of air pollution and noise. And the interchanges were designed so as waste soils can be used to fill the areas around the interchanges for tree planting and grassing.

The D/D Study Team had also carried out a survey on the candidate sites for disposing residual waste soils. The selection and use of these sites were agreed upon by the relevant commune PCs and district PCs. And measures to prevent/mitigate impacts caused by the stockpiling, reuse, transportation, and disposal of these waste soils are recommended (Section 5.2.13).

Operation phase: Domestic wastes and office wastes generated from the traffic management centers, parking areas, service areas, etc. should be properly collected, transported, and disposed by licensed companies.

Impacts on Acoustic Environment

Construction phase: Major noise sources during construction phase are construction machineries and transportation vehicles. Although efforts had been paid during the alignment planning to avoid causing impact to schools, hospitals, religious establishments, etc. the following schools and pagoda would be affected by excessive noise during construction phase: (1) Ngo Quyen Primary School (km 13+900), (2) Nghia Dien 2 Primary School (km131+900), (3) Nghia Trung Secondary School (km137+180), and (4) Duc Long Pagoda (km137+400). Measures to mitigate impact of noise to these establishments and other residential areas located near the construction sites are described in Section 5.3.4.

Operation phase: During operation phase, noise and vibration are generated mostly by the moving vehicles. A number of populous residential areas and sensitive receptors along the Expressway would be affected by noise generated by the traffic flow on the Expressway. Recommended mitigation measures include: engineering measures, management measures, and planning requirements.

In short term, tree planning (in the open areas within the Expressway's ROW, at the sections near by residential areas) is the most recommendable measure. And the use or horn should be prohibited at the sections of the Expressway near the noise sensitive receptors.

In long term, noise shall be regularly monitored, and based on the monitoring result and local people's requests, the need to implement other measures to mitigate impact of noise, such as relocation of residents/structures, installation of noise barrier, etc. would be examined (Section 5.3.4).

Impacts on Hydrological Situation

The planned Expressway will cross over 5 large rivers namely: Vu Gia, Thu Bon, Tam Ky, Tra Bong, and Tra Khuc (Figure 4.1) and more than one hundred small rivers, channels, etc. Many parts of the Project area are prone to flood every year. During flood season, the Expressway with its high embankment may work as a dyke that hinders the flow of flood water. This issue had been carefully examined during the project planning. Accordingly, based on the inundation analysis and consultation with local people, the alignment of the

Expressway, its vertical clearance, and its structures (such as bridges, viaduct sections, culverts, underpasses, etc.) had been carefully planned and designed so as impact of flood is mitigated as much as possible (Section 5.3.1).

Impacts to Heritage, Cultural/Archaeological Properties

The planned Expressway (section from km 21+800 to km 22+150) will pass through the western part of a Champa ruin in Trien Tranh Mound, Chiem Son Tay Valley (Duy Trinh Commune, Duy Xuyen District, Quang Nam Province). A part of this ruin has been recognized and ranked as provincial-level archaeological site of Quang Nam Province. According to result of the site observation, it suggests that there may be a collapsed Champa tower here, and the tower foundation might still be buried deeply in the ground *("Report on Results of Archaeological Investigation Stage 1 Along the Highway Route of Da Nang – Quang Ngai", The Institute of Archaeology, Hanoi, May 2010)*. Measures to avoid/mitigate impact of the Expressway to this ruin should be carefully examined before and during construction phase (Section 5.2.8).

Impacts of Land Acquisition, Compensation, and Resettlement

It is anticipated that more than 961 ha of land would be permanently acquired, more than 6,000 households would be affected by loss of land, and more than 4,000 households would have to move to other places. Replacement cost survey, detailed measurement survey, supplemental socio-economic survey have been carried out during the D/D Study, and the Updated Resettlement Action Plans which includes measures to mitigate impacts of land acquisition, resettlement, etc., have been prepared mainly for each district affected by the Project.

Traffic congestion and traffic accident during construction phase

Due to the operation of construction vehicles/machineries on local roads, and the temporary blockages of local roads for construction works, etc. –traffic congestion and traffic accident would increase on some local roads around the populous residential areas, industrial zones, interchanges with NH14B, NH14E, PR605, PR609, PR610, PR616, PR617, PR623, PR625, PR624, District Road 59, District Road 55, etc. Plan of operation of vehicles/machineries involving in the construction works, road safety awareness program, etc. shall be carefully prepared and duly implemented, and guardrails, fences, notice boards, traffic signs, lighting systems, etc. should be properly used around the construction sites (Section 5.2.9).

Impacts to local business

About 30 stores/business entities located at the road sides of PR623B (km 128+610) would be relocated for the project implementation. In addition, business entities located along the temporary entrance access roads (Table 4.9) would also be affected by noise, air pollution, vibration, etc. caused by the construction vehicles/machineries. Supports to these business entities shall be particularly considered through the preparation and implementation of the livelihood restoration plans.

Impacts on public health and public order

Health and well-being of local communities may be affected by unhygienic condition around the worker camps, construction sites, and by the influx of workers from outside, the increase of risk of transmission of HIV/AIDS and other sexual transmitted diseases, etc. Measures to mitigate these impacts are described in Section 5.2.11. An HIV/AIDS Prevention Program will be prepared and implemented with fund from WB loan for all packages of the Project.

Impacts of Split of Community

The alignment of the Expressway was planned so as impacts to populous residential areas are avoided as much as possible. However, in some sections, split of community is unavoidable (Section 4.4.5). Besides, in some sections, the Expressway will cause hindrance to local residents in accessing to their agricultural land, or market, or public facilities (such as school, community center, hospital, church, pagoda, etc.). In order to mitigate hindrance to local residents' movement, a number of side roads (collector roads) and viaduct sections, underpasses, overpasses are designed along the Expressway (Section 5.3.6).

In particular, about 126 households in Dien Quang Commune (km 16+500 ~ km 19+500) who are living in a narrow area between the existing railway and the planned Expressway would be difficult to access to outside areas, especially during flood. Impact mitigation measures for these households are described in Section 5.3.7.

In addition, students of Tinh Ha Primary School (km 124+100) would be difficult to access to the school, due to the appearance of the Quang Ngai North Interchange. Relocation of this school is considered as the optimum measure (Section 5.3.4).

Impacts of hazard (flood)

Many parts of the project area are prone to flood every year. During flood season, the Expressway would work as a dyke hindering the flow of flood water from the upstream of the river basins. Measures to mitigate impact of flood have been examined carefully during D/D Study. Based on result of the inundation analysis, and consultation with local people, elevated viaducts are designed instead of embankments at several sections of the Expressway where impact of flood is assessed serious. In addition, a number of drainage culverts are designed where necessary, with optimized opening to ensure the maximum flow of flood water. The list of drainage culverts with its technical specification is shown in the detailed design report of each package.

Impacts of Construction Materials Exploitation and Transportation

There are many borrow pits, sand pits, and quarries along the planned Expressway which have been examined as candidate sources of construction materials for the Project. These pits/quarries are mostly located near the planned Expressway. The farthest one is Cau Lau sand pit which is located 14 km from the planned Expressway. Only pit/quarry which has exploitation license (or legal environmental approval/commitment) was selected and listed up. Measures to prevent/ mitigate impacts caused by the transportation/stockpiling of construction materials are described in Section 5.2.16.

Temporary Entrance Access Road

According to the construction plan prepared during D/D, about 30 local roads are selected as candidate entrance access roads for transportation of construction materials, waste soils, etc. during construction phase (Section 4.3.14). Measures to mitigate impacts caused by the Project to natural environment and local communities along these roads are described in Section 5.2.14.

Environmental Management Plan (EMP) and Environmental Monitoring Program (EMoP)

The EMP for the DQEP was prepared in F/S and updated during D/D stage. The EMP addresses all issues identified in the EIA by: (i) organizing all measures to mitigate environmental impacts during the construction and operation; (ii) establishing an organizational structure, procedures, and institutional responsibilities for implementation; and (iii) identifying the monitoring requirements needed for the successful implementation of the suggested mitigation measures, and a budget and source of financing for each activity. The EMP contains guiding environmental principles and procedures for communication, reporting, training, monitoring and plan review, to which all staff, engineers, consultants, supervisors, Contractors, and sub-Contractors are required to comply with throughout the pre-construction, and construction phases of the Project.

Simultaneously, the EMP is the summary of commitments by the project owner presented in the EIA and the related implementation process. The EMP will enable VEC, the World Bank, and other relevant authorities in Da Nang City, Quang Nam and Quang Ngai Provinces to supervise the application of mitigation measures and compliance of commitments by the Civil Contractors.

B. Highlighting the changes

During the phase of feasibility study of the Da Nang - Quang Ngai Expressway Project, EIA Report for the Project was approved by Ministry of Natural Resources and Environment (MONRE) by the Decision No. 2378/QD-BTNMT dated November 12, 2008. And a supplementary EIA Report was approved by MONRE by Decision No. 2046/QD-BTNMT dated October 29, 2010. As stated in the above decisions of MONRE, **during implementation of the project if there are changes in content of the approved EIA Reports, the project owner must report** and undertake the changes only after obtaining the written approval of the Ministry of Natural Resources and Environment (MONRE).

The followings are highlighting the major changes between the EIA Reports of F/S stage and the Final Updated EIA Report prepared by the D/D team:

– Realignment;

– Mitigation of noise impact;

– Spoiled disposal sites;

– Material exploitation sites;

– Impact of flood;

– Impact to archaeological relics.

Realignment

In D/D stage, with the use of the 1/1000 topographic maps and detail site checking, various design controls (schools, temples, graves, memorial monuments, etc.) which could not be identified during F/S stage on 1/25000 topographic maps or satellite images have been found. Site investigations were also carried out to confirm these design controls, and modifications of several sections of alignment were examined between stakeholders.

The realignment of these modified sections will improve the technical and environmental conditions, and minimize the impacts which could not be avoided by the FS alignment. In particular, the modified alignments help to avoid impact to a number of have avoided schools, dams, archaeological sites, Martyr cemetery, cemeteries, and high-voltage electric poles...

The following table summarizes environmentally-sensitive spots/structures avoided by modifications of alignment in F/S 2010 and D/D.

Sensitive spots/structures avoided by modifications of alignment

<table>
<tr><th>No.</th><th>Location</th><th>Sensitive Spots/Structures</th><th>Avoided by F/S</th><th colspan="2">Avoided by D/D</th></tr>
<tr><td>1</td><td>Km0+800</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>2</td><td>Km1+100</td><td>Cemetery (More than 300 graves)</td><td></td><td>x</td><td></td></tr>
<tr><td>3</td><td>Km4+400</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>4</td><td>Km10+000</td><td>Bo Bo Mountaint</td><td>x</td><td></td><td></td></tr>
<tr><td>5</td><td>Km21+000 - Km23+000</td><td>Champa Ruins and cemetery (more than 300 graves)</td><td></td><td>x</td><td rowspan="5">Avoid encroachment to Go Gach Ruin, conservation area of Trien Tranh Ruin, Nguyen Thanh Han Secondary School.
Avoid direct affect to Tra Son Pagoda and Hoa Quang</td></tr>
<tr><td>6</td><td>Km24+180</td><td>Hoa Quang Pagoda</td><td>x</td><td></td></tr>
<tr><td>7</td><td>Km24+450</td><td>Nguyen Thanh Han Secondary School</td><td></td><td>x</td></tr>
<tr><td>8</td><td>Km24+840</td><td>Martyrs Cemetery</td><td></td><td>x</td></tr>
<tr><td>9</td><td>Km28+100</td><td>Cemetery (more than 3500 graves)</td><td></td><td>x</td></tr>
</table>

No.	Location	Sensitive Spots/Structures	Avoided by F/S	Avoided by D/D	
					Pagoda and cemetery.
10	Km34+200 Km35+000	Rocky Mountain		x	
11	Km44+500	Ngoc Kho River		x	Avoid bending Ngoc Kho River and Binh Chanh River
12	Km46+000	Binh Chanh River		x	
13	Km51+100	Temple		x	
14	Km60+650	500KV High Voltage Line	x		
15	Km66+000	10KV Electrical Substation	x		
16	Km67+186	500KV High Voltage Line	x		
17	Km67+900	500KV High Voltage Line	x		
18	Km69+000	10KV Electrical Substation	x		
19	Km71+000	500KV High Voltage Line	x		
20	Km77+000	Military Area	x		Confirm during D/D stage.
21	Km87+280	War Memorial		x	
22	Km91+230	500KV Electrical Substation		x	
23	Km92+480	500KV Electrical Substation		x	
24	Km94+000	Military Area	x		
25	Km94+000 - Km94+600	Ho May dam		x	
26	Km100+000 - Km100+400	Ham Rong dam		x	
27	Km100+220	110KV Electrical Substation		x	
28	Km100+880	110KV Electrical Substation		x	
29	Km101+025	110KV Electrical Substation		x	
30	Km103+245	500KV Electrical Substation		x	
31	Km103+635	500KV Electrical Substation		x	
32	Km106+000	Pagoda	x		
33	Km108+700	500KV High Voltage Line	x		
34	Km125+000	Pagoda	x		
35	Km130+000	35/15KV Electrical Substation	x		

Data source: D/D Study Team

Field reconnaissance survey had been carried out to confirm the environmental conditions of the areas around the modified sections. It is observed that natural environment conditions at the modified sections are almost similar (i.e. natural condition of the area along the D/D modified section is similar to that of the area along the before-modified section of F/S alignment). Therefore, there is no need to carry out additional survey on physical environmental quality at these modified sections.

In conclusion, the modification of alignment of the Expressway in D/D would lead to the avoidance/reduction of a number of impacts to local natural and social environment. The D/D modified alignment would not cause additional impact to natural and social environment comparing to the F/S alignment. The realignment of these modified sections will improve the technical and environmental conditions.

Mitigation of noise impact

During operation phase of the expressway, noise and vibration are generated mostly by traffic flow. During operation phase, to ensure the good quality of acoustic environment, mitigation measures including engineering measures, management measures and planning requirements should be implemented. During the F/S, the noise barrier was proposed to install in some locations and tree planning was proposed in other locations.

In short time, when the traffic volume is not so high, the noise impact is not serious. However, in long term period, when the traffic volume increases, the protection corridor of expressway would be extended to 50m from the road edge. The receptors, which located in the corridors, should be removed in the future.

During D/D stage, some sensitive receptors were avoided. There aren't any densely populated areas, which are sensitive with noise. However, in the Updated EIA Report, planting trees is proposed at the sections along the expressway within the ROW near the residential areas and other sensitive receptors. Installation of noise barrier is not proposed in early stage of operation phase. Post evaluation based on noise monitoring results at sensitive areas, and further consultations with the affected people during operation phase should be carried out to assess the necessity and the time when the noise barriers shall be installed. It is necessary to conduct the noise monitoring during operation phase. Reasonable mitigation measures will be developed based on result of noise monitoring and local resident's request. The measures would be as follows:

- Relocation of affected receptors: this measure is a most effectiveness method. However it is costly and lead to resettlement. The option is feasible if there is good cooperation with local authorities and local people. This method is recommended where the school or hospital is located near by the road, such as Tinh Ha primary school (Km124+100). After relocation the Tinh Ha School, the lands shall be used for another purpose, such as resettlement site.
- Installation of noise barrier: this measure is costly. This option is applied where a number of receptors densely located near the road. However, it is recommended that the noise barrier shall not be applied immediately after construction. Post-evaluation shall be carried out 3 years after construction and noise barriers shall be installed base

on result of post-evaluation.

- Tree planning: this option will not only help to protect the village from the noise impact but also clean the air, improve landscape and eco-system. This option shall be applied at all road sections near the populous areas. Trees shall be planted along the road section near the populated areas, and in the space between the ROW and the toe of talus. In order to effectively mitigate impact of noise, trees shall be planted in strip with its length covering the all populated area plus 100m more at both sides of the populated area.

In addition to the above mentioned measures, the use of horn shall be prohibited at the sensitive section of the road, and antiskid layer shall not be installed in the interchanges.

Spoiled disposal sites

It is estimated that about 3.4 million m^3 of excavated soil would be generated by the project, of which 2.2 million m^3 would be reused in filling the low areas along the expressway or filling the opened areas around interchanges, or utilized by the third parties. The estimated volume of waste soils remaining after being reused is about 1.2 million m^3. These residual soils should be properly disposed at the designated disposal sites.

The criteria for selecting the locations for soil deposit pits and spoil disposal sites including the requirement of the project, topographical and geological conditions, as well as the requirements for environmental protection and soil conservation were confirmed in the approved EIA report. However, the list of the sites wasn't included.

During the D/D Study, attempts were made to maximize the reuse of waste soils in filling the areas within the land acquisition demarcation lines (GPMB lines) along both sides of the expressway works where tree planting is possible to mitigate impacts of air pollution and noise. Reuse of waste soils was also taken into consideration in the design of the interchanges to use waste soils to fill the areas around the interchanges for tree planting and grassing.

As the updated work, the D/D Study Team had also carried out a survey on the potential sites for disposing residual waste soils. The selection and use of these sites were agreed by the relevant commune PCs. Details about these waste soil disposal sites are included in Chapter 4.

During the construction phase, the following requirements should be followed by the Contractor:

- The Contractor should be obligated to use the designated waste soil disposal sites for that purpose. If the Contractor intends to use the sites other than the designated ones, the Contractor must obtain approval from the Environmental Supervision Consultant and written agreements from the relevant local commune PCs and district PCs.
- The Contractor should negotiate and pay proper compensation to the user of the land to be used as waste soil disposal site.
- These sites should be adequately planned; the design (based on the 1/5,000 topographic map) should include a retaining wall with enough strength, slope

protection; drainage facility, and access road.

- For the waste soil disposal site near the river, the retaining wall should be built and the waste soil should be piled up from coarse soil in the bottom and fine soil to the top.
- For the site located near a creek or a ditch, structures such as pipe culvert, French drain, etc. should be used to prevent wash out of the spoil during rainstorm.
- Structures such as mortar rubble masonry pavement and grouted rubble toe protection form should be used to ensure the stability of the site.
- Drainage ditch will be built around the site.
- For the site near the residential area, transportation of waste soil at night should be prohibited, and the access road should be frequently watered on the dry days to control dust flying.

Material exploitation sites

The criteria for selecting the locations for material exploitation sites were confirmed in the approved EIA report. During the D/D Study, as the updated work, the D/D Study Team had also carried out a survey on the potential material exploitation sites to confirm the validity of these pits/quarries (i.e. quality of the materials, supply capacity, legal exploitation licenses, environmental protection commitments, etc.). The selection and use of these sites were agreed by the relevant commune PCs. Details about these material exploitation sites are in Chapter 4.

Besides, transportation of construction materials would be mainly by roads and partly by waterways. During transportation, these materials would be spilled out and cause pollution to the areas along the roads or the water courses.

Whenever transportation of materials is done on the existing roads, impact mitigation measures including the followings should be taken.

- Construction materials shall be supplied only from the quarries that being operated under a good environmental management.
- Earth, rock, sand shall not be deposited on public or private right of way as a result of Contractor’s operations, including any deposits arising from the movement of construction plant or vehicles.
- Provide water spray vehicles to water the unpaved ground, storage piles and other areas where airborne dust may originate. The water spray operation should be carried out in dry and windy day, at least twice a day (morning and afternoon).
- Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition. The tarpaulin shall be properly secured and shall extend at least 300 millimeters over the edges of the side and tailboards.

- Trucks transporting construction materials should meet allowable exhaust gas emission standards (stated in Decision 249/2005/QĐ-TTg on October 1, 2005), and should be carefully covered.
- Site for stockpiling soils and sand should be located far more than 120m from the populous residential areas.

In addition, to mitigate water pollution caused by transportation of materials by waterways, the following measures should be applied.

- Materials carriers should be equipped with surrounding wall barriers to avoid spillage of materials into the watercourses.
- Fine materials which are easily dispersed by wind should be well covered by sheets, etc. during transportation.
- Transportation of excessive large quantity of materials which overloads the capacity of the vessels should be forbidden.
- Use only vessels which are in compliance with standards for waterway transportation.

Impact of flood

During F/S stage, the inundation analysis covered all river systems has not carried out, therefore, flood inundation damage risk analysis has not carried out. During D/D stage, inundation analysis of the Vu Gia - Thu Bon, Tam Ky, Tra Bong, Tra Khuc river basins has carried out and appropriate technical solutions had been proposed to favor the criteria for reducing impacts of flood with reasonable costs. In addition, construction of an evacuation space is proposed at the area located at the sites of expressway to serve the people in Dien Quang commune, Dien Ban district, in emergency cases during flood. The detailed are as follows:

(i) Flood Inundation Damage Risk Analysis

The flood potential on the Danang – Quang Ngai expressway is quite high, especially sections of the Thu Bon and Vu Gia rivers (Km 0 – Km 20). Hydrological survey data indicates that the project runs through the flood areas in Thu Bon and Vu Gia Rivers, where 2 – 3 m floods often occur.

A detail flood study in particular for this road section has been done and the output/recommendations have been included in the engineering design of the expressway to assure an adequate flood release capacity by providing sufficient culverts, underpasses, and bridges along the expressway alignment. The rationale of the cross structures should secure sufficient drainage capacity during/after flood in order to reduce adverse effects to agricultural products. Required structure types and/or numbers of structures determined based on inundation analysis by hydro-mathematical models. Conditions of flood inundation such as water level, water depth and duration will be changed under with and without Project conditions. The following approach is taken to clarify the shifting of flooding conditions between with and without Project conditions.

Criteria for inundation damage risk were set up in consideration of inundation water depth and duration with reference to the "Assessment manual on economic loss by flood disasters" (MLIT Japan, 2005). Based on the simulation results and the MLIT criteria, inundation damage risk of with and without Project conditions along the expressway were estimated.

Provisional Criteria for Inundation Damage Risk

Inundation Depth	Duration of Inundation			
	0 - 1 day	1 - 2 days	2 - 3 days	More than 3 days
0.0 – 0.5m	Low	Low	Medium	Medium
0.5 – 1.0m	Low	Medium	Medium	Serious
1.0 – 2.0m	Medium	Medium	Serious	Serious
More than 2.0m	Serious	Serious	Serious	Serious

The typical damage risk will be shifting in major inundation sections from 1% flood without project scenario to 1% flood with project. The inundation analysis results shown that inundation damage risk increase and the risk becomes "Severe" at most flood prone sections of the expressway (considering 1.0 time, 1.5 times and 2.0 times of drainage openings). Incase, even we provide 2.0 times of drainage openings in the expressway, the risk still "Severe", therefore, sufficient drainage openings should be considered to not only mitigate inundation damage risk, but also appropriateness with actual condition. The inundation damage risks of 1% flood in cases of with the Project and without the Project are as follow.

Typical Damage Risk Shifting in Major Inundation Sections

No.	Section	Location	Damage risk shifting				
			1% flood, without Project		1% flood, with Project		
					1.0 time	1.5 times	2.0 times
I	KM01+000 - KM21+000	KM05+760	Medium	→	Serious	Medium	Medium
		KM14+520	Medium	→	Serious	Serious	Serious
		KM12+500	Serious	→	Serious	Serious	Serious
II	KM38+000 - KM40+000	KM38+880	Low	→	Medium	Low	Low
		KM38+300	Medium	→	Serious	Medium	Medium
		KM39+660	Serious	→	Serious	Serious	Serious
III	KM54+000 - KM59+000	KM54+720	Low	→	Medium	Low	Low
		KM58+240	Medium	→	Serious	Serious	Serious
		KM57+220	Serious	→	Serious	Serious	Serious

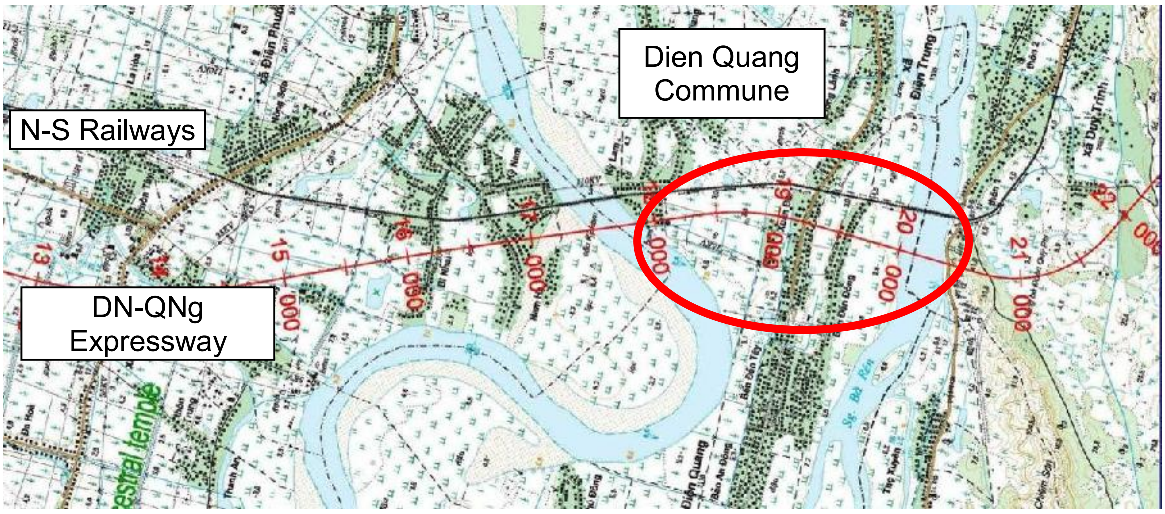
No.	Section	Location	Damage risk shifting				
			1% flood, without Project		1% flood, with Project		
					1.0 time	1.5 times	2.0 times
IV	KM62+000 - KM70+000	KM63+680	Low	→	Medium	Medium	Medium
		KM69+100	Medium	→	Serious	Serious	Serious
		KM63+000	Serious	→	Serious	Serious	Serious

The Expressway after being constructed would function as a dam in upstream of the railway. According to the inundation analysis, during D/D stage, bridges and culverts with opening larger than these ones proposed in F/S shall be provided at suitable sections of the Expressway in order to drain much more flood water towards downstream.

(ii) Solution for 126 household in Dien Quang Commune

There are 126 households in Dien Quang commune, Dien Ban district, Quang Nam province living outside of the Right-Of-Way (ROW) of the Project, and would not be directly affected by land acquisition due to the Project. These households would continue residing in a narrow and isolated area bounded by the Expressway, the railway, and the rivers. It would be more difficult for them to access to the western side of the Expressway. And damages by flood would be more severe.

Under such situation, in order to mitigate impacts caused by the Expressway to these households, during the public consultation meetings organized in Dien Quang Commune, people here strongly addressed expectations such as: (i) relocation of all households living in this area to the resettlement sites, (ii) construction of appropriately-long viaduct structure at this section, (iii) provision of open space for local residents to evacuate during flood.



Alignments of the Expressway and Railways near Dien Quang Commune

Relocation of affected residents in this area was considered as an option. However, it would cause significant secondary impacts such as resettlement, deterioration of living, loss of means of livelihood, etc. Therefore, in order to mitigate impacts of the Project to these people, the following 3 alternatives were examined during D/D: (1) provision of short viaducts as proposed in F/S, (2) provision of long viaducts and a high space for evacuation during flood, and (3) provision of long viaduct for the whole section.

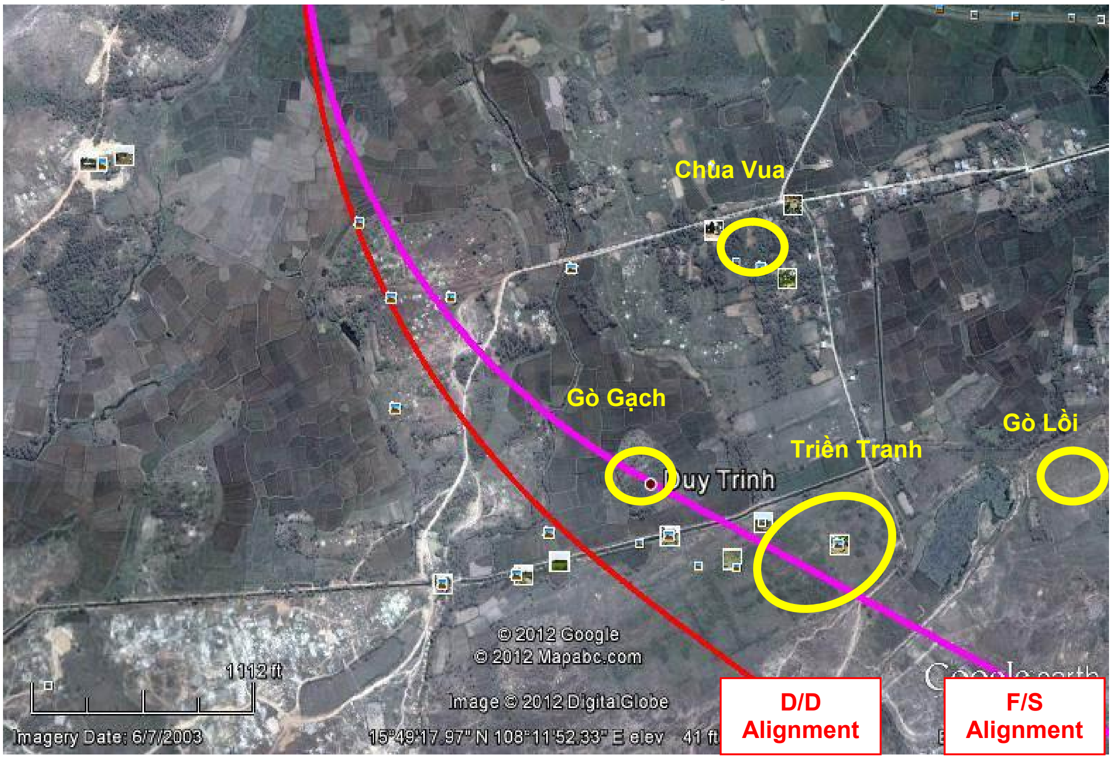
In Alternative 2, an evacuation space with surface area of about 1,000 m^2 is planned at the roadside of the Expressway bound to Da Nang. People can use this place as a shelter during heavy flood time, and can use ambulance cars or other transportation mean to go to Da Nang city in case of emergency. The evacuation space is considered very important for local residents during flood. Therefore, Alternative 2 is recommended as the optimum measure to mitigate impact of the Project to affected people in Dien Quang Commune.

Impact to Archaeological Relics

During F/S stage, an archaeological investigation was carried out by the Institute of Archaeology of the Vietnamese Academy of Social Sciences in 2010. According to this investigation, there is a group of Champa architectural ruins that may be affected directly or indirectly by the Project. These ruins are located in Chiem Son Tay Valley of Chiem Son Hamlet, Duy Trinh Commune, Duy Xuyen District, at section Km 21+800 - Km22+450 of the planned expressway (see figures below). These ruins (namely Go Gach, Go Loi, Trien Tranh and Chua Vua) have been recognized and ranked as provincial-level archaeological sites under the Decision No. 754/QĐ UB on March 13, 2006 of Quang Nam Province Committee. The ruins of Go Gach and Trien Tranh would be encroached seriously by the road alignment proposed in F/S.

However, in D/D, the alignment had been modified and consequently the encroachment to Go Gach Ruin is avoided. A part of the Trien Tranh hill remains to be encroached by the alignment proposed in D/D.

Location of Champa ruins, F/S and D/D alignments.



The Trien Tranh Ruin has preliminarily been studied by the Service for Culture, Sport and Tourism of Quang Nam and the Bureau of Culture of Duy Xuyen District. A considerable number of decorated bricks and big-sized stones with architectural sculpture signs, particularly one rectangular stone altar decorated with four elephants at four sides, have been collected.

During D/D, the proposed road alignment had been modified and it avoids direct impacts to Go Gach Ruin, Go Loi Ruin and the conservation area of Trien Tranh Ruin. The distance between the land acquisition line (ROW) and the conservation area of the Trien Tranh Ruin designated by Duy Xuyên district PC is about 70m.

No one can be sure that there is no archaeologically-valuable remain/artifact being buried under the area where will be encroached by the Expressway. Therefore, there is a risk of delay of construction work if such remain/artifact is unearthed by chance during construction.

During construction phase, some archaeologically-valuable artifacts or sites would be unearthed in chance. The excavation should be stopped until the authorized department identifies the relics.

In conclusion, there are several changes in the Project's planning which relating to environment. These changes will generally help to avoid or reduce the environmental impact of the Project. Some of the proposed changes will bring benefits to the local people as well as help to reduce the initial investment cost of the Project.

Introduction

The Da Nang – Quang Ngai expressway is of international importance to the Government of Vietnam. The recently developed East – West Economic Corridor, a 1,500 km corridor, connecting Da Nang with the Andaman Sea in Myanmar, through Laos and Thailand, promoted Da Nang's location as a gateway to the international market. The expressway development will stimulate the development of Da Nang as an exporting center. Construction of this expressway section is essential for the socio-economic development and growth of the central of Vietnam.

Background

The preparation of Pre-F/S for the Project under BOT scheme was approved by MOT in Decision No. 2654/QD-BGTVT dated September 11, 2000. The Pre-F/S report was prepared by PMU85 and approved by the Prime Minister in his letter No. 493/CP-CN dated April 21, 2003. Continually, the preparation of F/S was approved by MOT in Decision No. 134/QD-BGTVT dated January 14, 2004. The F/S report was also prepared by PMU85 and submitted to MOT in his letter No. 514/BQL-KHDA2 dated May 11, 2005. However, this BOT scheme Project did not materialize because of funding sources were not identified at that time.

Two (2) years later, the Project was approved as one (1) of the top priority projects in transport sector by GOVN in Decision No. 412/QD-TTg dated April 11, 2007. For carrying forward the Project, GOVN requested JETRO to assist a further study expecting materialization of the Project by a JBIC (currently JICA) loan scheme in June 2007. JETRO conducted the study and submitted the study report to MOT on April 28, 2008.

In parallel with the JETRO study, WB declared GOVN to be eligible for the IBRD loan in November, 2007 and the Project was identified as the top priority use for the loan. After submission of the JETRO study report, WB undertook the identification missions in April and June, 2008 and confirmed necessity of updating the JETRO study to meet his requirements and decided to allocate the fund from on-going RNIP (IDA Credit No.: 3843-VN) to conduct the WB supplemental study. The study report was prepared by PMU85 and submitted to MOT in his letter No. 551/BQl-KHDA2 dated June 13, 2009.

In response to the supplemental study, WB engaged an international consultant and undertook the WB appraisal study. In the appraisal study, WB modified the alignment at three (3) sections by taking into consideration social and environmental issues. Based on the modified alignment, TEDI updated the supplemental study and submitted as the draft F/S report to MOT in April, 2010. The draft F/S report was also finalized by TEDI in accordance with the MOT appraisal report No. 6188/BGTVT-KHDT dated September 8, 2010 and submitted by VEC as the F/S report to MOT in September 2010. The F/S report was approved by MOT in Decision No. 2656/QD-BGTVT dated September 10, 2010.

In parallel with the F/S approval, WB agreed to allocate the fund from RNIP for D/D and the Prime Minister allowed commencing the procurement of D/D consultant. Through the procurement procedures, NK-NE-Chodai-TEC JV (the Consultant) was selected and signed the contract with PMU85 on November 15, 2011. Subsequently, PMU85 issued NTP in his letter No. 1622/PMU85-PP2 dated November 18, 2011 and the consulting service was officially commenced from December 1, 2011. Outline of the Project background is shown in Figure Intro-1.

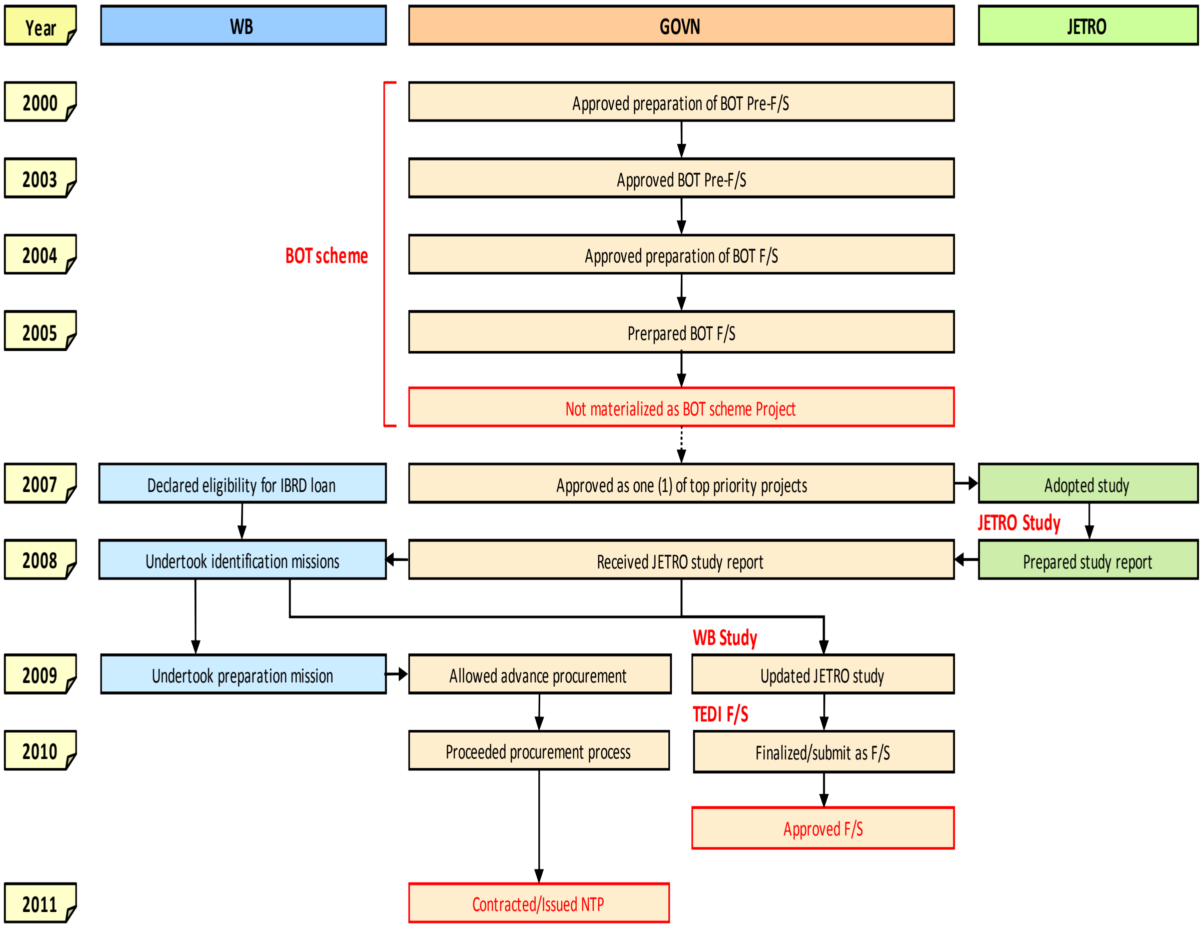


Figure Intro-1: Project Chronicle

Location

The expressway is a part of the North-South Expressway located in parallel with the existing NH1A and North-South Railway and passing through Da Nang city, Quang Nam and Quang Ngai provinces in the central region. The road starts at the intersection of the Da Nang Bypass and NH14B in Da Nang city and ends at the connecting point with the planned City Ring Road at existing NH1A in Quang Ngai province. The major socio-economic developments along the expressway are Chu Lai Open Economic Zone in Quang Nam province and Dung Quat Industrial Zone in Quang Ngai province. As for the cultural resources, Hoi An Ancient Town and My Son Sanctuary, registered as the world heritage (cultural heritage), are existed along the expressway.

The main objectives of the Project are to enhance travel efficiency and safety by constructing an expressway from Da Nang to Quang Ngai, contributing to economic growth in the central region, and build institutional capacity for expressway development in Vietnam's Ministry of Transport.

Project location map is shown in Figure Intro-2.

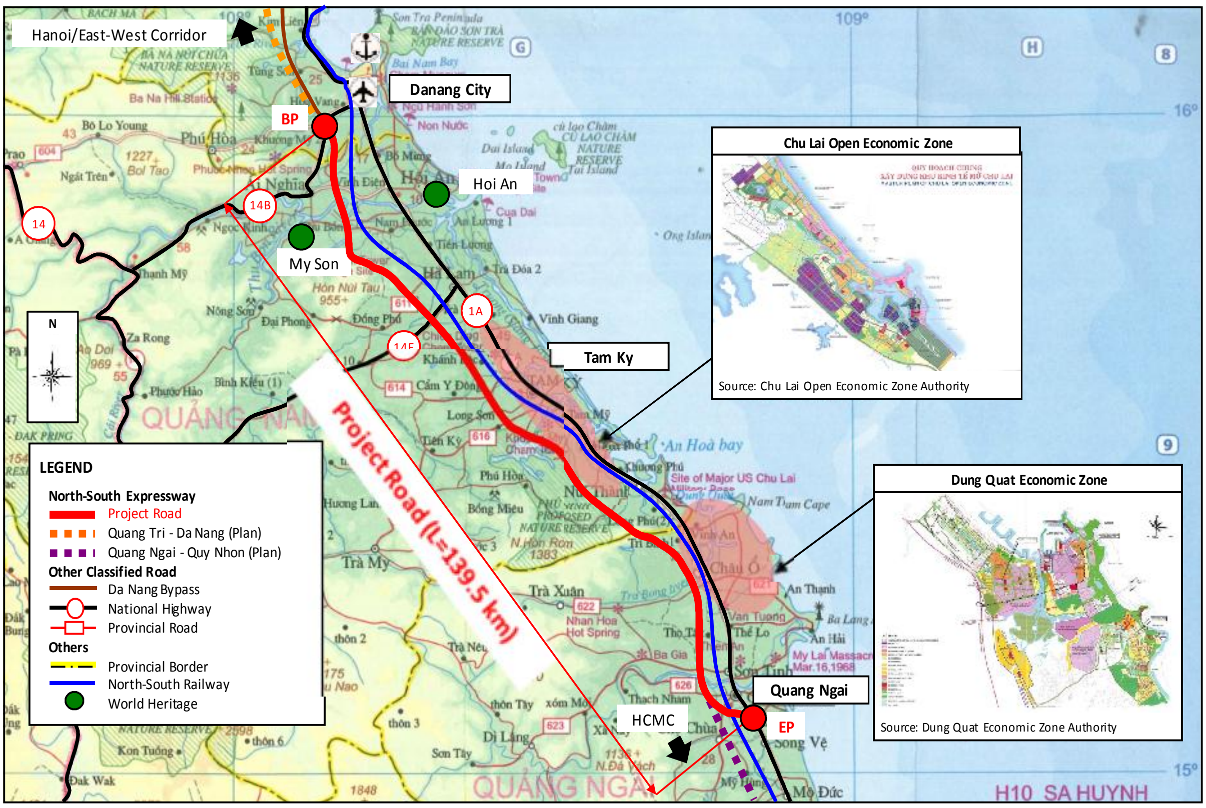


Figure Intro-2: Project Location Map

Environmental study

The original EIA report based on the JETRO study was prepared by PMU85, and approved by MONRE in Decision No. 2378/QD-BTNMT dated November 12, 2008. The supplemental EIA report based on the F/S alignment was also prepared by PMU85 and approved by MONRE in Decision No. 2046/QD-BTNMT dated October 29, 2010. Social and environmental assessment framework for the expressway is shown in Figure Intro-3.

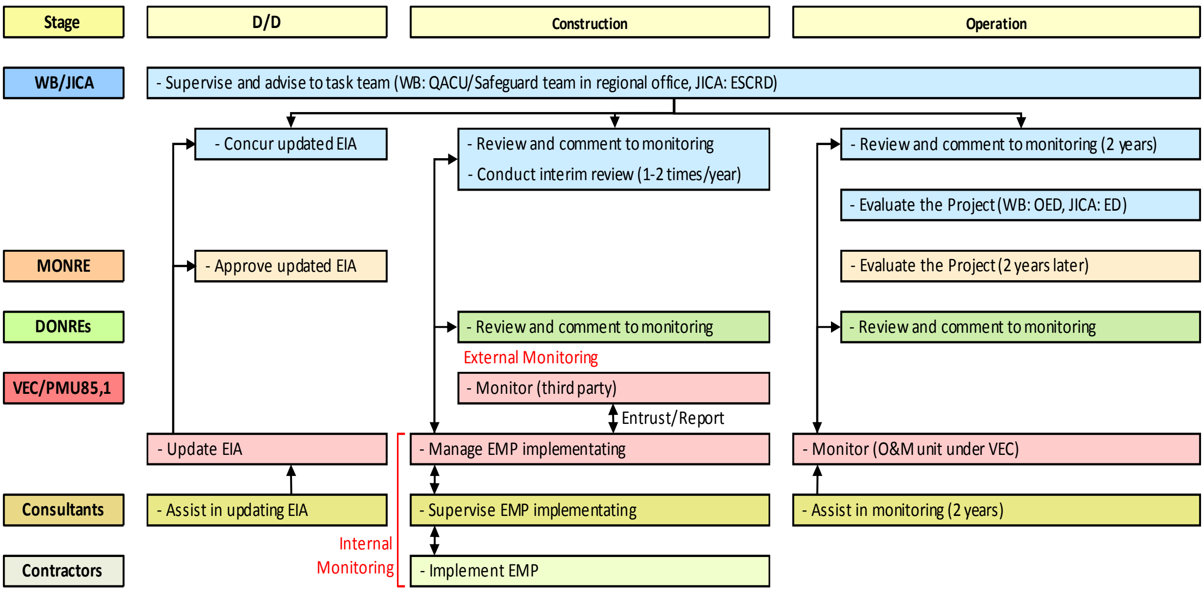


Figure Intro-3: Social and Environmental Assessment Framework for the Expressway

The project is categorized as “Category A” of WB requirement on safeguards. The following safeguard policies are triggered by the proposed project: Environmental Assessment (OP/BP 4.01), which is the primary requirement and thus the main focus of this EIA report; Physical Cultural Resources (OP/BP4.11); and Involuntary Resettlement (OP/BP 4.12). During the detailed design stage study, no other Bank’s safeguards policies have been found to be triggered.

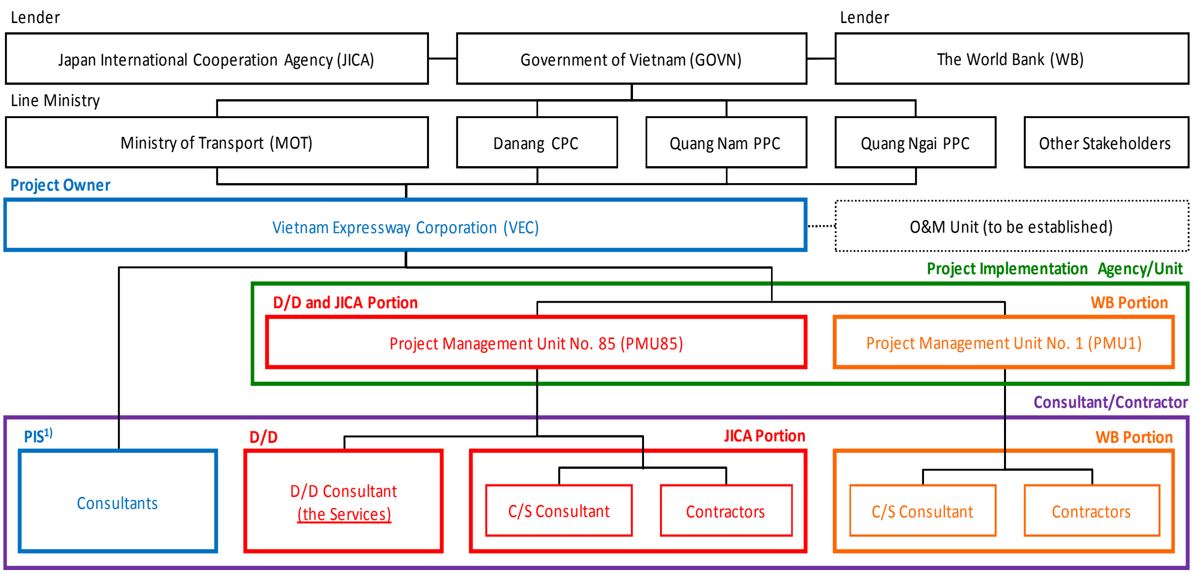
Since no project components will involve international waterways, dam construction, in disputed areas, indigenous people, forest or usage of pest control substances as defined in OP7.50, OP4.37, OP7.60, OP4.10, OP4.36 and OP4.09 respectively, policies related to these subjects are not applied in the EIA.

Regarding Natural Habitats (OP4.04, 2001), the project will not involve critical natural habitats as identified in OP4.04, Annex A. However, the project goes through some wildlife habitats, thus the general principle of this policy will be applied to the EIA.

Chapter 1 Description of the Project

The Da Nang – Quang Ngai expressway project is located in the central coastal region (Da Nang city, Quang Nam and Quang Ngai provinces).

MOT designated VEC as the Project Owner in Decision No. 220/QD-BGTVT dated January 22, 2010 and also appointed PMU85 as the Project Implementation Agency for the D/D stage in Decision No. 2149/QD-BGTVT dated September 19, 2011. As for the construction stage, MOT approved that PMU85 for JICA financed portion and PMU1 for WB financed portion are Project Implementation Agencies, by signing the principle contracts with VEC in Decision No. 2656/QD-BGTVT dated September 10, 2011. Project implementation structure is shown in Figure 1-1.



Note: 1) Project Implementation support for VEC

Figure 1-1 Project Implementation Structure

The Project consists of the following three (3) components as shown in Table 1-1.

Table 1-1 Three Project Components

No.	Component	Description
01	Component A Civil Works	Construction of four-lane dual carriageway road (with capacity for eventual widening to six lanes) and 131.5 km for expressway and 8.02 km for linking road
02	Component B ITS (Intelligent Transport Systems)	Provision of traffic management and toll collection facilities
03	Component C Expressway Operation and Maintenance (O&M)	Planning an institution to operate and maintain the expressway and identifying facilities and equipment that it will need.

Source: TOR

1.1 Main Features

Main features of expressway construction and O&M provision are shown in Table 1-2. This Table is made based on result of Basic Design.

Table 1-2 Main Features of the Project

No.	Items	Main Features	Ref. in TOR
01	Road Length	139.5 km By Road Class: Expressway section: 131.5 km, Linking road section: 8.02 km By Jurisdiction: Danang city: 8.0 km, Quang Nam province: 92.0 km, Quang Ngai province: 39.52 km Beginning Point (BP): Intersection of the existing Danang bypass and NH14B in Danang city Ending Point (EP): Connecting point with the planned city ring road at the existing NH1A (KM1063+700) in Quang Ngai province	Component A (TOR 1(1))
02	Road Classification	Expressway: Type A, Class 120, Linking Road: Class III, Delta	
03	Design Speed	Expressway: 120 km/hr (Tunnel section: 100 km/hr), Linking Road: 80 km/hr	
04	Nos. of Lane	4 lanes (Ultimate stage: Widened to 6 lanes)	
05	Road Width	Expressway: 25.5m (4 lanes) and 33.0m (6 lanes) Bridge sections: 25.5 m and 26.0m Tunnel section: 2x12.80m Linking Road: 12.0 m	
06	Design Hydrological Frequency	Expressway: 1 %, Linking Road: 4 %	
07	Major River Bridge	4 bridges (L=2,535.2 m in total) Ky Lam Bridge (L=1,028.8 m), Chiem Son Bridge (L=439.1 m), Tra Bong Bridge (L=438.5 m), Tra Khuc Bridge (L=728.8 m)	
08	Other Bridges	114 bridges (L=9702 m in total)	
09	Tunnel	1 tunnel (KM022+900, L=2@540 m)	
10	Culvert	833 culverts Culvert Box: 399 culvert boxes (138 roadway culverts and 261 waterway culverts), Culvert Pipe: 434 culvert pipes	
11	Soft ground	Approximately 3.6 km	

No.	Items	Main Features	Ref. in TOR
12	Interchange	9 interchanges	
13	Frontage Road	Approximately 38.8 km	
14	Electrical Facilities	Power supply, lighting, tunnel ventilation and safety facilities	Component B (TOR 1(2))
15	ITS	Traffic management, toll collection[3)] and communication systems	
17	O&M Building	Traffic Management Center (TMC), Expressway Operation Office (EOO), Toll Plaza Office (TPO), Toll Barrier (TB), Toll Gate (TG), Service Area (SA), Parking Area (PA).	Component C (TOR 1(3))
18	O&M Equipment	O&M vehicles, spare parts, maintenance equipment and consumables	

Source: Basic Design Report

1.2 Typical Cross section

Number of lanes on thruway during the initial stage is four and widening to six lanes is planned as ultimate stage according to Decision No. 2656/QD-BGTVT issued by MOT on 10 September 2010. In the F/S, nonstandard and exceptional values of cross section elements were proposed.

Through several times of discussion, cross sectional elements of the thruway, including the initial stage and the ultimate stage, were decided as shown in Table 1-3 and Figure 1-2.

Table 1-3 Total Width of Sections

Section	Total Width	Remarks
General (Initial Stage)	25.5m	Median 1.5m Marginal Strip (Inner) 0.75m@2 Travelled Way 3.75@4 Paved Shoulder 3.0@2 Earthen Shoulder 0.75@2
Bridge (PC-Box)	26.0m (Initial Stage)	Median 1.5m Marginal Strip (Inner) 0.75m@2 Travelled Way 3.75@4 Paved Shoulder 3.0@2 Parapet, Service Space 1.0@2
	26.0m (Ultimate Stage)	Median 1.5m Marginal Strip (Inner) 0.50m@2 Travelled Way 3.50@6 Marginal Strip (Outer) 0.50@2 Parapet, Service Space 0.75@2
Bridge (Other than PC-Box) (Initial Stage)	25.5m	Median 1.5m Marginal Strip (Inner) 0.75m@2 Travelled Way 3.75@4 Paved Shoulder 3.0@2 Parapet, Service Space 0.75@2

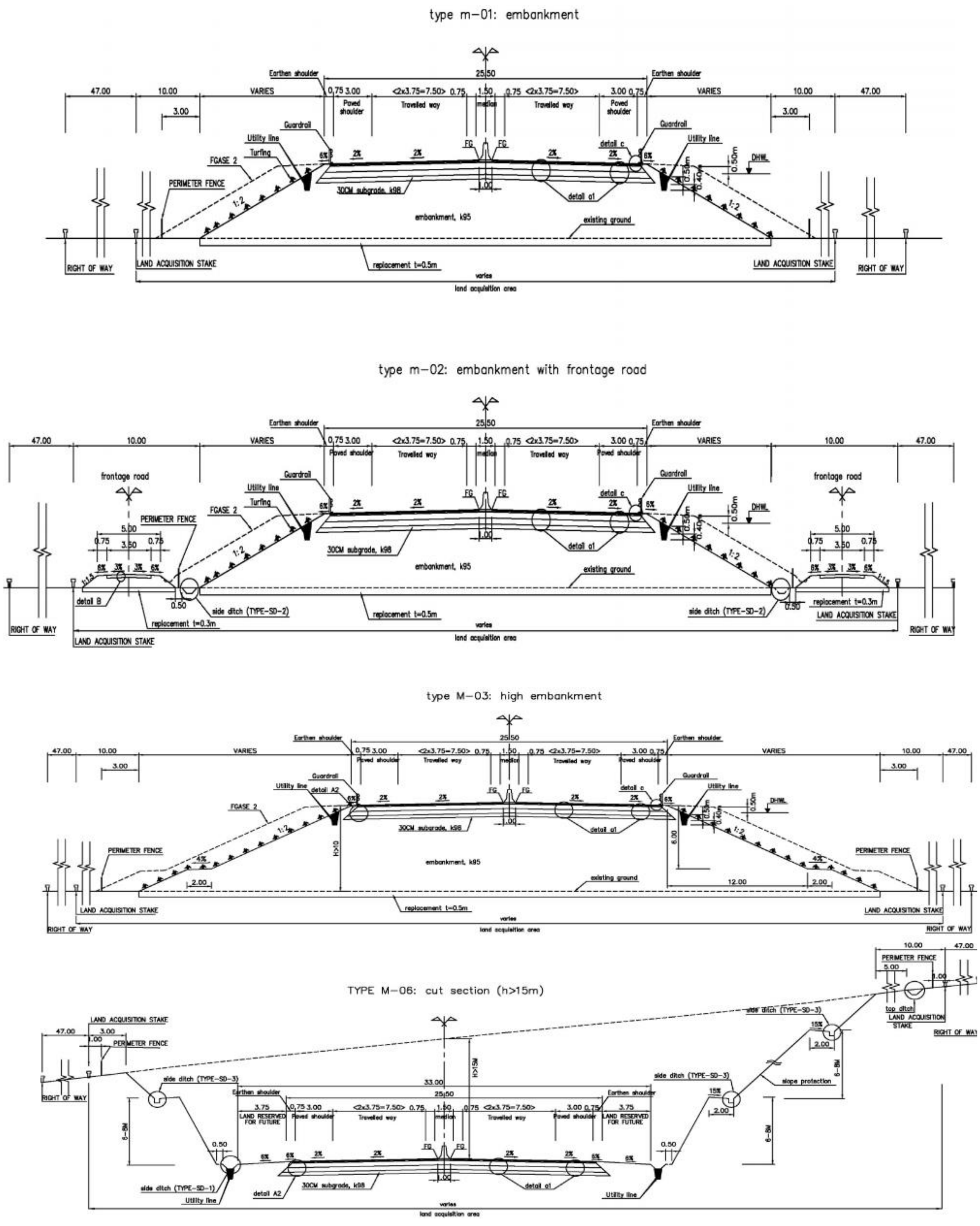


Figure 1-2 Typical Cross Sections of Expressway Mainline

1.3 Interchanges

Based on the results of the modification from F/S, collection and analysis of necessary materials, and site investigations to understand natural and social conditions of subjected interchanges on the basic design, basic design of the interchanges are carried out. List and location of nine subjected ICs are shown in Figure 1-3 and Table 1-4.

Table 1-4 List of Interchanges

No.	Interchange	Connecting Road			
		Name	Crossing Location on Expressway	Distance between IC(km)	Province
1	Tuy Loan IC	NH14B Da Nang BP	Km0+000		Da Nang City
2	My son IC	PR609	Km13+260	13.260	Quang Nam Province
3	Ha Lam IC	NH14E	Km40+880	27.62	ditto
4	Tam Ky IC	PR616	Km64+510	23.63	ditto
5	Chu Lai IC	Planning Road	Km82+990	18.48	ditto
6	Dung Quat IC	Planning Road	Km101+740	18.75	Quang Ngai Province
7	Binh Son IC	PR622	Km112+410	10.67	ditto
8	Quang Ngai North IC	PR623	Km123+845	11.43	ditto
9	Quang Ngai IC	Urban Road	Km130+502	6.65	ditto

1.4 Bridges, Tunnel, Underpass and Culverts

The proposed expressway will include 118 bridges spanning 12.3 km, of which four major bridges will cross four large rivers namely Ky Lam, Chiem Son, Tra Bong and Tra Khuc. The other 128 bridges are crossing smaller rivers, irrigation canals, drainage channels and local roads. The proposed expressway has 20 bridges with a function like the viaducts in the area subjected to annual flooding of Vu Gia – Thu Bon rivers basin, Thu Bon and Ba Ren rivers, Tra Bong river and Tra Khuc river system.

The proposed expressway has one tunnel (with two tubes) with length of 540 m crossing the Chiem Son mountain.

In addition there are 188 cross structures (underpass, overpass, interchange and pass under bridges) designed under the Project, provide the pass crossing the Expressway for local residents. The average distance between the passes is about 560m.

There are about 700 culverts including box culverts and pipe culverts. With the culvert system, the irrigation and drainage condition is generally no changes.

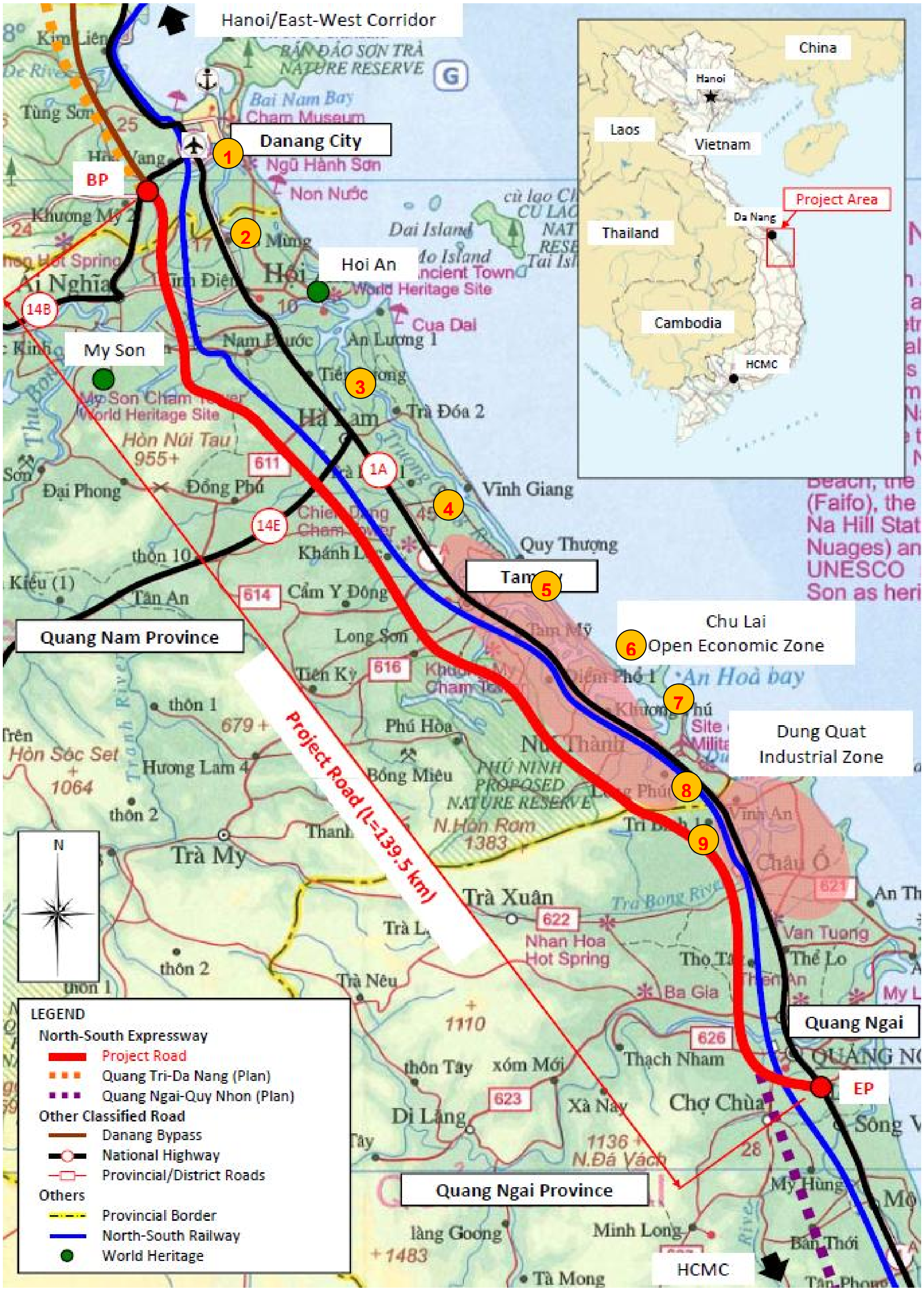


Figure 1-3 Project Location and Interchanges

1.5 Access Road, Construction Material, and Disposal Site

The proposed Expressway will run parallel with the national highway NH1A and it will also cross other national highways and provincial roads namely NH14B, NH14E, PR610, PR611, PR616, PR617, PR623, PR625 and other local roads. Since the distance from these roads to the project alignment is short, these roads can be used as access roads for the project. Totally about 30 existing roads with total length about 148 km shall be used as access roads. Detailed information of access roads is showing in Chapter 4.

The project is located in a plain cultivated (mostly paddy fields) area with low hill terrain with abundant resources of construction material. Except for cement, asphalt, and steel which need to be imported from the outside market, most of the construction materials would be supplied from existing pits along the expressway. Detailed information of construction material sites and transportation is showing in Chapter 4 and Appendix 9.

There will be a large volume of surplus soil and waste materials such as waste rock which will be generated from the excavation of the tunnel and during the construction of the Expressway. The disposal of the excess material will be in compliance with the environmental management of the project. Detailed information of disposal sites is showing in Chapter 4 and Appendix 7.

1.6 Auxiliary

Some essential facilities are constructed for management, maintenance, safety and service in the period of operation. There is one Traffic Management Center (Da Nang Management center), two Expressway Operation offices, seven Toll stations, two Service Areas, four parking yards, two throughway toll barriers. Figure 1-4 shows the information about the auxiliary facilities of the expressway.

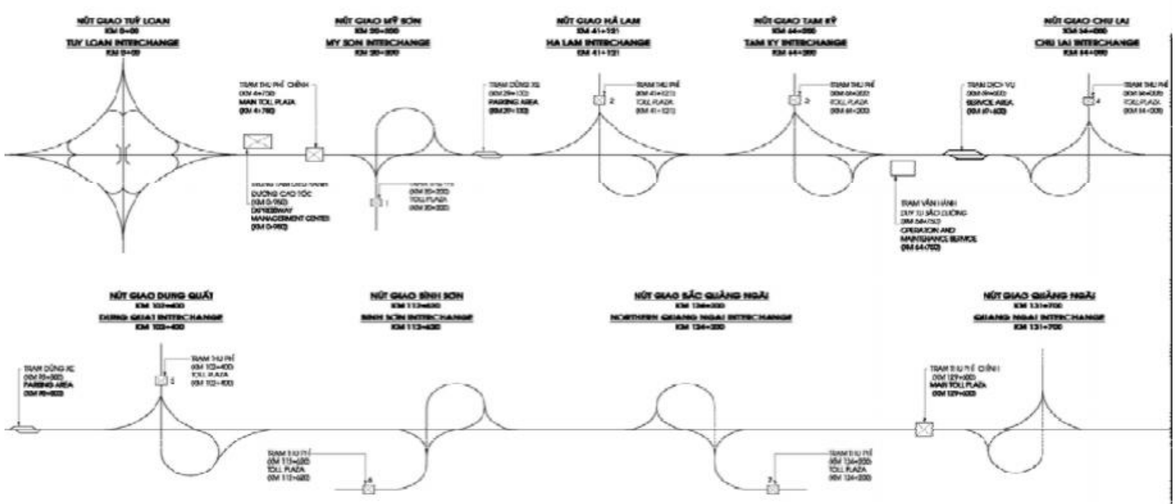


Figure 1-4 General outline of auxiliary facilities

Chapter 2 Analysis of Alternatives

The consideration of a range of alternatives helps to produce a solution that satisfies the purpose and need for the project while protecting environmental, cultural, and community resources. Two basic categories of alternatives were explored and evaluated for this project:

1. The without-the-project alternative (zero-option) includes short term minor maintenance activities that maintain continuing operation of the existing roadway(s) and all other committed projects within the network (such as adjacent roads).
2. The with-the-project alternatives include construction of a new expressway which is systematically designed and selected from proposed road options both at macro-scale and micro-scale.

2.1 Without-the-Project Alternative (zero-option)

According to JETRO's survey (April, 2008), in 2007 total mixed traffic volume of National Highway 1A (NH1A) was 9,965 vehicles/day, of which 3,944 vehicles/day belonged to the Da Nang - Quang Ngai section. Traffic volume in NH1A is escalating on a yearly basis. The NH1A has been re-constructed under the class III standard for delta roads, but the flood frequency calculated and designed on flooded road sections of NH1A were only P= 10% instead of the suggested P=2%. All flooded road sections of NH1A with small depth were repaired by elevating the road bed and widening aperture of culverts and bridges. However, at present, the narrow width, bad road bed, small radius curve, and large traffic volume, facilitate the occurrence of traffic accidents. Particularly, *mixed traffic,* during night time. That is industrial and residential traffic, long trip and short trip traffic, mixing of cars, buses, motorbikes, heavy load trucks, vehicles, and even bicycles. In general, NH1A does not satisfy the daily increasing traffic volume demand brought about by the rapid socio-economic development of the region.

2.2 With-the-Project Alternatives

Given the needs of the expanding economy, the Government of Vietnam (GOV) has embarked on the development of an expressway network. An expressway network master plan was completed in 2007, supported by the Asian Development Bank (ADB) and approved by Prime Minister in 2008 as "Vietnam Expressway Network Developing and Planning until 2020 and the View for Post 2020" (Decision No. 1734/QD-TTg). The plan emphasizes the development of the north-south corridor parallel to NH1A, with expressways forming radial and circular links around the major cities. The plan includes a total length of 3,262 km of the North-South Expressway and prioritizes the section of the Project, Da Nang - Quang Ngai, as the center of road network of Central Vietnam. The Da Nang – Quang Ngai section is also included in the Detailed Plan of North-South Expreswway (Decision No.140/QD-TTg dated January 21, 2010).

The Project is expected to be an important infrastructure in promoting inter-provincial connection and supporting socio-economic development of Central Vietnam. The Project construction will be pivotal in developing the Lien Chieu and Hoa Khanh Industrial Zones, Da Nang City, Chu Lai Open Economic Zone, Dung Quat Industrial Zone, Tam Ky Town (Quang Nam Province), and other areas of the region. Saving of travel time and cost contribute to attract tourists and to create better investment conditions for industrial parks and economic zones.

The Project is also expected to reduce traffic accident on NH1A. "Mixed traffic", especially during night time, consisting of industrial traffic and living traffic, long trip traffic and short trip traffic, is considered as a major cause of traffic jam and traffic accident on NH1A. With the project, mixed traffic will be significantly reduced. Industrial and long trip traffic shall be carried by the expressway and to be separated from living traffic. The expressway is designed to reduce number of traffic accidents by provision of industrial logistic corridor separate from living traffic on NH1A.

The alignment of Da Nang – Quang Ngai Expressway had been firstly examined early in the Pre-F/S 2003. Since then, the alignment had been reviewed and modified many times. However, it seems that the process of alignment planning can be summarized in two stages: the first stage from 2000 to 2009 which includes the Pre-F/S 2003, F/S 2005, JETRO Study 2008, and the WB Supplemental Study 2009; the second stage from 2010 to this present time which includes the F/S 2010 and the on-going D/D.

In these studies, the following macro-scale criteria were applied for selecting the optimum alternative aligment:

1) Avoiding mountains and hilly areas as much as possible;
2) Avoiding affects to the reservoirs located between Da Nang and Quang Ngai;
3) Minimizing impacts on paddy fields and agricultural lands;
4) Avoiding and minimizing affects to the existing railway;
5) Avoiding and minimizing impacts on local towns and industrial zones along the aligment;
6) Avoiding affects to the existing NH1A highway;
7) Enhancing and optimizing connections with existing road network and NH1A;
8) Avoiding and minimizing impacts on critical protected areas, critical forests, flora and fauna spcies of conservation importance.

Proposed Alignment Alternatives

1) Alternative alignments proposed in F/S 2005

The preparation of Pre-F/S for the Project under BOT scheme was approved by MOT in September, 2000. Accordingly, PMU85 was assigned to prepare a Pre-F/S report for the Project. and this report was approved by Prime Minister on April 21, 2003. Two years later, the first version of F/S Report was prepared and submitted to MOT on May 11, 2005. In this F/S 2005 Report, two alternative alignments were developed as following.

The first alternative runs through lowland terrain securing a good geometric aspect and connecting to the local road systems while providing good service to industrial parks along the route. But its disadvantage is that the alignment passes mainly through the flood plain areas and therefore it will need to acquire a desirable large area of residential/agricultural land.

The second alternative passes through the western highlands, where is less affected by floods. But its disadvantage is due to its geometric aspect of the alignment. It will also need a large volume of cutting and digging. And in addition, the land clearance for this alternative is anticipated very difficult due to the military areas and the 500kV electric power transmission lines existing in the areas along the alignment.

The first alternative alignment which runs through the lowland areas was selected as optimum alternative in F/S 2005.

2) Alternative alignments proposed by JETRO Study in 2007-2008

In 2007, GOV approved the Project as one of the top priority projects in transport sector by Decision No.412/QD-TTg dated April 11, 2007. JETRO was requested to assist a further study expecting materialization of the Project by a JBIC loan scheme, and submitted a report to MOT on April 28, 2008.

In JETRO Study, the alignment proposed in the F/S 2005 was agreed among the related agencies and local PCs. However, several sections of the alignment were modified to avoid the following control points (Table 2-1).

Table 2-1 Main Control Points of F/S 2005 Alignment and JETRO Alignment

No.	Location	Item	Description/Counter measures
1	km0	Bypass of Da Nang	Connecting the Bypass of Da Nang
2	km0	Intersection of NH14B	Ensure the space for interchange (Da Nang IC)
3	km2	River Yen	The alignment should be orthogonalized to river as much as possible.
4	km10	River La Tho	The alignment should be orthogonalized to river as much as possible.
5	km17	River Thu Bon	The alignment should be orthogonalized to river as much as possible.
6	km20	River Ba Ren	The alignment should be orthogonalized to river as much as possible.
7	km21	Quang Nam Provincial Road 610	The alignment should be orthogonalized in consideration of IC installation
8	km25	Hilly Area	Avoid hilly area, or construction work of cut and tunnel
9	km30	Hilly Area	Avoid hilly area as much as possible
10	km32	North-South railway	Ensure the distance from railway (50m)
11	km35	Vicinity of South-North Railway	Avoid rocky mountain from km33 to km35 closing to the railway side
12	km38	North-South railway	Ensure the distance from railway (50m)
13	km41	Intersection of NH14E	Ensure the space for interchange (Ha Lam IC)
14	km64	Crossing Quang Nam Provincial Road 616	Ensure the space for interchange (Tam Ky IC)
15	km75	Chu Lai Economic Zone and Phu Ninh Lake Environmental Preservation Area	Avoid separating the development district and minimize effects to natural environment
16	km86	Crossing Quang Nam Provincial Road 617	Ensure the space for interchange (Chu Lai IC)
17	km100	Storage Dam	Avoid Storage Dam area
18	km102	Quang Nam Provincial Road, Binh Thi -Dung	Ensure the space for interchange (Dung Quat IC)

No.	Location	Item	Description/Counter measures
		Quat Road	
19	km109	River Tru Bong	The alignment should be orthogonalized to river as much as possible.
20	km112	Crossing Quang Ngai Provincial Road 622	Ensure the space for interchange (Binh Son IC)
21	km126	Crossing Quang Ngai Provincial Road 623	Ensure the space for interchange (Quang Ngai IC)
22	km127	**Elementary school**	F/S concluded that school should be relocated because the geographical and river orthogonal condition have to bring the alignment close to original location of the school.
23	km128	River Tra Khuc	The alignment should be orthogonalized to river as much as possible.
24	km130	The center of Quang Ngai province	Avoid the center of Quang Ngai province
25	km131	Crossing Quang Ngai Provincial Road 625	Ensure the space for interchange (Quang Ngai IC)

Data source: EIA Report, 2010

3) Alternative alignments proposed by WB Supplemental Study in 2009

In parallel with the JETRO Study, WB declared GOV to be eligible for the IBRD loan in November, 2007, and the Project was identified as the top priority use for the loan. In April~June 2008, the World Bank (WB) took an Identification Mission, and a Post-Identification Mission associated with field trips to the whole alignment to confirm the proposed alignment.

As stated in the WB's Aide-Memoire in July 14, 2008, the WB basically agreed on the study options proposed by the JETRO Consultants. However, there still remained several issues to be determined as follows:

- On the basis of previous surveys of the whole alignment, the alignment should be adjusted to minimize impacts to major control points such as cultural properties, industrial zones, army bases, and high voltage electric power lines. Similarly, it was requested to reduce the area of agricultural land acquisition and to improve technical standards of the whole alignment including the ending point of the Project in Quang Ngai Province. The location of the southern end point should be connected with the provincial road that would serve as the southern arterial ring road of Quang Ngai Province.
- The EIA report and RAP report including compensation for land acquisition, and economic and financial analysis should be updated in compliance with the WB's requirements.

After the identification missions in April and June, 2008, WB decided to allocated a fund to conduct a supplemental study to update the JETRO Study. The WB Supplemental Study Report was prepared by PMU85 and submitted to MOT in his letter No.551/BQL-KHDA2 dated June 13, 2009.

The alignment proposed in 2009 by WB Study (namely "Nippon Koei Alignment") basically overlaps with the one proposed in F/S 2005 and JETRO Study in 2008. However, it proposed to revise the western side of the alignment in several sections such as Km 21~Km 26, Km 34~Km 43; Km 67~Km 90; Km 106~Km 115; and Km 122~Km 129 including a new design control at Km 90~Km 96. These are minor modifications only in the remaining part of the project alignment to meet technical requirements.

Horizontal alignment was carefully updated through several meetings with local PCs and local residents considering the selection of alignment, design standards, design controls. Followings are major updates (EIA Report 2010, p34):

- Use longer tangent element and larger curve radius in order to minimize vehicle operation cost (VOC) and land areas,
- Update design controls by site investigation and in consultation with People's Committees, Armies, and Chu Lai OEZ Development Company.
- The minimum radius applied in the Study is 1,000m between the Chiem Son Bridge and the tunnel. A 1,200m radius is applied at the ending point, and all other curves have more than 2,000m radius.

In comparison to the previous studies, it seems that more number of environmentally-sensitive structures (i.e. pagoda, school, etc.) were considered as design control point in the modification of alignment in this Study.

The alignment proposed by the WB Study was evaluated adequacy by the environmental consultant in charge of the EIA Study. It is said that the environmental consultant had carried out the site investigation and confirmed that the alignment runs mainly through the paddy fields, crop areas, eucalyptus plantation areas, and avoids several sensitive spots/structures as pagoda, school, and residential areas.

4) Alternative alignments proposed by TEDI F/S Study in 2010

In December 10, 2009, TEDI started a supplement assignment to work on the micro scale adjustments of the proposed alignment including three sections: i) Km 0+00-km to 16+00; ii) Km 58+00-km to 68+00; and iii) Km 109+00-km to 129+00. This additional work was based on Circulars No. 422/TB-BGTVT signed on September 23, 2009 and 594/TB-BGTVT signed on December 25, 2009 by MOT. (EIA Report 2010, p4)

Based on the alignment proposed by Nippon Koei in the WB Supplemental Study, TEDI prepared a Draft F/S Report and submitted it to MOT in April 2010. This Draft F/S Report was then finalized by TEDI in accordance with MOT's appraisal report, and submitted again to MOT in September 2010 as the F/S Report. The F/S Report was finally approved by MOT in Decision No. 2656/QD-BGTVT dated September 10, 2010.

In this F/S Report, the alignment proposed by Nippon Koei was assessed as following.

- Regarding geometric standards: the alignment prepared by Nippon Koei is straight, with very good technical requirements, minimum radius of horizontal curve R=4000m.
- Control points: The alignment mainly eliminates main control points in Bo Bo mountain area, shooting garelly of army force, crowded population areas, big industrial zones, irrigational dams, etc. However, at the sections of the beginning area at Km0-Km16, Km60-Km73, there are a lot of electrical poles of the 500KV

electrical network and other electrical networks,… Moreover, on the section Km0+000 – Km16+000, the route also crosses some villages and Cam Son industrial area. On the section Km109-Km129, the alignment of Nippon Koei also comes into crowded population areas and heavily flooded areas of Tra Khuc valley.

Consequently, in F/S 2010, only 3 sections (Km0~Km16, Km60~Km73, and Km109~Km129) of the alignment proposed by Nippon Koei were modified and described as "re-alignment sections" (Figure 2-1~2-3).

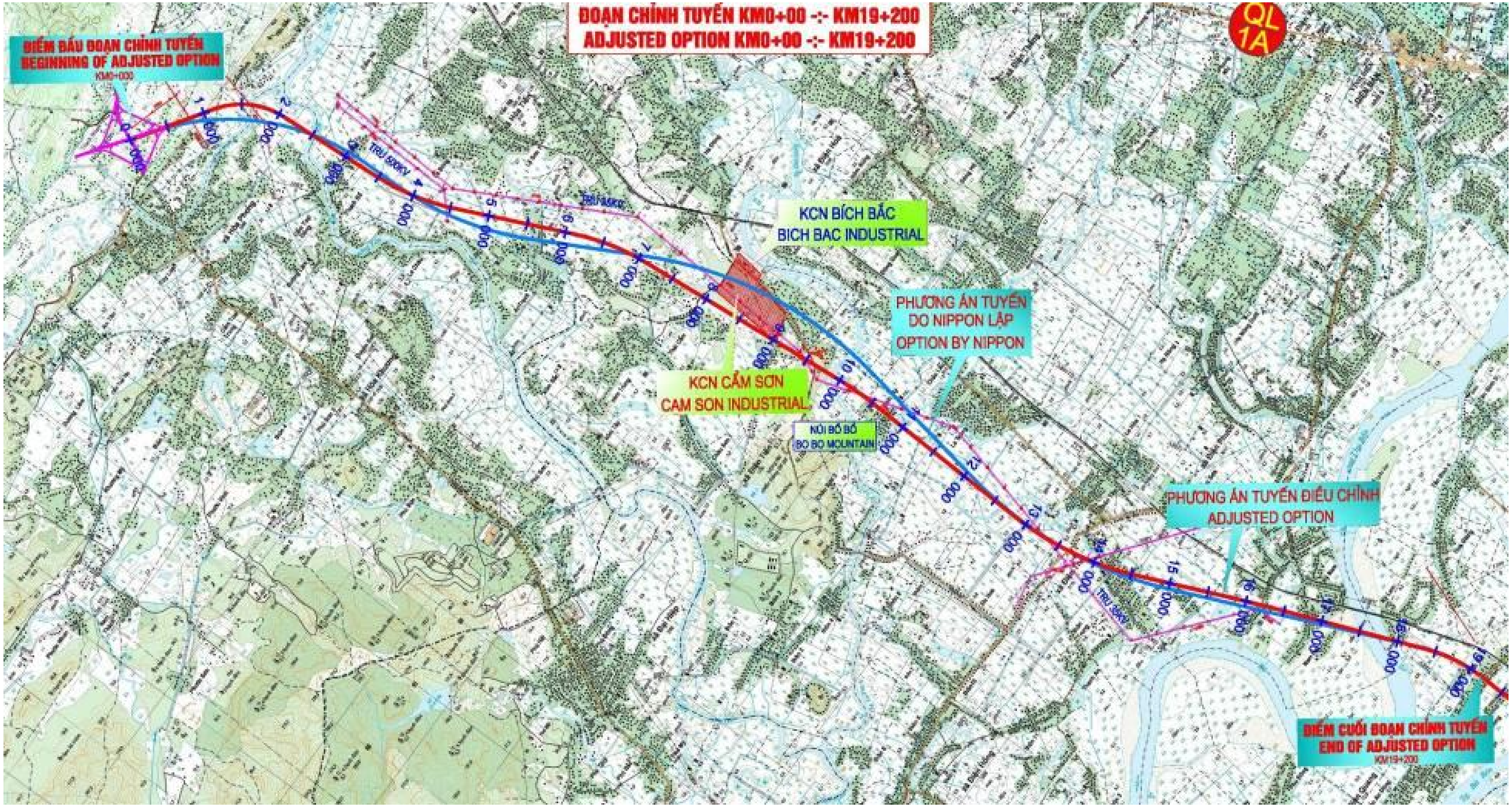


Figure 2-1 Plan of the adjusted section Km 0+000 – Km 19+200

Figure 2-2 Plan of the adjusted section Km 60+000 – Km 73+000

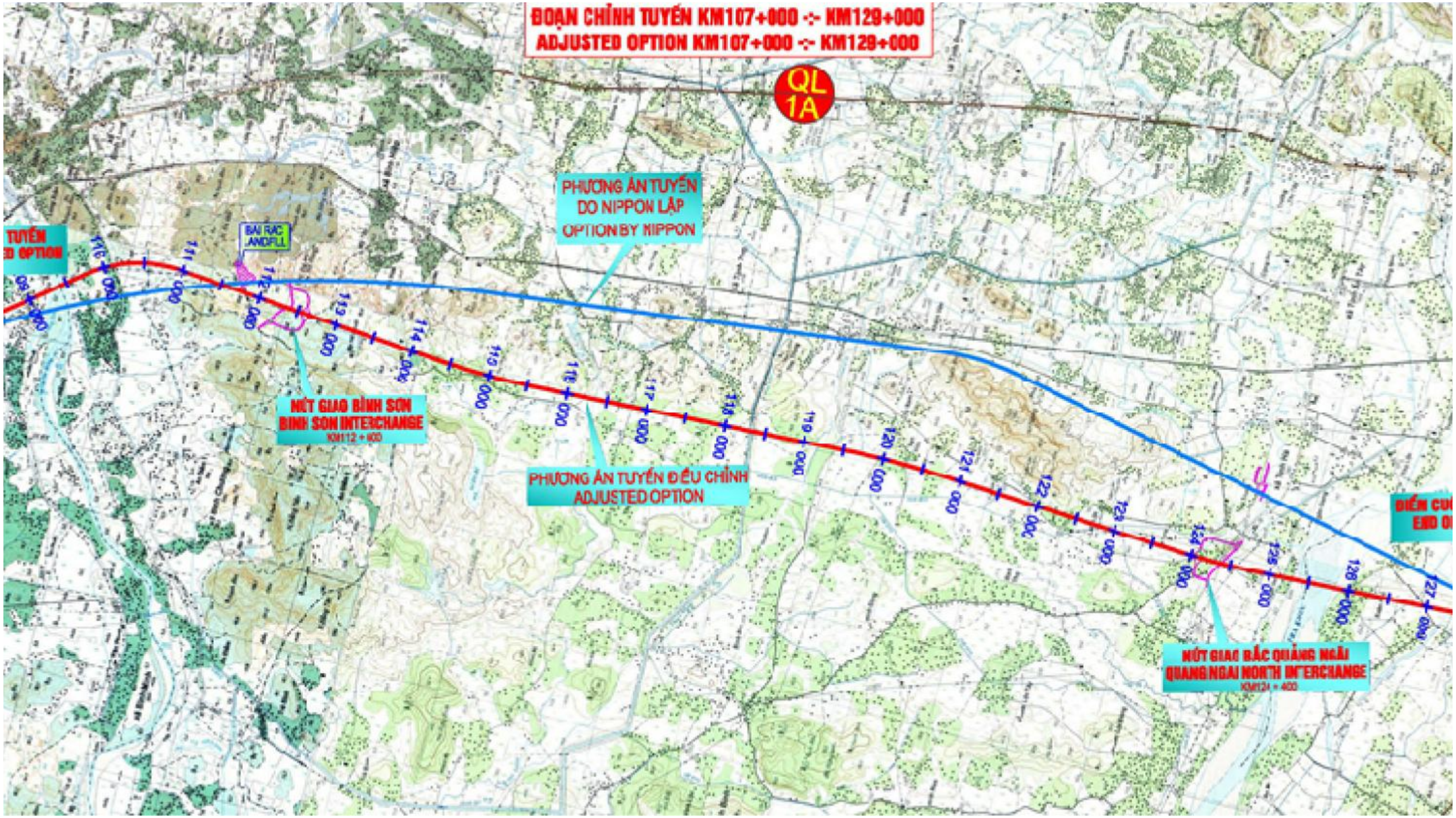


Figure 2-3 Plan of the adjusted section Km 102+900 – Km 131+500

2.3 Adequacy of Alignment Modified in D/D

Based on the F/S 2010 alignment, topographic survey was commenced on August 22, 2011. Following to the planimetric survey, appropriateness of the F/S alignment has been verified with reference to design controls identified by site investigation.

As a result of verification of the F/S 2010 alignment, some alignment sections are needed to modify to avoid the design control points and the results of the alignment modifications are summarized in the report of "Technical Report (2nd Draft), Finalization of Expressway Alignment (Some Modifications from F/S Alignment)" by letter No. DQEDD-PMU85-44-11 dated 5th November 2011.

WB and TEDI entrusted by MOT had reviewed this Technical Report (2nd Draft) and provided several comments on the alignment modification. The D/D Consultant then modified the alignment based on these comments.

Table 2-3 shows the alignment sections which were modified in D/D.

Table 2-3 Design Controls and Alignment Modification Policy

No	Section (F/S)	Design Control		Alignment Modification Policy
1	Km0+600 – km1+600	Cemetery		Alignment needs to avoid the cemetery
2	km20+600 – km21+800	Small Radius (R=1,000)		Radius shall not be smaller than the F/S. Application of larger radius is desirable.
3	Km21+000 – km22+000	Cemetery		Alignment needs to avoid the cemetery
4	km22+600 – km23+200	Portals of the Danang Tunnel	Terrain condition at portals of the Danang Tunnel was carefully investigated on the topographic map and at site. As a result of the investigation, the consultant concluded that location of the tunnel portal by the F/S is not appropriate due to possible imbalanced earth pressure.	Location of the portals shall be relocated to appropriate terrain. Alignment of the road section in the East side of the tunnel shall be modified to avoid impacts to the Champa Archaeological Ruins (in Duy Trinh Commune) as much as possible.
5	km24+180	Pagoda		Alignment needs to avoid the Hoa Quang Pagoda (150m in the left) because that the pagoda is important for local residents.
6	km24+500	Cemetery		Alignment needs to avoid the cemetery (100m in the left).
7	km24+380	Schools		Alignment needs to avoid the Nguyen Thanh Han and Duy Son High School (250m in the left) .
8	Km27+000 – km29+000	Duy Xuyen Cemetery		Alignment needs to avoid the cemetery
9	Km33+800 – km35+000	Railway	According to "Laws of Railway, National Assembly, 27 June 2005 (No. 9/2005/L/CTN)", necessary clearance from the foot of the embanked roadbed is 5m and 3m from the outer edge of the longitudinal drainage ditches respectively.	Alignment shall maintain at least 5m clearance from the foot of the embanked roadbed and 3m from the outer edge of the longitudinal drainage ditches respectively.
10	Km34+200 – km35+000	Rocky mountain		Alignment shall be set to reduce rock excavation volume as much as possible with consideration of maintaining safety clearance of the railway and construction safety.

No	Section (F/S)	Design Control		Alignment Modification Policy
11	Km44+500	Ngoc Kho River		Alignment should maintain adequate safety distance from the edge of the river.
12	Km46+000	Binh Chanh River		Alignment should maintain adequate safety distance from the edge of the river.
13	Km51+100	Shrine		Alignment needs to avoid the shrine (50m in the right) because that the shrine is important for local residents.
14	Km71+313 – Km81+569	Army shooting area		Alternative alignment study report was submitted to PMU85 by Letter No. DQEDD-PMU85-15-11 dated 6th September 2011, and was approved by PMU85 at the meeting held in Quang Nam PC on 07 September 2011.
15	Km87+280	War memorial		Alignment needs to avoid the war memorial because that the war memorial is very important monument.
16	Km91+340	HVL 500kv		1)Alignment shall maintain 14m (populated area) or 10m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
17	Km91+400	HVL 500kv tower	Tower is located at 25m east of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
18	Km94+000 – Km94+600	Ho May Dam	Ho May dam is classified as Grade III in TCXDVN 285-2002 according to DARD, Quang Nam province.	In accordance with Decree 27-2007 ND-CP, necessary clearance for protection of the Grade III dam is minimum 100m from the base of dam.
19	Km92+650	HVL 500kv tower	Tower is located at 35m east of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
20	Km92+740	HVL 500kv		1)Alignment shall maintain 14m (populated area) or 10m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
21	Km94+240	HVL 220kv		1)Alignment shall maintain 8m (populated area) or 7m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
22	Km94+300	HVL 110kv		1)Alignment shall maintain 7m (populated area) or 6m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
23	Km100+000 – Km100+400	Ham Rong Dam	Ham Rong dam is classified as Grade IV in TCXDVN 285-2002 according to DARD, Quang Ngai province.	In accordance with Decree 27-2007 ND-CP, necessary clearance for protection of the Grade IV dam is minimum 50m from the base of dam.
24	Km99+230	HVL 110kv tower	Towers are located at 20m east of the alignment respectively.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
25	Km99+340	HVL 110kv		1)Alignment shall maintain 7m (populated area) or 6m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
26	Km99+350	HVL 110kv tower	Towers are located at 3m west of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
27	Km99+520	HVL 110kv tower	Towers are located at 25m west of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect

No	Section (F/S)	Design Control		Alignment Modification Policy
				foundation of the tower.
28	Km100+370	HVL 110kv tower	Towers are located at 27m west of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
29	Km100+565	HVL 110kv tower	Towers are located at 1m west of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
30	Km100+580	HVL 110kv		1)Alignment shall maintain 7m (populated area) or 6m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
31	Km100+720	HVL 110kv tower	Towers are located at 25m east of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
32	Km101+380	HVL 110kv tower	Tower is located at 20m east of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
33	Km101+520	HVL 110kv tower	Tower is located at 15m west of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
34	Km101+530	HVL 110kv		1)Alignment shall maintain 7m (populated area) or 6m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
35	Km103+440	HVL 110kv		1)Alignment shall maintain 7m (populated area) or 6m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
36	Km103+595	HVL 500kv tower	Tower is located at 30m west of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
37	Km103+600	HVL 500kv		1)Alignment shall maintain 14m (populated area) or 10m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
38	Km103+635	HVL 500kv tower	Tower is located at 5m east of the alignment.	Alignment shall maintain adequate clearance from tower of HVL to protect foundation of the tower.
39	Km103+640	HVL 500kv		1)Alignment shall maintain 14m (populated area) or 10m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.
40	Km104+815	HVL 110kv		1)Alignment shall maintain 7m (populated area) or 6m (under-populated area) clearance from the lowest point of HVL in accordance with Norm 11TCN18-2005.

Data source: D/D Technical Report

2.4 Conclusion on Alternative Alignment

The planned expressway passes through one city and two provinces (Danang City, Quang Nam Province, and Quang Ngai Province) whose a large portion (about 80%) of surface area is mountainous and forest area. The Truong Son Mountain Range lays along the west of the project area, and it narrows the width of the low plain areas between the foots of the mountains in the west and the seashore in the east. Figure 2-4 shows the likely common cross-section of the project location.

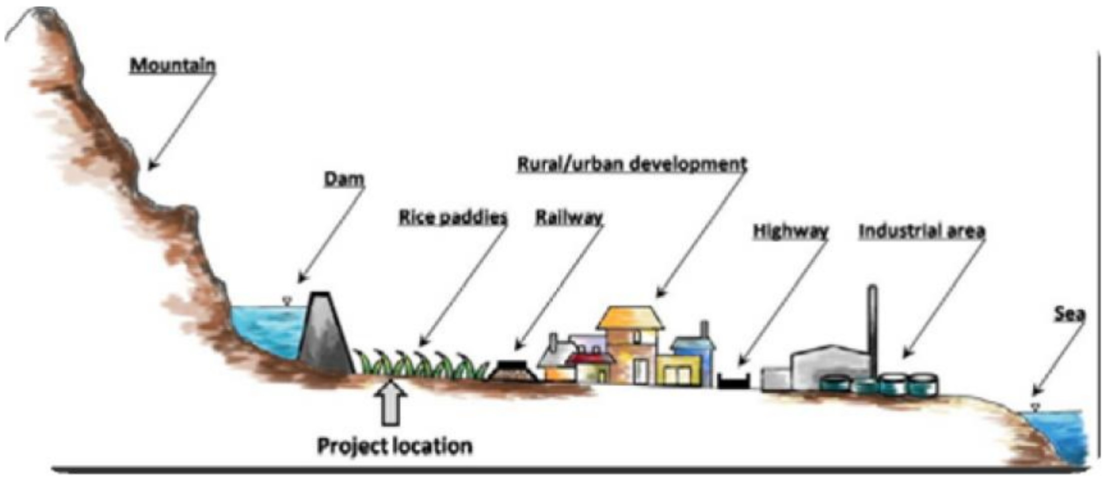


Figure 2-4 Cross section of Project Location

As described previously, two alignment alternatives were examined in F/S in 2005, and the alignment alternative which runs through the low plain areas was considered as the optimum alternative. This selection is considered reasonable due to its geometric aspect, avoidance of cutting and digging of the rocky mountains, avoidance of impacts to military areas, etc.

As shown in the following Figure 2-5, the alignment planning at this macro level had taken into consideration the following three major control points:

i) Ho Nuoc Mountain at km27-km29
ii) Phu Ninh Lake and Hon Ro Mountain at km70-km75
ii) Hang Ba Mountain, Ga Cao Mountain, Son Tra Mountain at km93-km100

Avoidance of these three control points is considered indispensable for all alignment alternatives. Since all alignment alternatives should run through the narrow areas limited by the rocky mountains and the lakes in the west side and the existing national railway in the east side, only minor changes in alignment between these three control points are allowable.

Although the alignment planning (including the selection of optimum alignment alternative) was done based on topographic maps with scale of 1/50000 and 1/25000, the planning process is considered valid at macro level before F/S 2010.

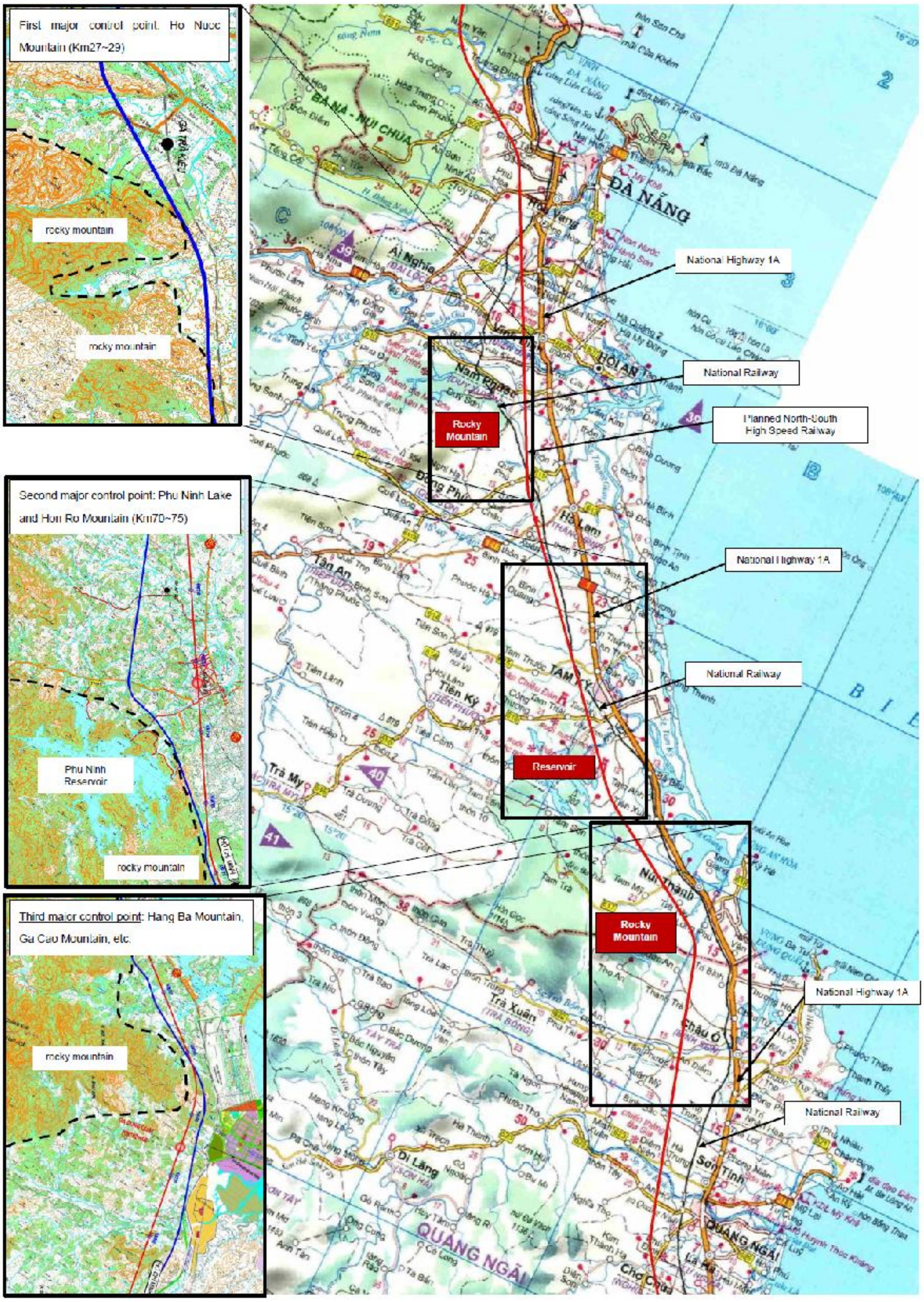


Figure 2-5 Three majors control points at macro level of alignment planning

In F/S 2010 and D/D, planimetric survey had been carried out along the alignment determined in F/S 2010 (with width of 70 meters from each side of the centerline). And topographic maps with scale of 1/5000 and 1/1000 had been made for the thruway horizontal alignment planning.

In D/D stage, with the use of the 1/1000 topographic maps, various design controls (schools, temples, graves, memorial monuments, etc.) which could not be identified on 1/25000 topographic maps or satellite images have been found. Site investigations were also carried out to confirm these design controls, and modifications of several sections of alignment were examined between stakeholders.

The following Table 2-3 summarizes environmentally-sensitive spots/structures avoided by modifications of alignment in F/S 2010 and D/D.

Table 2-3 Sensitive spots/structures avoided by modifications of alignment

<table>
<tr><th>No.</th><th>Location</th><th>Sensitive Spots/Structures</th><th>Avoided by F/S</th><th colspan="2">Avoided by D/D</th></tr>
<tr><td>1</td><td>Km0+800</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>2</td><td>Km1+100</td><td>Cemetery (More than 300 graves)</td><td></td><td>x</td><td></td></tr>
<tr><td>3</td><td>Km4+400</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>4</td><td>Km10+000</td><td>Bo Bo Mountaint</td><td>x</td><td></td><td></td></tr>
<tr><td>5</td><td>Km21+000 -
Km23+000</td><td>Champa Ruins and cemetery (more than 300 graves)</td><td></td><td>x</td><td rowspan="5">Avoid encroachment to Go Gach Ruin, conservation area of Trien Tranh Ruin, Nguyen Thanh Han Secondary School.
Avoid direct affect to Tra Son Pagoda and Hoa Quang Pagoda and Duy Xuyen cemetery.</td></tr>
<tr><td>6</td><td>Km24+180</td><td>Hoa Quang Pagoda</td><td>x</td><td></td></tr>
<tr><td>7</td><td>Km24+450</td><td>Nguyen Thanh Han Secondary School</td><td></td><td>x</td></tr>
<tr><td>8</td><td>Km24+840</td><td>Martyrs Cemetery</td><td></td><td>x</td></tr>
<tr><td>9</td><td>Km28+100</td><td>Cemetery (more than 3500 graves)</td><td></td><td>x</td></tr>
<tr><td>10</td><td>Km34+200
Km35+000</td><td>Rocky Mountain</td><td></td><td>x</td><td></td></tr>
<tr><td>11</td><td>Km44+500</td><td>Ngoc Kho River</td><td></td><td>x</td><td rowspan="2">Avoid bending Ngoc Kho River and Binh Chanh River</td></tr>
<tr><td>12</td><td>Km46+000</td><td>Binh Chanh River</td><td></td><td>x</td></tr>
<tr><td>13</td><td>Km51+100</td><td>Temple</td><td></td><td>x</td><td></td></tr>
<tr><td>14</td><td>Km60+650</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>15</td><td>Km66+000</td><td>10KV Electrical Substation</td><td>x</td><td></td><td></td></tr>
<tr><td>16</td><td>Km67+186</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>17</td><td>Km67+900</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
<tr><td>18</td><td>Km69+000</td><td>10KV Electrical Substation</td><td>x</td><td></td><td></td></tr>
<tr><td>19</td><td>Km71+000</td><td>500KV High Voltage Line</td><td>x</td><td></td><td></td></tr>
</table>

No.	Location	Sensitive Spots/Structures	Avoided by F/S	Avoided by D/D	
20	Km77+000	Military Area	x		Confirm during D/D stage.
21	Km87+280	War Memorial		x	
22	Km91+230	500KV Electrical Substation		x	
23	Km92+480	500KV Electrical Substation		x	
24	Km94+000	Military Area	x		
25	Km94+000 - Km94+600	Ho May dam		x	
26	Km100+000 - Km100+400	Ham Rong dam		x	
27	Km100+220	110KV Electrical Substation		x	
28	Km100+880	110KV Electrical Substation		x	
29	Km101+025	110KV Electrical Substation		x	
30	Km103+245	500KV Electrical Substation		x	
31	Km103+635	500KV Electrical Substation		x	
32	Km106+000	Pagoda	x		
33	Km108+700	500KV High Voltage Line	x		
34	Km125+000	Pagoda	x		
35	Km130+000	35/15KV Electrical Substation	x		

Data source: D/D Study Team

Field reconnaissance survey had been carried out to confirm the environmental conditions of the areas around the modified sections. It is observed that natural environment conditions at the modified sections are almost similar (i.e. natural condition of the area along the D/D modified section is similar to that of the area along the before-modified section of F/S alignment). Therefore, there is no need to carry out additional survey on physical environmental quality at these modified sections.

In conclusion, the modification of alignment of the Expressway in D/D would lead to the avoidance/reduction of a number of impacts to local natural and social environment. The D/D modified alignment would not cause additional impact to natural and social environment comparing to the F/S alignment.

However, in the whole section of the proposed alignment, the following 24 populous residential areas would be affected (Table 2-4).

Table 2-4 Populous residential areas likely affected by the proposed alignment

No.	Location	Affected village/ hamlet	Characteristics
1	Km000+450 - Km000+650	Phu Hoa Hamlet, population density is medium	Mostly are one-storey structures
2	Km005+500 - Km005+750	Thach Bo Hamlet, population density is medium	Mostly are one-storey structure
3	Km010+680 - Km013+800	Provincial Road 609 and Thon Tay Hamlet, population density is medium	Have not been identified in F/S
4	Km014+040 - Km014+500	Chau Thuy Hamlet, population density is medium	Mostly are one-storey structures
5	Km016+660 - Km016+940	Ky Long Hamlet, population density is medium	Have not been identified in F/S
6	Km019+100 - Km019+320	Xuan Dai Hamlet, population density is medium	Mostly are one-storey structures
7	Km023+950 - Km024+280	Hamlet 5, Duy Son Commune, population density is medium	Mostly are one-or-two-storey structures
8	Km024+740 - Km024+840	Hamlet 5, Duy Son commune, population density is medium	Mostly are one-or-two-storey structures
9	Km037+200 – Km037+300	Hamlet 4, Phuc Tho commune,	Have not been identified in F/S
10	Km042+660 - Km043+040	Hamlet 1, Binh Quy Commune population, density is medium	Mostly are one-storey structures
11	Km047+100 - Km047+500	Hamlet 4, Binh Chanh Commune, population density is medium	Mostly are one-storey structures
12	Km049+020 - Km049+280	Binh Hoi Hamlet, Binh Que Commune	One-or-two-storey structures
13	Km051+020 - Km051+120	Binh Quang Hamlet, Binh An Commune	Mostly are one-storey structures
14	Km063+620 - Km063+860	Hamlet 10, Tam Thai Commune, population density is medium	Mostly are one-or-two-storey structures
15	Km089+060 - Km089+240	Da Phu Hamlet, Tam My Commune, population density is medium	Mostly are one-storey structures
16	Km089+340 - Km089+560	Da Phu Hamlet, Tam My Commune, population density is medium	Mostly are one-storey structures
17	Km100+120 – Km100+760	Tri Binh Hamlet, Binh Nguyen Commune, population density is medium	Mostly are one-or-two-storey structures
18	Km105+560 - Km105+900	Phuoc Binh Hamlet, Binh Nguyen Commune, population density is medium	Mostly are one-storey structures
19	Km116+080 - Km116+880	Tho Tay Hamlet, Tinh Tho Commune, population density is medium	Mostly are one-storey structure,
20	Km123+840 - Km124+140	Ha Trung Hamlet, Tinh Ha Commune, population density is medium	Have not been identified in F/S
21	Km128+320 - Km128+850	An Hoi, An Hoi Nam hamlets, Nghia Ky Commune, population density is medium	Have not been identified in F/S
22	Km129+350 - Km129+450	An Hoi Nam Hamlet, Nghia Dien Commune,	Have not been identified in F/S
23	Km131+700 - Km132+450	Dieu An Hamlet, Nghia Ky Commune, population density is medium	Have not been identified in F/S
24	Km137+450 - Km137+550	Nghia Trung Commune	Have not been identified in F/S

Data source: D/D Study Team

In order to assess the validity of the proposed alignment, the additional topographical survey and social environmental survey on these 24 populous residential areas have been carried out. Base on results of these surveys, validity of the proposed alignment is assessed at each of these above mentioned areas. Result of this assessment is described in detail in Appendix 5.

These 24 areas are classified into 3 groups as (1) best solution, (2) good solution, and (3) worst solution. Result of the classification is summarized as follow:

+ At 9 areas, the proposed alignment is assessed as the best solution;
+ At other 15 areas, the proposed alignment is assessed as the good solution, from the environmental point of view. However, modification of alignment is considered difficult due to the lack of information on the land use condition at other sections of the alignment adjacent to the concerned area, and due to the fact that modification of a specific section would cause unexpected affect to other adjacent sections.
+ No area is assessed as the worst solution.

Consequently, it can conclude that the proposed alignment is likely the optimum alignment for the Project as of this present time.

Chapter 3 Natural, Environmental and Socio-economic Conditions

3.1 Natural Environment

3.1.1 Project Location

The Project area is located in the central coastal region (Da Nang city, Quang Nam and Quang Ngai provinces). Danang City (mainland) is located in the area bounded by coordinates 15°55'15" to 16°40'N latitude and 107°49' to 108°20'18" E longitude. Thua Thien Hue Province borders the city on the north, Quang Nam Province on the south and the west of the city and East Sea on the east of the city. Hoang Sa Islands border the East Sea, lying inside the coordinates 15°30' to 17°12' latitude and 111°30' to 115°00' longitude. Danang City is composed of seven districts (Hai Chau, Thanh Khe, Lien Chieu, Son Tra, Ngu Hanh Son, Hoa Vang and Hoang Sa) with 47 communes. The total area of natural land is 1,255.537 km^2. Danang has a coastline of approximately 90 km, of which, more than 30 km are used for tourism activities. The center of the city is 760km from Ha Noi to the North and 960 km from Ho Chi Minh City to the South.

Quang Nam is located in the middle of Central Vietnam (15°23'- 15°38'N Latitude and 108°26' - 108°44' E Longitude). It borders with Da Nang city to the North, with Quang Ngai province to the South, with the sea to the East and with Kon Tum province and Laos PDR to the West. The Truong Son Mountains, Laos, and the East Sea also border the province. Quang Nam has various mountains and hills (cover 72% of its surface) with many high mountains such as Lum Heo Mountain 2,045m, Tion Mountain 2,032m, Gole - Lang Mountain 1,855m. Main rivers (Vu Gia, Thu Bon, Tam Ky rivers) run from Truong Son Range to the East Sea.

Quang Ngai is a coastal province in the South Central Region of Vietnam. It is located 883km south of Hanoi and 838km north of Ho Chí Minh City. Quang Ngai borders with Quang Nam to the North, Binh Dinh to the South, and Kon Tum to the West and toward the East Sea (Bien Dong) in the East.

The total land area of Da Nang City is 1,255.5 km^2, Quang Nam is 10,406.8km^2, and that of Quang Ngai province is 5,137.7 km^2. The population of Da Nang City is 0.902 millions, Quang Nam is 1.551 millions, and Quang Ngai is 1.392 millions.

3.1.2 Climate

Da Nang, Quang Nam and Quang Ngai are coastal provinces in the south-central region of Viet Nam, which are strongly affected by typical tropical-monsoon weather and are influenced by climates from both northern and southern Vietnam. The provinces have two distinct seasons: the dry season that lasts from January to July and the rainy season that lasts from August to December. The average annual rainfall ranges from 1,800 to 2,450 mm, of which most of the precipitation occurs in the rainy season. In Quang Nam and Quang Ngai the monthly rainfall can reach 1,000 mm or more mostly during October.

The yearly temperature variation ranges from 20 to 30°C, of which the average monthly temperature is 25 - 26°C. June is the hottest month, when temperatures rise close to 30°C while January is the coolest month at around 20°C. The average humidity varies from 82 to 85% and there are about 2100 - 2200 sunshine hours per year. In the first half of summer season from April to August, hot and dry western wind blows strongly over the coastal fields, accompanied by extreme temperature over 40°C.

Viet Nam usually faces roughly 10 typhoons annually, of which most of the typhoons hit the northern and central region. The typhoons usually land in the project area from August to November and bring heavy rain with gust velocity up to 100km/h and choppy sea when most rainfall comes; monthly rainfall reaches more than 1,000mm.

3.1.3 Physical Environment

1) Topography and Terrain

The topography along the alignment of the Da Nang - Quang Ngai Expressway is characterized by low mountain terrain and accumulative coastal sand dunes plain terrain. Such topography is distributed along a narrow range but it runs continuously along the proposed Expressway. Typically, ground elevation ranges from 1 m to 50 m. To the West of the Expressway rise high mountain ranges. The East of the expressway is characterized by relatively flat and wide fields which are separated by mountain sections leading to the sea. The topography and terrain of the project area are depicted in Figure 3.1.

Figure 3-1: Topography and Terrain of the Project Area

2) Geology and Environmental Risks (land subsidence, cracks, etc.)

The project area has a complex and diverse geological structure with various types of soil including alluvial soil, coastal sandy soil, and exhausted soil, etc. The alluvial soil in the region only accounts for 2.8% of the natural land area, black soil accounts for 1.86% and depleted grey soil 10%. The yellow red soil accounts for the greatest proportion of 68.2%.

The project is located at a joint fraction between the A Vuong Eugeosynclinal folded zone, the Nong Son and the Kham Duc tectonic zone. The area is characterized by complex geological structures and developed faults. The distribution of different geological structures is complex, including formations from the Paleozoic, Mesozoic, and Cenozoic Era. The project is located within a hilly area, from low to medium altitude. The faults are well developed in this area, the geomorphic units are complex, various types of rocks with poor stability, together with the area high humidity with plenty of rain, promote frequent landslides, lateritic weathering processes, erosion, and sedimentation.

Lateritic weathering process: Lateritic process is concentrated in the transition section from low hill to plain terrain creating lateritic layer of 3m -5 m.

Erosion: This phenomenon occurs in every location, especially in places with thin flourish composition. Erosion and cracks are drastically formed due to fragments and weathered rocks. V-shaped cracks have depth of 3 - 4m.

Sedimentation: Rivers in upstream area encroach banks due to high transversal slope, and short length of rivers. Encroached materials are swept away by flows to form sediment in middle zones or downstream of rivers such as Yen, Thu Bon, Ly Ly, Tam Ky, Tra Bong, and Tra Khuc. Encroached materials also form sandy islands in the river or alluvial plain in coastal area.

Landslide: Scour is vulnerably occurred in gravel layers in deep hollow. Scour and drift-sand also occur in terrains such as coast sand hills. The landslides are most common during the rainy season.

Seismic activity: rarely occurs within the project area and there is no clear activity in the faults and folds which has been observed or recorded. The Project area has not had any earthquake higher than 6.0 on the Richter scale. The intensity of seismic activity is classified as degree VII. In the design stage, the degree VII seismic activity will be adopted for the tunnel and large bridges.

3) Water Resources, Hydrology and Flood

The section between Da Nang and Quang Ngai, where the expressway passes, is notorious for accepting flood and inundation annually caused by strong storm during the rainy season. The expressway runs parallel with National Highway 1 and Railway and the total length of the expressway is 139.522 km. So, the expressway mostly passes through the flat floodplains at foothills of mountains between Danang and Quang Ngai which are vulnerable to flood and inundation. Vu Gia, Thu Bon, Tam Ky, Tra Bong and Tra Khuc are the major rivers which cause flood and inundation problems on floodplains because of heavy rainfalls during rainy season in the region. Therefore, carrying out investigations on existing flood inundation situations along the expressway alignment and impact of expressway construction on flood inundation is important for designing the expressway.

As mentioned above, the expressway alignment passes through the floodplain of five (5) major rivers. The topographic condition of the river basins and information on the hydrologic condition of the river system are briefly described.

Vu Gia -Thu Bon River: Vu Gia-Thu Bon River basin covers large parts of Quang Nam province and some parts of Danang, Kontum and Quang Ngai provinces. The Vu Gia-Thu Bon river system originates on the Eastern side of the Truong Son mountain range and has a total catchment area of 10,350 km^2. Vu Gia River is 204 km long and it merges into the sea in Danang. The tributaries of Vu Gia are Dak Mi, Bung and Con rivers. Similarly, Thu Bon River is 152 km long and it originates at an elevation of more than 2,000 m. The Ngoc Linh Mountain (2,598m) is the highest point in the basin, where slope varies from 20° to 30°. After passing through mountains range, Thu Bon River flows through large uplands, floodplains and coastal areas. The lowest point in coastal areas is the Cuadai Estuary (0-1 m). The coastal lowlands are densely populated and agricultural lands. There is considerable variation in spatial distribution of rainfall in the river basin. The 1% rainfall of stations in basin are 533mm/d (Danang), 539mm/d (Cau Lau), 516 mm/d (Tam Ky) and 637mm/d (Tra My). The high elevation areas of the basin get higher amount of rainfall than flat floodplain areas. The 1% specific discharge at Nong Son of Thu Bon River is 4.271$m^3/s/km^2$ whereas that of Vu Gia River is 4.698$m^3/s/km^2$ at Thanh My station.

Tam Ky River: Tam Ky River originates from the Phu Ninh reservoir which has surface area of 33.4km^2. The Phu Ninh reservoir drains the areas lying on the Eastern Side of Truong Son mountain range. Having dams in the reservoir, the flow in Tam Ky River is controlled by the dams. The catchment area of Tam Ky River up to expressway is about 267km^2. There is considerable spatial variation in rainfall in the river basin. The 1% rainfall of Tam Ky is 515mm/d and that of Tra My is 637mm/d.

Tra Bong River: The Tra Bong River originates from the Truong Son mountain range in Quang Ngai province. The river is 56km long and total catchment area is about 697km^2. The Tra Bong River basin gets higher rainfall than other river basins, because 1% rainfall of Tra Bong is 802mm/d. The upper parts of the basin has steeper slope and the lower parts of the basin is more or less flat with settlements and agricultural lands which are vulnerable to flood and inundation. The river flows through Tra Bong, Binh Son and finally merged into the sea at Dung Quat bay.

Tra Khuc River: Tra Khuc River originates at Dakrobao Mountain (2,299m) and drains the eastern slopes of the Ngoc Linh mountain range. It is 135km long and has catchment area of 3,240km^2. The major tributaries of the river are Dac Se Lo, Giang, Dac Leng and Nuoc Lac River. The variation in spatial distribution of rainfall in the river basin is quite remarkable. The 1% rainfall of Quang Ngai is 595mm/d whereas that of Gia Vuc is 717mm/d. The high elevation areas of the basin get higher amount of rainfall than flat floodplain areas. The 1% specific discharge of the river is 7.642$m^3/s/km^2$ at Son Giang. The upper parts of the basin have steeper slopes and lower parts have small slopes flat floodplain with widening river channel. During rainy season (September – December) about 75% of total annual runoff occurs and the river drains it into the sea at Co Luy.

Ve River: Ve River does not flow across the expressway alignment. It flows some kilo-meters far from the end point of the expressway. However, high flood in the river inundates some parts of the end section of the expressway in Quang Ngai Province. Ve River originates from the west of Ba To district in Quang Ngai and flows in South-West to North-East direction. It flows through Nghia Hanh, Tu Nghia and Mo Duc districts and merge into the sea at Co Luy and Duc Loi mouth. The total length of the river is about 90 km and catchment area is 1260 km^2. The main tributaries are Lien, Tano and Me rivers. The 1% specific discharge of Ve River at An Chi station is $7.976m^3/s/km^2$.

Flood: As these rivers originate from precipitation and flow from the western mountainous region, the flow rate varies significantly between seasons. During the flood season, the flow rate is twelve times higher than the dry season. The project's proposed road will cross surface water streams via bridge structures. The river system is shown in Figure 3-2. There are many water reservoirs for irrigation in the eastern plain area along the alignment of the expressway. The Phu Ninh reservoir is the largest one with $33.4km^2$.

A large difference exists between wet season maximum flows in different years, caused mainly by differences in incidence and strength of typhoons. In the period 1995-1999 the central region of Viet Nam was affected by 13 typhoons. The rivers are flashy, meaning that there are rapid variations in flow, hourly, daily and weekly, during the wet season. From October to November, the project area is affected by strong storms, depressions, and East - West monsoon. Heavy rains are likely to result in heavy floods since the soil surface has been saturated with water during rainy season which started at the end of August.

Data Analysis showed that one flood with grade alarm 3 occurs every year in the Thu Bon River in Cau Lau area. Floods with warning grade 3 usually occur in October and November (about 94%), the remaining ones occur in December. Maximum flood occurs in October and November with frequency of 75%. The highest frequency occurs in October with frequency of 50%. Historical floods occurred in the following years: 1964, 1980, 1999, 2004, 2007, 2009 and 2011.

Annual flood usually occurs in Thu Bon River from October to December. This Flood is normally serious and prolongs for several days causing damage to assets and people. Consequently, design and mitigation measures must be implemented regarding this flood. Annual flood usually occurs from mid-October to December 25 in the Tra Khuc River. Flood sometimes occurs in early December (i.e., December 3, 1986 and December 1-6, 1999). However, there were 3 serious floods in November 2007 on November 3-5, November 10-14 and November 17-19 due to depressions in combination with tropical monsoon.

Flood in this area is extremely serious due to short flood rise, high speed flood flow, and strong intensity and amplitude. The flood progress is very complex and the duration of flood crest can prolong 3 to 5 days. The flood pattern in the DQEP area is described in Figures 3-3 and 3-4.

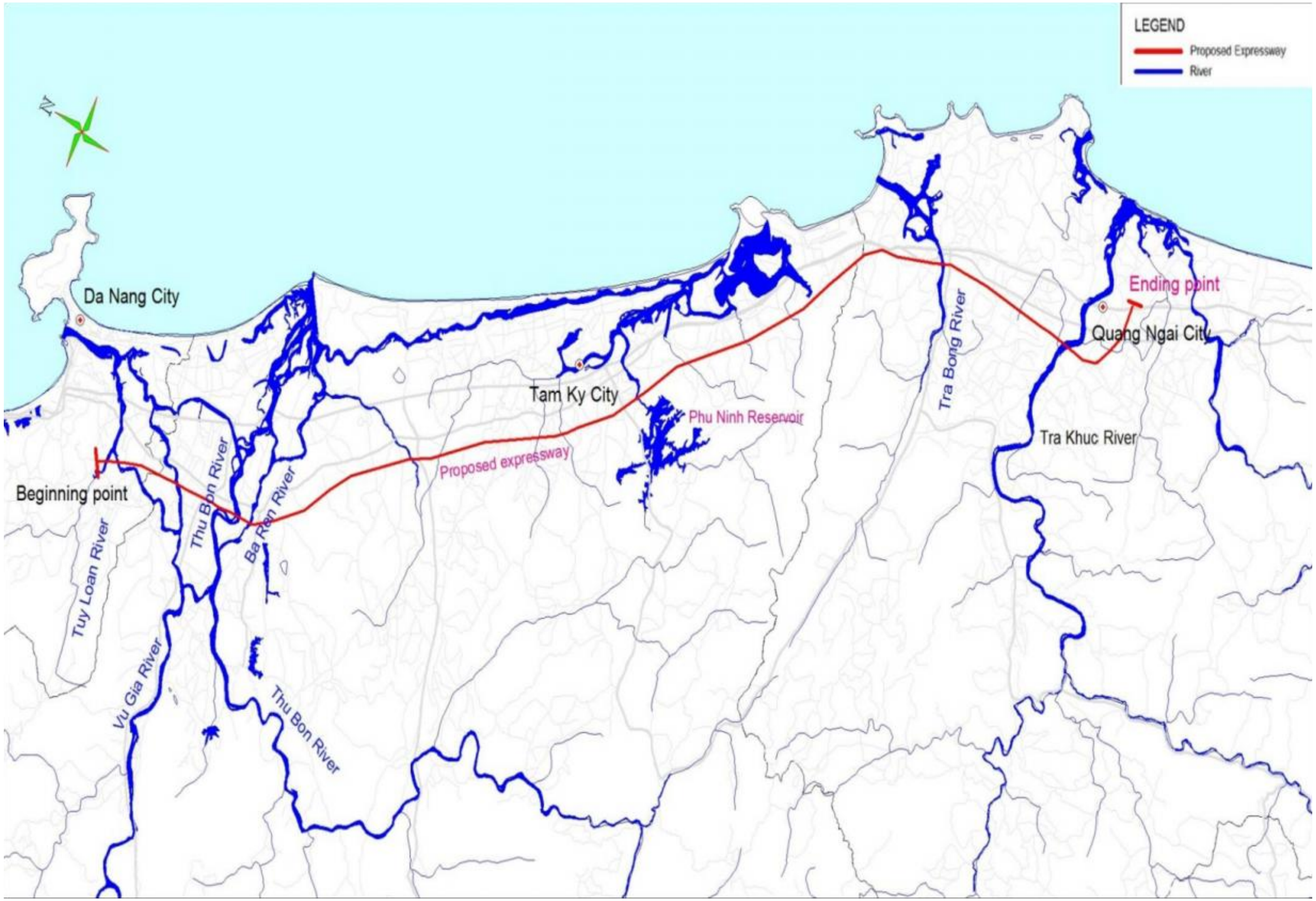


Figure 3-2: Major Rivers in the Region along the Da Nang - Quang Ngai Expressway

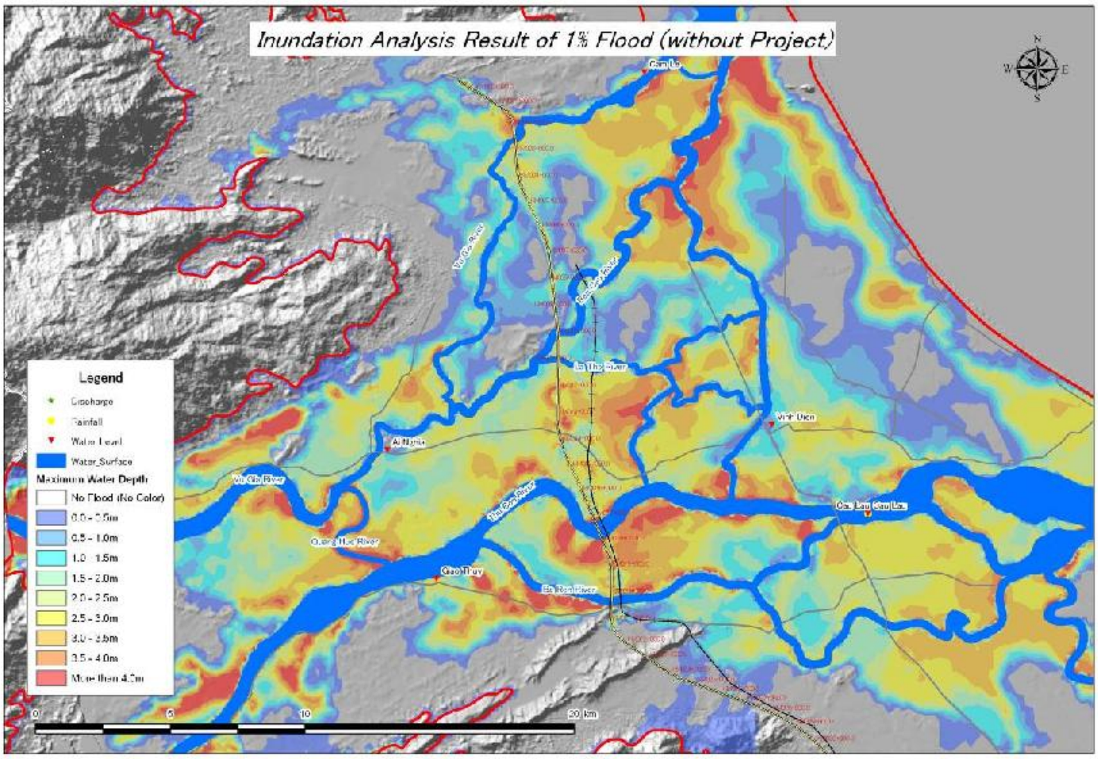


Figure 3-3: Map of Water Depth of 1% Flood at KM00+000 – KM30+000 (Without Project)

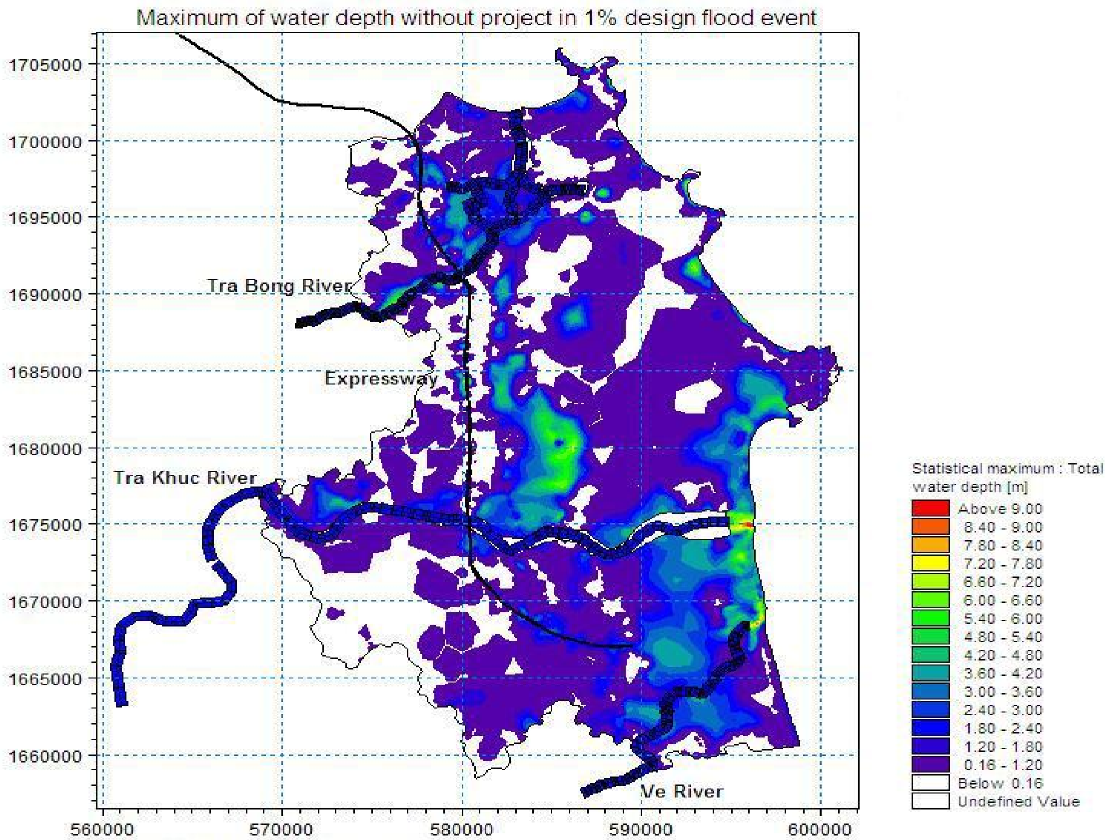


Figure 3-4: Map of Water Depth of 1% Flood at Quang Ngai Section (Without Project)

Average flood level in farms in Dien Ban district on the left bank of Thu Bon river and Hoa Vang district down stream of Vu Gia is 1.4 m and the maximum flood level is 3.2 m. Average flood level in farms in Duy Xuyen district on the right bank of Thu Bon river, located between Thu Bon and Ba Ren river is 1.3 m and the maximum flood level is 3 m.

Average flood level in farms in Que Son district on the right bank of Ba Ren river is 0.5 m and the maximum flood level is 1.5 m.

Average flood level in farms in Thang Binh district in vicinity of Truong Giang river is 0.5 m and the maximum flood level is 1.2 m.

Historical flood during the past 70 years occurred in 1964 with the average flood level of 2-2,5m and maximum flood level of 3-4 m. The flood of 1999 was not as high but the flood occurred in spring tide time resulting in large flooded areas.

Damages due to Floods: Rainfall and serious flood occurred in November 1999 submerging all plain and low hill areas from Da Nang to Khanh Hoa. All districts of Quang Nam, Da Nang and Quang Ngai were submerged 2-3 m deep for several days; flood depth was 3-4 m in residential areas in Hoa Vang District, Da Nang City, Dien Ban, Duy Xuyen, Que Son, Thang Binh, Tam Ky, and Nui Thanh; flood depth was 1-1.5 m in plain area and Quang Ngai city. In such situation, all transport means were severely delayed and interrupted for days. Many sections of NH1A were submerged under water (0.5-2 m) including localized landslides. Many provincial roads were damaged due to flood or landslide.

3.1.4 Environmental Quality

1) Surface Water Quality

During FS stage, water quality sampling has been conducted at 10 locations in 4 major rivers namely Thu Bon, Ba Ren, Tra Bong, and Tra Khuc rivers and in Phu Ninh reservoir. Water quality assessment in the Project area is shown in Table 3-1.

Table 3-1: Monitoring Site of Surface Water Environment

No	Station	Name	Sampling sites
1.	Km17+500	Thu Bon River	2 samples per location at the depth of 0m and 1.5m from the surface.
2.	Km20+000	Ba Ren River	
3.	Km109+400	Tra Bong River	
4.	Km126+000	Tra Khuc River	
5.	Km69+000	Phu Ninh reservoir	

The water of these major rivers is mainly used for agricultural irrigation and navigation. According to National technical regulation on surface water quality QCVN 08-2008/BTNMT, these rivers will be assessed based on Class B1 Standard.

Most of surface water quality parameters of the project area meet the standards set for class B1 of QCVN 08-2008/BTNMT, except the contents of suspended solids (SS) at Thu Bon River, BOD5 at Thu Bon, Ba Ren and Tra Bong rivers, and COD at Thu Bon and Ba Ren rivers. In general, the water quality of major rivers and reservoir in the study area is fairly good.

2) Groundwater Quality

In the project area, groundwater contains more complex components in narrow plains near the seaside, and large rivers. The groundwater capacity is not high. The depth of groundwater is normally 10-20m and the main supply source is rainfall and rivers. At present, the groundwater mainly serves domestic use of the local people living along the proposed highway and in some places for watering flowers and fruit trees.

Sampling of groundwater has been conducted at four locations near four major rivers (Thu Bon, Ba Ren, Tra Bong, and Tra Khuc rivers).

Comparing with groundwater quality standard - QCVN 09: 2008/BTNMT, the groundwater quality in the DQEP area is observed as following:

- pH varies from 5.75 to 6.72 within the allowable range;
- Coli forms are absent;
- Heavy metal contents are small and generally meet QCVN 09: 2008/BTNMT.

In summary, groundwater in the project area is good in quality. Parameters of groundwater quality generally meet QCVN 09: 2008/BTNMT requirements.

3) Acoustic Environment

Noise Monitoring: Representative sensitive receptors (14) were selected for noise monitoring along the project.

Assessment of Noise level: The existing noise level along the proposed expressway is mainly subject to noise from daily-life activities and traffic noise in existing roads (national roads and village roads). Based on the monitoring data in villages, the noise level between 6h-18h at the sensitive receptors ranges from 49.3 dB(A) to 69.4 dB(A), 18h-22h ranges from 34.5 dB(A) to 61.9 dB(A) and from 22h-6h ranges from 33.1 dB(A) to 54.5 dB(A). The noise level at the schools and pagoda ranges from 48.1 dB(A) to 53.8 dB(A) between 6h - 18h, from 42.8 to 51.2 between 18h - 22h and 41.0 dB(A) to 46.2 dB(A) during 22h - 6h. In general, the noise levels measured at the schools and pagoda exceed the Class I standard.

4) Ambient Air Quality

Ambient Air Quality Sampling: During FS stage, a total of 14 representative sampling points were selected for ambient air quality sampling along the proposed alignment route. The ambient air quality is monitored at the same time and located with the noise monitoring. The parameters for analysis are NO2 (nitrogen dioxide), SO2 (sulfur dioxide), CO (carbon monoxide) and TSP (total suspended particulates). The procedure of sampling and analysis followed the Technical Specifications for Environmental Monitoring.

Table 3-2 shows typical ambient air pollutant concentrations observed at 14 sampling points.

In summary, the ambient air quality within the assessment scope is relatively good.

Table 3-2: Ambient Air Quality Monitoring Results

Area	SO_2(mg/m^3)	NO_2(mg/m^3)	CO (mg/m^3)	TSP (mg/m^3)
1. Phu Hoa	0.0156	0.0433	0.761	0.29
2. Thach Bo	0.0099	0.0039	1.280	0.23
3. Ben Den Dong	0.0165	0.0046	0.808	0.30
4. Hamlet 3 – Phu Tho commune	0.0055	0.0040	2.033	0.27
5. Quy Xuan	0.0060	0.0028	0.429	0.23
6. Hamlet 1 – Tam Phuoc commune	0.0027	0.0034	0.640	0.27
7. Hamlet 3 – Tam Phuoc commune	0.0008	0.0014	2.283	0.17
8. Thai Xuan	0.0008	0.0015	2.511	0.21
9. Tri Binh	0.0014	0.0017	0.026	0.26
10. Phuoc Thuan	0.0049	0.0016	1.861	0.18
11. An Thuan	0.0036	0.0024	1.600	0.24
12. Ngan Giang	0.0027	0.0018	1.184	0.22
13. An Hoi	0.0039	0.0051	4.208	0.26
14. La Ha	0.0720	0.0073	6.466	0.35
QCVN 05:2009/BTNMT (in 1 hour average)	0.35	0.20	30	0.30
Exceed the Standard (%)	0	0	0	1

3.2 Ecological Resources

3.2.1 Ecosystems, Flora and Fauna

The surveys of current terrain and aquatic ecosystems were conducted at 16 locations along the alignment of the project. The field surveys included flora, fauna, aquatic ecosystems, and habitat of protected areas.

1) Flora biodiversity and distribution

Plant species along both sides of the proposed Da Nang - Quang Ngai Expressway included 333 species which belong to 73 families and three phyla. Species were further categorized in seven groups according to their life form:

a) Hardwoods - 75 species: Pinus kesiya, Ceiba pentandra, Canarium album, C. tramdenum, Hopea ferrea, Pterocarpus macrocarpus and others.

b) Medium size wood - 140 species: Antidesma ghaesembila, Baccaurea ramiflora, Breynia fruticosa, Mallotus philipinensis, Ricinus communis and other species.

c) Liana - 25 species: Rubus alceaefolius, Gouania leptostachya, Cissampelos pareira, Cyclea tonkinensis, Stephania hernandifolia among others.

d) Shrubs - 50 species: Achyranthes aspera, Amaranthus spinosus, Brassaiopsis ficifolia Dunn. Var. Ficifolia, Hoya obovata, Ageratum conyzoides, Eclipta prostrata, Eupatorium odoratum.

e) Creeper - 1 species: Smilax aspericaulis.

f) Herb - 27 species: Pityrogramma calomelanos, Pteris ensiformis, Dicranopteris dichotoma, Lygodium scandens, Comelia communis, Carex hypolytroides, Phrynium placentarium etc.

g) Parasitic species - 6 species: Aerides falcata, Cheirostylis cochinchinensis, Ludisla discolor, Micropera pallida, Neuwiedia annamensis, and Oberonia pachyphylla.

Plant species were also categorized in eleven groups according to their use including : 75 wood species; 107 medicinal species ; 40 food species; 16 ornamental species; 7 dye species; 4 resin producing species; 4 oil producing species; 4 species used to knit; 3 tannin producing species; 3 fibred producing species, and 1 species producing attar.

Topographically, the area is mainly plain terrain and low mound hills agro-ecosystem which have been affected by human activities for a long time. Typical crops include timber trees with economic value such as *acacia, eucaliptus, pines* etc. and industrial crops such as cashew, coffee, tea, rubber, sugar-cane, and cassava. The crops that are in common include rice, maize and balata. The fruit trees are banana, coconut, orange, jack-fruit, star-apple and others.

Section from the start point to Km 20: This section of DQEP is used mainly for growing rice crops, and farm produce. Most of the region is an agro-ecosystem that occurs next to villages and along both sides of rivers. Some plants with economic values are fruit-trees (banana, orange, rose-apple, star fruit, jackfruit, strawberry tree), Castor oil plant, *Cuye rong, spinybamboo and some Rubiaceae species. Non-commercial plants such as mimosa pigra,* *ageratum conycoides, eupatorium odoratum, imperata cylindrical are scattered in arge quantities. In addition, there are some other species belonging to the following families: Verbenaceae; Poaceae; Asteraceae; Mimosaceae; Moraceae; Arecaeae; Polypodiaceae; Musaceae; Araceae; Meliaceae, Fabaceae, Cyperaceae, Euphorbiaceae; Rutaceae; Rosaceae.*

Section from Km 20 to Km 35 - low mound hill terrain: This area has been affected by human activities. Planted forest ecosystem includes mainly Acacia mangium (black wattle) growing at the hill base with average diameter ranging from 7 to 9cm and average cover of 37%. Plant composition includes species such as white *eucalyptus, acacia, yellow flower senna, coconut, bamboo, banana, white cedar, Dendrocalamus membranaceus (may sang bamboo), Ageratum conycoides (caángay) and some species belonging to Asteraceae, Arecaceae, Fabaceae, and Convolvulaceae. In addition, plants such as scrubs, trees in plain hill including mainly heliophilous species belonging to Euphorbiaceae, Alangiaceae and species belonging to family Poaceae* were recorded.

Section from Km 35 to Km 65 - basically plain terrain: Sections of this terrain with alternating low hills. Land currently used for rice cultivation, vegetables, and cash crops, in addition to forest and hilly land. Agricultural crops blend with natural secondary vegetation on a large scale including mainly orchards *(orange, Artocarpus heterophyllus, Averrhoa carambola, banana), food tree (maize, rice...), bamboo, white eucalyptus, mimosa pigra, casuarina, Muntingia calabura* and arrangement of scrubs, grass and types of bamboo distributed in rice fields, offices, schools and along both sides of rivers.

Section from Km 65 to Km 71 - low mound hill terrain: A section of land in this mountainous land is mainly used for timber trees, fruit trees and occasional paddy field. The vegetation in this area is totally different from other sites. This area is the lake ecosystem, the species are adapted to aquatic life, small silt content... and in downstream of the river there is a mangrove ecosystem of high ecological value, including *Rhizophora apiculata, Excoecaria agallocha, Bruguiera spp, Kandelia candel, Aegiceras corrniculatum.* Additionally, plants along the road and villages are mainly casuarinas, coconut, areca, and some other fruit trees.

Section from Km 71 to Km 92 - basically plain terrain: Land along the proposed route is mostly hilly garden, fruit trees, and vegetables of all kinds. A portion of land is being used for reforestation, and planting of timber trees. Common vegetation found in this area includes fruit trees (banana, coconut, pineapple, rose- apple, star apple, mango), bamboo, Acacia and white eucalyptus as well as natural secondary plants such as Mimosa pigra, Eupatorium odoratum, wild scrub, and grass scattered along two sides of the road and river.

Region from Km 92 to Km 103 - low mound hill terrain: In this Section the land is mainly used for timber trees, fruit trees and occasional paddy field. Tree plantation includes species such as senna, eucalyptus, and pine, which is about 1km away from the road. Furthermore, fruit trees (jack fruit, rose apple, guava), *maize, cusuarina and natural plants such as Mimosa pigra, Ageratum conycoides* are scattered along both sides of bridge and river.

Section from Km 103 to the end point - basically plain terrain: This section includes mainly farmland and paddy field, and a small portion of industrial crops (cassava, sugar cane ...) and timber trees. Land here is mostly used for civilian purposes such as student housing, orchards. Cultivated vegetables on alluvial plain along river sides and natural plants are scattered around the bridge with main species such as *Dendrocalamus membranaceus,* *eucalyptus, yellow flower sienna, Acacia, coconut, banana, Bidens bipinnata, Mimosa pigra.*

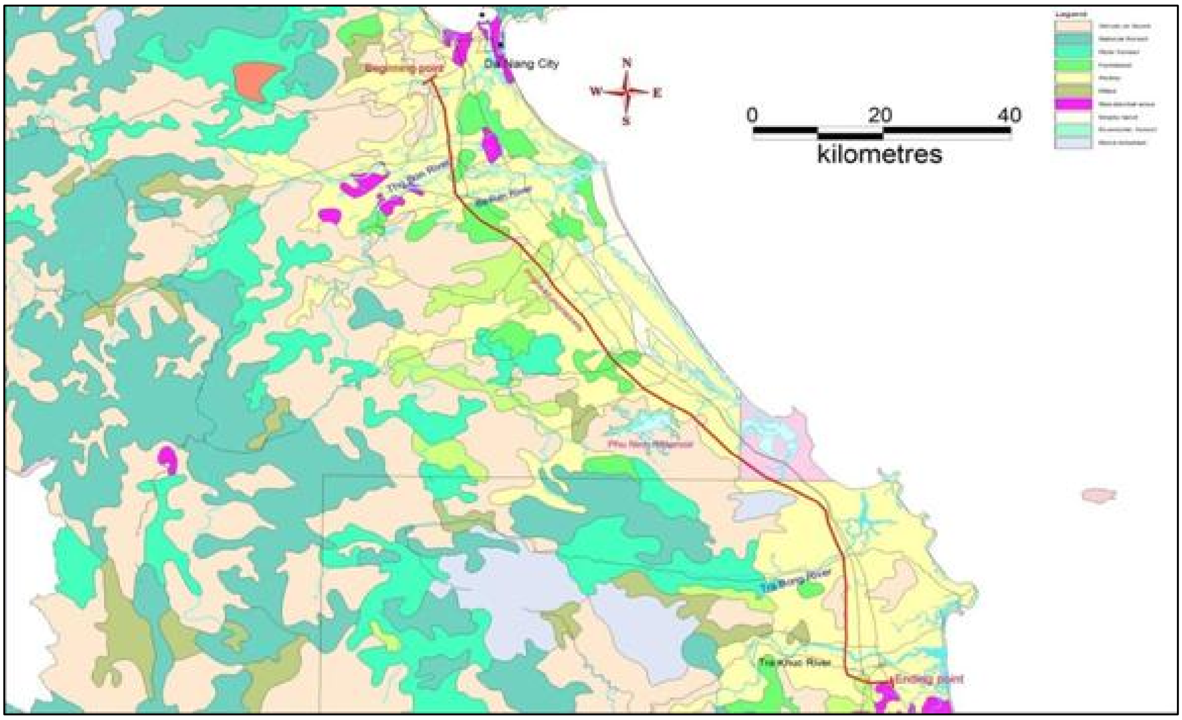


Figure 3-5: Current Distribution of Vegetation Types

2) Fauna

Amphibians: There are 8 Amphibians species belonging to 4 families from the order Anura recorded in the project area. Among these, family Ranidae has the highest number with 4 species, accounting for 50% of total amphibians. None of these species belongs to the Viet Nam Red List of Threatened Species.

Table 3-3: Amphibian Species in the Project Area

No.	Name	
	Type: Amphibian	
	ANURA	
	Family	**Species**
1	*1. Bufonidae*	*Bufo melanostictus (Schneider, 1799)*
2	*2. Hylidae*	*Hyla simplex (Boettger, 1901)*
3	*3. Ranidae*	*Hoplobatrachus rugulosa (Wiegmann, 1835)*
4		*Limnonectes limnocharis (Boie,1834)*
5		*Occidozyga lima (Gravenhorst, 1829)*
6		*Rana guentheri (Boulenger, 1882)*
7		*Rana macrodactyla (Gunther, 1859)*
8	*4. Rhacophoridae*	*Polypedates leucomystax (Gravenhorst 1829)*

Reptiles: There are 24 reptile species belonging to 8 families (order Squamata) recorded in the project area. Among these, family Colubridae has the highest number with 12 species, accounting for 50% of total Reptiles. There are 5 venomous snakes. They are *Rhabdophis subminiatus, Bungarus fasciatus, Bungarus candidus, Ptyas korros, and Naja Atra. Adaptations* of these species are very diverse. Some species dwell in or nearby community houses such as *Hemidactylus frenatus, Hemidactylus garnoti, Mabuya longicaudata, Mabuya multifasciata. Others as Xenopeltis unicolor, Xenochrophis piscator dwell* in ponds or swamps. *Cyclophiops multicinctus, Dendrelaphis pictus, Ptyas korros* live on trees. *Rhabdophis subminiatus, Ramphotyphlops braminus, Elaphe radiate* exist in grass and near ponds. And *Calotes versicolor, Calotes mystaceus, Elaphe radiate, Bungarus fasciatus, Bungarus candidus, Najaatra* dwell in holes or hide under a patch of dry grass for hunting dawn preys including small birds or amphibians. None of these species belongs to the Viet Nam Red List of Threatened Species.

Bird: There are 83 bird species belonging to 37 families and 13 orders recorded in the project area. Among these, family Ardeidae has the highest number with 7 species, next to *Sylviidae – 6 species, 3 families (Anatidae, Scolopacidae, Sturnidae)* – 4 species each, the last one has only 1 to 3 species. The average number of species per family is about 2.2 species. There are many landscapes and habitat types along the route, so many bird species are distributed accordingly in the area. There is not bird species included in the Viet Nam's Red Data Book.

Mound hills with grass plots and scrubs - 51 species: *Egretta garzetta, Ardeola bacchus, Milvus migrans, Falco tinnunculus, Falco severus, Gallus gallus, Streptopelia chinensis, Cacomantis merulinus, Centropus sinensis, Otus bakkamoena, Caprimulgus macrurus, Halcyon smyrnensis, Hirundo rustica, Pycnonotus jocosus, Lanius schach, Saxicola ferrea, Prinia rufescens, Aethopiga saturate, Crypsirina temea, Corvus macrorhynchus*… Agricultural land with rice fields and gardens - 73 species: *Bubulcus ibis, Corturnix chinensis, Anas querquedula, Charadrius dubius, Vanellus indicus, Tringa ochropus, Tringa hypoleucos, Gallinago sternura, Pittacula alexandri, Ceryle rudis, Alcedo athis, Motacilla flava, Hemipus picatus, Pycnonotus jocosus, Lanius schach, Garrulax chinensis, Garrulax canorus, Prinia rufescens, Prinia hodgsoni, Aethopiga saturate, Crypsirina temea, Corvus macrorhynchus, …*

Residential areas with fruit gardens - 63 species*: Ardea cinerea, Aethopiga saturate, Crypsirina temea, Corvus macrorhynchus, Egretta garzetta, Falco tinnunculus, Falco severus, Amaurrorni sphoenicurus, Charadrius dubius, Columba livia dometicus, Centropus sinensis, Tyto alba, Copsychus saularis, Parus major, Dicrurus macrocercus, Corvus macrorhynchus,…*

Rivers, springs, ponds, reservoirs, rice fields, and swamps – 32 species: *Ardea cinerea, Egretta garzetta, Butorides striatus, Elanus caerulenus, Milvus migrans, Amaurrorni sphoenicurus, Charadrius dubius, Vanellus indicus, Columba livia dometicus, Centropus sinensis, Alauda gugulla, Saxicola ferrea…*

Mammals: There are 25 Mammals species belonging to 14 families from 6 orders recorded in the project area. Among these, family *Muridae has* the highest number with 5 species, next to *Suiridae* 4 species; the last one has only 1 to 2 species. The average of species per family is about 1.7 species, so species composition of mammals in this area is very scattered. Survey results showed that the distribution of mammals varies according to habitat types:

Mound hills with grass plots and scrubs - 19 species: *Suncus murinus, Tupaia glis, Pipistrellus javanicus, Melogale personata, Viverra zibetha, Viverricula indica, Herpestes javanicus, Herpestes urva, Sus scrofa, Muntiacus muntjak, Muntiacus muntjak, Bubalus bubalis, Bos taurus, Callosciurus flavimanus, Dremomys rufigenis, Menetes berdmorei, Tamiops rodolphei, Bandicota indica, ...*

Agricultural land with rice fields and gardens - 9 species: *Suncus murinus, Herpestes urva, Sus scrofa, Canis familiaris, Bubalus bubalis, Bos taurus, Rattus flavipectus...* Residential areas with fruit gardens - 11 species: *Suncus murinus, Pipistrellus javanicus, Canis familiaris, Felis catus, Bubalus bubalis, Bos taurus, Mus musculus, Rattus flavipectus...* Rivers, springs, ponds, reservoirs, rice fields, and swamps - 3 species: *Sus scrofa, Bubalus bubalis, Bos taurus.*

River systems and streams from Da Nang to Quang Ngai province have the specific characteristics of those in Central Vietnam. The lengths are short; the flow velocity is strong in rainy season while in dry season, flow velocity is weak. The system involving Vu Gia - Thu Bon Rivers is the most important, with high potential for hydroelectric generation and fish production. This river system has two main branches including Vu Gia and Thu Bon and it has three other branches including Dak My, Bung and Tranh. Therefore, this system harbours a high biodiversity of fish and other aquatic organisms.

Fish:

Composition of fish species in project areas from Da Nang to Quang Ngai includes 187 species, belonging to 45 families, 12 orders (Table 24), of which the system of Vu Gia - Thu Bon rivers accounts for 107 species, 31 families, 9 orders.

Species composition reflects different levels of dominance of main orders and families. *Cypriniformes* account for 165 species, occupying 64.2 %, *Perciformes* (21 families, 53 species) - 20.6 % and Siluriformes (7 families, 21 species), occupying 8.2%. *Cyprinidae* and *Gyrinocheilidae* have 77 and 71 species respectively.

No.	River Tributaries	Number of species	H' index
1	Ta Vin Tributary converge Bung river	13	1.0397
2	Khe Vinh	13	2.1246
3	Bung river	43	2.1798
4	Vu Gia Tributary at Ha Nha area (middle stream)	21	2.7083
5	Vu Gia Tributary at Ai Nghia area (middle stream)	32	2.7912
6	Vu Gia Tributary converge Thu Bon area at Vinh Dien	27	2.1274

Note: H' index is The Shannon index that it is one of several diversity indices used to measure diversity in categorical data

Plankton and Benthos

Analysis results in 3 provinces in the project area identified 60 species belonging to 3 phyla, of which Bacillariophyta includes 50 species occupying 83,4% of the total species, Pyrrophyta – 8 species, occupying 13,3%, Cyanophyta just includes 2 species, occupying 3,3%.

PHYLUM	Class	Order	Family	Species No Family	Percentage
Cyanophyta	Cyanophyceae	Nostocales	Oscillatoriaceae	2	2.0 - 3.3%
Bacillariophyta	Bacillariaceae	Centrales	Coscinodiscaceae	4	50.0 – 83.4%
			Thalassiosiraceae	1	
			Leptocylindraceae	4	
			Rhizosoleniaceae	7	
			Bacteriaceae	3	
			Chaetoceraceae	15	
			Biddulphiaceae	5	
			Hemidiscaceae	2	
		Pennales	Fragillariaceae	3	
			Naviculaceae	3	
			Nitzschiaceae	3	
Pyrrophyta	Phytomastigo horeae	Dinoflagellat	Peridiniidae	8	8.0 – 13.3%

Regarding density composition, Silic algae always predominate with a ratio ranging from 43,2% to 100%. Density distribution has great difference among sampling sites and sampling months rainy season (February) and dry season (August).

Density of phytoplankton in February varies from 1378 cells/m3 (Quang Nam) to 2499 cells/m3 (Quang Ngai), lower than in August, which ranges from 2639 (Quang Nam) to 16222 cells/m3 (Da Nang).

Being a group of organisms which is sensitive with environmental change, a high increase of phytoplankton density in the sites (Da Nang, Quang Ngai) is a warning of environmental pollution existed in the project area.

Zooplankton

Synthesized data gained about Zooplankton in fresh water rivers in the project sites such as Ba river (August, 2005) and Bung river (February, 2006) shows that species composition is quite poor with 34 - 35 species, belonging to 17 families. Zooplankton species compositions in the tributaries of Ba and Bung rivers are represented for fresh water areas because of presence of *Cladocera*, predominant with 50% and *Rotatoria* occupies from 8.6 – 20.6 % while *Copepoda* has only from 7 to 13 species, occupying the secondary position (20.6 -37.1%).

Zoobenthos

Fresh water areas are rice fields, rivers, and water reservoirs where Zoobenthos and Fish survive. Zoobenthos in aquatic areas include 34 species belonging to 17 families, 6 classes, 3 phyla, of which *Mollusc* include the most abundant species number with 24 species, accounting for 70.6 %, *Arthropoda* include 8 species - 23,5% and *Annelida* include only 2 species – 5.9 %. Shrimps, crabs, oysters, and snails have ecological value – not only as bioindicators for environmental quality but also as food resources for humans, aquatic cattle, and fish.

3.2.2 Protected area (Phu Ninh Natural Reserve)

Phu Ninh is situated in Nui Thanh district and Tam Ky town, south-eastern Quang Nam province, close to the border with Quang Ngai province (Figure 3-6). The proposed nature reserve is focus on a reservoir. The site increases in elevation from under 50m in the north, to 1,362m in the south. Phu Ninh has not been listed in any official government decree concerning the Special-use Forest system. The People's Committee of Quang Nam province is interested in the establishment of Phu Ninh as Nature Reserve. A management/investment plan for the proposed Nature Reserve has not yet been prepared, and the site is currently designated as a 23,409 ha watershed protection forest under the management of Quang Nam Provincial Forest Protection Department (FPD). A watershed protection forest management board was established by Quang Nam Provincial People's Committee on 12 March 1997 (Quang Nam Provincial FPD 2000). The Phu Ninh Reservoir was recently awarded national historical heritage status in 2009. Phu Ninh reservoir is an irrigation work containing a half billion cubic meters of water. The catchment area is 33.4km^2. It was started to be build in 1977 and was finished 10 years later. It provides important services such as irrigation, hydro-electricity, forest and agriculture or supply fresh water for daily life. Especially, it harbors a hot mineral spring water source. Phu Ninh Reservoir is well known as an eco-tourism resort, a vast expansive surface with beautiful islands and tree-covered mountains. Various plants and many precious species are preserved here.

The proposed alignment was designed following the avoidance principle. The Phu Ninh Reservoir was avoided. The distance from the alignment to the Phu Ninh protected area varies from 1.8km to 2.5km. The proposed highway will mainly cross the residential land, and agricultural cultivation area of the Phu Ninh Reservoir basin.

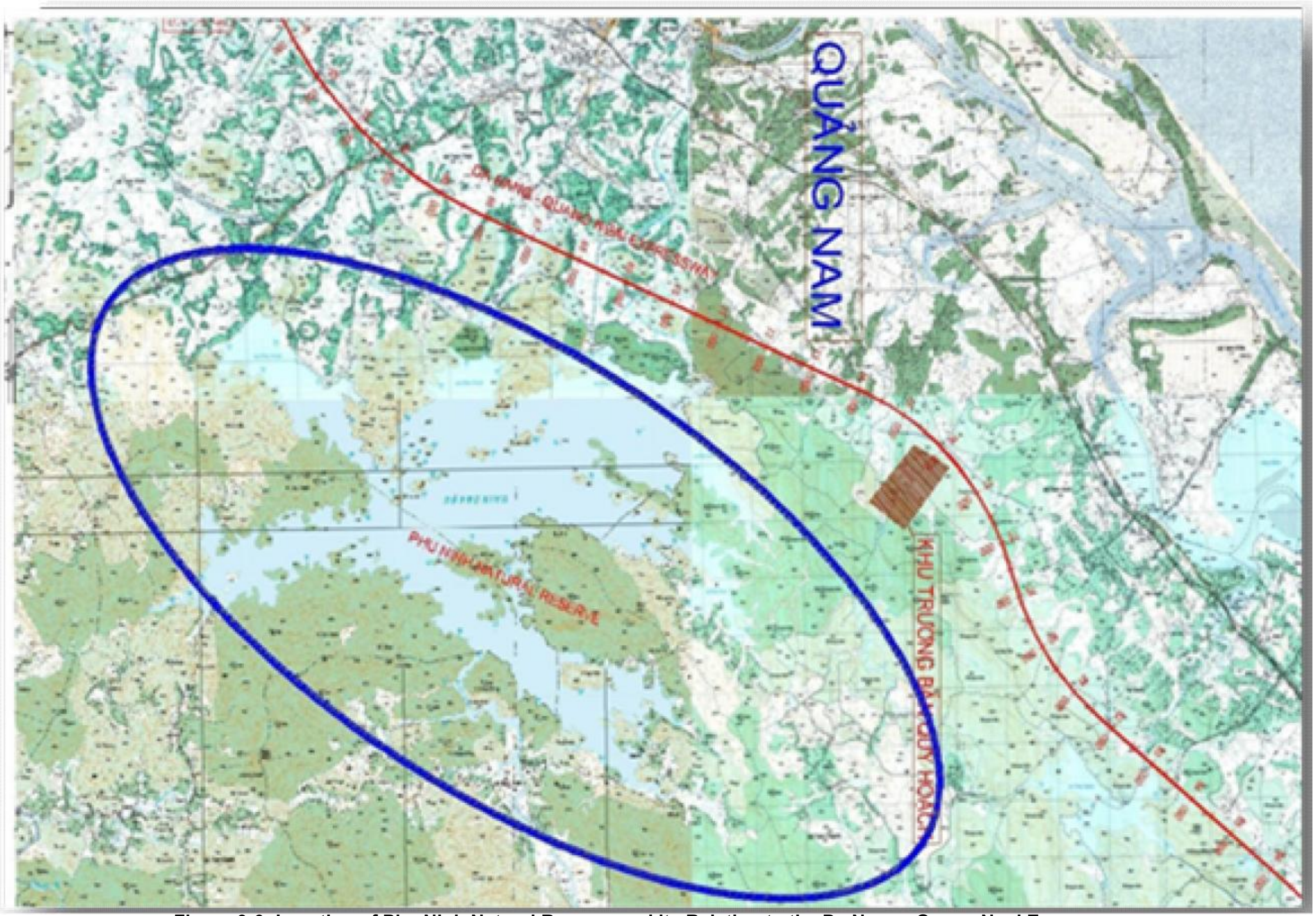


Figure 3-6: Location of Phu Ninh Natural Reserve and its Relation to the Da Nang - Quang Ngai Expressway

3.3 Socio-economic Environment

3.3.1 General

Da Nang is one of the national's economic, cultural, scientific and technological centers, strategically located in the central region of Vietnam. Danang has been designated by the central government to be the core city of the Key Economic Zone in central Vietnam, the entrance to the UNESCO World Heritage sites, and the terminal point of the East-West Corridor linking with Laos, Thailand and Myanmar.

During the last ten years Danang has shown a continuous and stable economic growth corresponding to a healthier quality of life, advanced infrastructure, and improved urban planning. The economy has been optimistically restructured, with the industrial and construction sector making up 47.59%, the service sector 49.4% and the agro-forestry and fishery sector 3.01% of the GDP.

Quang Nam is a province that considers agriculture as the main industry. With two famous traditional products: the world's highest essential oil content Tra My cinnamon (Saigon cinnamon) and Ngoc Linh ginseng. However, Quang Nam is rich in mineral resources including coal, gold, white sand and mineral water. There are also large reserves of industrial white sand at Thang Binh and Nui Thanh districts. The province exhibits a remarkable development of the industry and infrastructure facilities, positively influencing the stable growth of the national economy. Agriculture products occupy 24.98% of GDP, the industrial production value occupies 38.18 % of GDP, and service production value occupies 36.84%. GDP grew at an average rate of more than 10% during the last years.

Right on the National Highway 1A and the Trans-Viet Railway, Quang Ngai plays an important strategic role in the Pivotal Economic area of Central Vietnam and the East - West Economic Corridor bordering with Laos and Myanmar. Quang Ngai province has embarked into a fast economic structural adjustment and growth in recent years. At present, Quang Ngai province considers agriculture as the main economic sector.

In general, except for Da Nang city, the economy of both provinces is under-developed, with the GDP per capita lower than the national average. The GDP per capita varies significantly between different provinces. Da Nang's GDP is about 1.5 times higher than the national average. The GDP of Quang Nam and Quang Ngai represents 60% of the national average.

On August 13, 2004, the Prime Minister of Vietnam signed a decision to establish a Key Economic Zone in central Vietnam comprising Da Nang City and Thua Thien-Hue, Quang Nam, Quang Ngai and Binh Dinh provinces. A move aimed at leveraging the strategic location, potentials, and advantages of these dynamically growing areas. Da Nang thereby, has the crucial role of becoming a growth nucleus by giving impetus to the socio-economic growth of the central coast and the Central Highlands region.

3.3.2 Population Structure and Ethnic Groups

The population structure of areas along the route is shown in Table 3-4. Except for Da Nang city where the urban population and urbanization rates are high, the population density outside Da nang is comparatively low and the proportion of rural/agricultural population is high in the Quang Nam and Quang Ngai provinces.

Table 3-4: Population Structure of Areas under the Influence of the Project

Province/ City	Overall Population	Urban Population	Rural Population	Population Density
Da Nang City	901,546	781,659	119,887	708
Quang Nam Province	1,551,345	269,580	1,281,765	165
Quang Ngai Province	1,391,682	205,716	1,185,966	272

Source: Statistic Yearbook of Da Nang City, Quang Nam, and Quang Ngai Provinces, 2010

The main ethnic groups in Da nang City, Quang Nam, and Quang Ngai Provinces are Kato, Xe Dang, Gie Trieng, Cor, Hre and Hoa. Most ethnic minorities are currently living in the west of the provinces, in upland, and mountainous regions. The role of elders, chief of villages, and heads of kinships still play an important role in social relations within the ethnic minority communities.

The field surveys and public consultation meetings show that these ethnic minority people will not be affected by land acquisition and other impacts caused by the Project.

3.3.3 Living Condition

The annual average net incomes of farmers in the areas directly affected by the Project range from 10 to 20 million VND, and the annual average salaries of urban residents range from 14.71 to 27.95 million VND. The difference between incomes of farmers and urban residents is considerable (from 4 times to 5 times).

According to the EIA survey on socio-economic condition of the Project – affected areas, most villages in the affected areas rely on agriculture as the main income source. In particular, the income of the region comes from paddy and cash crops such as fruits and vegetables. Some village families have young relatives working in the more developed regions such as the local urban centers or the coastal regions to supply their income.

3.3.4 Transportation Conditions

Danang International Airport, located at the center of the city, is the third international airport in Vietnam. It is an important gateway to access to central Vietnam. Danang Station is a major station along the Trans-nation Railway, also known as the Reunification Railway. National Highways 1A and 14B run through the city, providing road connections to Ha Noi in the North and Ho Chi Minh City in the South, as well as the Central Highlands and Laos to the West. The Hai Van Pass on National Highway No.1A is a mountain pass between Da Nang and Thua Thien Hue Province. To reduce travel time and ensure security for motorists on the twisting mountain road, the Hai Van Tunnel was built, and brought to operation in 2005. It is the longest tunnel (6.28 km) in Southeast Asia, and allows motorists to travel through the pass in 30 minutes instead of 60 minutes if they use the old Hai Van Pass route. Da nang port system is the third largest in Vietnam after Ho Chi Minh City and Hai Phong.

Travelers going to Quang Nam or coming from Quang Nam by train usually stop at Da Nang or Tam Ky Railway Station, and then take buses to reach their destinations. However, a large part of Quang Nam province's territory is mountainous area, so transportation in this province is particularly difficult.

Road and waterway system in Quang Ngai province includes National Highway No. 1, Trans-nation Railway running through the province, National Highway 24 linking the province with the highland provinces, Dung Quat deep seaport, Quang Ngai International Airport located 35 km North of Quang Ngai city in the North.

3.3.5 Infrastructure Facilities

Recently, the Vietnamese government has focused investment efforts in developing the economic zones along the proposed project area. Many major infrastructure development projects have been completed or are being implemented, including the Hai Van Pass Tunnel, one of the biggest tunnel projects in South - East Asia, linking Hue with Da Nang; the Da Nang - Quang Ngai Expressway; Chu Lai Open Economic Zone (Quang Nam province); Dung Quat Economic Zone (Quang Ngai) with the development of an oil refinery, and petro-chemical industry; Nhon Hoi Economic Zone (Binh Dinh); and upgrading and expansion of the Da Nang International Airport and seaport.

Power Supply: The electric power transmission system in the Project area (Da Nang, Quang Nam, Quang Ngai) is quite developed. The grid voltage system of 35 KV is included in the high voltage grid system of 500 KV. Due to the severe topographic condition, and dispersed residential areas, power grids tend to be concentrated in some narrow areas. Along the alignment, in sections km0 - km16; km58 - km73; and km91 – km105 there is high density of high voltage electric poles. In these sections, adequate alignment planning is required to minimize impacts to the electric grid.

Irrigation: There are many reservoirs for irrigation of the eastern plains along the alignment of the expressway. The Phu Ninh Reservoir is the largest one with an average water surface area of $33.4km^2$. Near by is the Thai Xuan Reservoir with $1.86km^2$. These reservoirs are generally located in upstream of the roads. The distance from the reservoirs to the proposed alignment varies from 100m to 4,500m. There are also many rivers, streams, water dams, and irrigation channels for agriculture across the proposed alignment.

Housing: The field survey results indicate that houses in the area are mostly one story or two stories and made of stick and mortar, or mud. Because the population density is quite low in this area, the floor area per capita is relatively large.

3.3.6 Education and Public Health

People in the project area suffer severe limitation of access to social infrastructures in general. The health sector in the area faces severe resource constraints although the higher incidence of health problems compared to the other regions in Vietnam. Supply of clean water is still a concern to many. Education is available, but school fees make it difficult for poor children to get access to education. It is indicated that physical access to schools can also be difficult by secondary sources. In fact, many hamlets in the area still lack access to all-weather roads today. Most communes in Quang Nam and Quang Ngai have only about 20 – 40% of all - weathered roads.

3.3.7 Cultural, Historical, Religious Heritages and Other Important Establishments

In January 2010, The Vietnam Institute of Archaeology carried out a comprehensive investigation regarding tangible cultural heritage sites along the DQE project. The research was designed to determine, study, and evaluate potential (i.e., remains, relics still buried under the ground, etc.) and observable archaeological sites on the ground, as well as those relics associated with contemporary local residents (for instance, communal houses, temples, pagodas, shrines, burials…), irrespective of being ranked or not.

The survey showed that there are four architectural ruins, namely Chua Vua, Trien Tranh, Go Loi and Go Gach, occurring in the Chiem Son Tay valley (Duy Trinh commune, Duy Xuyen district), and one area presenting evidence of an ancient pottery kiln system along the Tra Bong river in Binh Son district (Quang Ngai). The locations of these sites are adjacent to the route construction area. Additionally, the consultative group also collected a number of artifacts in the working area. Of the four sites mentioned above, only one site namely Trien Tranh is going to be directly impacted. The information concerning the archaeological sites along the alignment is summarized in Appendix 4.

3.3.8 Land Use

Existing land use in the project area road is described below. The area of forest land has the largest percentage of coverage of the area, about 50% on average. This is more obvious in Hoa Vang district (Da Nang City) where forest land coverage is about 74.88%. The agricultural production land is high and ranges from 8.91% to 24.0% of the land cover. Unused land is relatively high and ranges from 10.83% in Hoa Vang district to 26.72% in Quang Nam province. The other category land area is quite small. Thus the majority of land use that will be affected by the road project includes forest, cultivated, and unused lands

Region		Total area	Agricultural production land	Forestry land	Specially used land	Residential Land	unused Land
Hoa Vang District	Area (Km^2)	736.91	65.65	551.78	15.01	23.69	79.78
		100	8.91	74.88	2.17	3.21	10.83
Quang Nam Province	Area (Km^2)	10,438.37	1,482.70	5,659.89	298.34	208.70	2,788.74
		100	14.0	54.22	2.86	2.00	26.72
Quang Ngai province	Area (Km^2)	515,256.39	123,919.71	242,694.2	9,416.05	17,667.66	102,551.86
		100	24.0	47.1	3.4	1.8	19.9

3.4 Sensitive receptors along the road

Since the commencement of D/D, the Study Team has carried out a series of field surveys to confirm the environmental and social conditions, and the environmentally-sensitive spots/structures along the proposed alignment.

In addition, the Study Team has also carried out a number of hearings to local residents and authorities, etc. to collect necessary information to confirm the validity of the alignment planning.

As a result of these surveys and hearings, the Study Team had identified a number of design control points and environmentally-sensitive spots/ structures as shown in Appendix 2 and 3.

These design control points and environmentally-sensitive spots/structures were considered during the process to evaluate the adequacy/shortcomings in the choice of the alignment.

Chapter 4 Anticipated Environmental Impacts

4.1 Checklist of Environmental Impacts

Table 4-1 describes potential impacts those would be caused by the Project during pre-construction phase, construction phase, and operation phase.

Table 4-1 Checklist of Environmental Impacts

Environmental Impacts		Evaluation			Remark
		Pre-construction phase	Construction phase	Operation phase	(Cause of impacts)
Pollution					
1	Air pollution	-	A	B	- Exhaust gases and dust from construction equipment - Exhaust gases and dust from vehicles bringing construction materials and excavated soil - Exhaust gases and dust from vehicles using the expressway (operation phase)
2	Surface water pollution	-	A	B	- Contamination/toxic materials from construction sites/camps - Polluted runoff water from road surface, leakage of toxic materials caused by traffic accident, etc. (operation phase) - Waste water from the service areas, parking areas, etc. (operation phase)
3	Groundwater pollution	-	B	C	- Contamination from construction sites
4	Spoil, waste	-	A	B	- Transportation and disposal of spoils/construction wastes generated from the demolition of structures, and construction of road, tunnel, bridges, etc. - Solid wastes generated from construction yards/sites, worker camps - Solid wastes generated from service areas, parking areas, etc. (operation phase)
5	Soil contamination	-	B	B	- Toxic materials from construction equipment - Polluted runoff water from road surface (operation phase)
6	Vibration	-	B	C	- Vibration generated by construction equipment - Vibration from vehicles bringing construction materials and spoils - Vibration generated by vehicles using the expressway (operation phase)
7	Noise	-	A	A	- Noise generated by construction equipment - Noise from vehicles bringing construction materials and spoils - Noise generated by vehicles using the expressway in operation phase
8	Ground subsidence	-	C	C	- Ground subsidence may occur in the section with soft soil foundation
9	Offensive odor	-	-	-	-
10	Sediment	-	-	-	-
Natural Environment					

Environmental Impacts		Evaluation			Remark
		Pre-construction phase	Construction phase	Operation phase	(Cause of impacts)
11	Protected area	-	-	-	- There is no protected area around the project sites
12	Terrestrial ecosystem	B	B	C	- Loss of plantation (tree cutoff) - Civil works (excavation and refilling) - There is no report on existence of precious species around the project sites
13	Hydrological situation	-	A	A	- River flows in the project area may be affected by the road embankment, especially in case of flood
14	Topography and soil erosion	-	A	C	- Excavation works or banking of soil
Social Environment					
15	Land acquisition and resettlement	A	C	-	- Large area of land would be acquired to make land for road, service areas, parking areas, etc.
16	Living and livelihood (including economic activities)	A	A	B	- Loss of residential land/cultivated land, - Interruption of production, interruption of schooling, - Relocation of houses/graves, relocation of public utilities, - Split of land, split of community, etc.
17	Heritage, Cultural / Archaeological Properties	-	A	O	- There is no any heritage existing in the project sites - Champa ruin (Trien Chanh ruin in Duy Trinh Commune, Km22+000) may be encroached
18	Landscape (aesthetics and visual effects)	-	C	C	- High road embankment may cause damage to rural landscape in some sections
19	Traffic (congestion and accident) and public facility	-	A	B	- Vehicles involving in construction works may cause traffic congestion and accident on the access roads - Increased traffic volume on linking roads may cause more traffic congestion and accident on these roads (operation phase)
20	Split of community	-	A	A	- Split of land/ community, communication impedance, etc. (in construction phase and operation phase)
21	Public health condition	-	B	C	- Influx of new labor may bring epidemics such as HIV
22	Hazard	-	A	A	- Damage of flood may be more severe due to the highly-embarked road - Accidents involving trucks transporting hazardous materials on the bridges may pollute the river water
23	Religious consideration	B	B	B	- Several religious establishments may be relocated in pre-construction phase, or may be affected by noise, vibration etc. during construction phase and operation phase
24	Ethnic minorities and indigenous peoples	-	-	-	- There is no any report on the existence of ethnic minorities and indigenous peoples in the project area
Others					
25	Unexplored bombs and mines	C	C	-	- Unexploded bombs and mines may exist in the project area

Note *A: serious negative impact is expected*
B: negative impact is expected to some extent
C: limited impact / negligible impact
O: To be assessed together with other items

Table 4-2 summarizes major impacts that may be caused by the Project during pre-construction phase, construction phase, and operation phase. These impacts and its associated mitigation measures will be described in more detail in the next sections of the report.

Table 4-2 Major impacts caused by the Project

Environmental items	Pre-construction phase	Construction phase	Operation phase
Pollution			
Air pollution	-	▲	▲
Surface water pollution	-	▲	○
Groundwater pollution	-	○	-
Spoil, waste	-	▲	○
Soil contamination	-	○	○
Vibration	-	○	○
Noise	-	▲	▲
Natural Environment			
Protected area	-	-	-
Terrestrial ecosystem	-	▲	○
Hydrological situation	-	▲	▲
Topography and soil erosion	-	▲	○
Social Environment			
Land acquisition and Resettlement	▲	○	-
Living and livelihood (including economic activities)	▲	▲	○
Heritage, Cultural/ Archaeological Properties	-	▲	○
Landscape (aesthetics and visual effects)	-	○	○
Traffic (congestion and accident) and public safety	-	▲	○
Split of community	-	▲	▲
Public health condition	-	○	○
Hazard	-	▲	▲
Religious consideration	○	○	○
Ethnic minorities and indigenous peoples	-	-	-
Unexplored bombs and mines	○	○	-

Note ▲ *serious negative impact is expected*
○ *negative impact is expected in some extent*
\- *limited impact / negligible impact*

The Project has aimed to minimize these impacts through careful selection of the route in consultation with the public, and completion of impact assessments compliant with Vietnam and World Bank regulations. Descriptions of anticipated impacts and corresponding mitigation measures are described in the subsequent sections.

4.2 Impacts in Pre-construction Phase

Before construction, the main impact is caused by land acquisition and resettlement. With the selected alignment, about **961 ha** of land including the followings would be permanently acquired:

- Agricultural land: **437 ha (46%)**
- Secondary forest: **184 ha (19%)**
- Resident land: **73 ha (8%)**
- Other land & water surface: **267 ha (27%)**

According to result of the inventory of losses, it is estimated that more than **6,000** households would be affected, and among them, more than **2,200** households would be relocated.

Detailed information on land acquisition, resettlement, impact on socio-economic etc. is described in the updated Resettlement Action Plans (RAPs). Sub-RAPs for each district are being prepared, including of land acquisition, resettlement, compensation information and restoration programs.

4.3 Impacts in Construction Phase

4.3.1 Air Pollution

The most typical impact of expressway construction on local community health is impacts by dust and emission. Air pollution not only impacted on people's health but also on agriculture.

Air pollution during construction phase is mainly caused by: (1) flying dust produced from mixing lime and soil, (2) material stock grounds, (3) Emission, leakage/spillover of materials/spoils during transportation, (4) dust from temporary roads and unpaved road surfaces.

The parameter of total suspension particle (TSP) is mainly used to assess the level of impact.

1) Flying dust from mixing lime and soil

The expressway construction needs to set up a number of cement mixing stations, where locations will be determined in the construction stage. In general conditions, according to testing results, the TSP concentrations in the air at the locations 50 m, 100 m, and 150 m from a cement mixing station in leeward direction are 8.849 mg/m^3, 1.703 mg/m^3, and 0.483 mg/m^3 respectively. The TSP concentration at the location 300 m or farther from the cement mixing station generally meets the requirement of national environmental standard on air quality.

2) Dust from material stock grounds

Lime, cement and other bulk materials are apt to fly under wind force. The flying dust is generally concentrated at the location 50 m from the stock ground in leeward wind direction. Considering its harmful effect to humans and plants, protection works should be properly undertaken during the material stocking process.

3) Emission, Leakage/spillover of materials/spoils during transportation

Lime, gravel, sand and other bulk materials and spoils are very likely to cause dust pollution during transportation. TSP concentration may be 4 times higher than the national standard on air quality at the location 150 m from the materials/spoils transporting road in leeward direction.

Emission of construction vehicles is as follow:

Vehicle	SO2	NOX	CO
1. Car and Bus			
- Engine capacity < 1400 cc	1.74	1.31	10.24
- Engine capacity 1400 – 2000 cc	2.0	1.13	6.46
- Engine capacity> 2000 cc	2.3	1.13	6.46
Average	2.05	1.19	7.72
2. Truck			
- Gasoline engine > 3,5 ton	4.5	4.5	70
- Light truck, diesel engine <3,5 ton	1.16	0.7	1
- Medium truck, diesel engine <16 ton	4.2	11.8	6.0
- Heavy truck, diesel engine >16 ton	7.26	18.2	7.3
- Bus, diesel engine >16 ton	6.6	16.5	6.6
Average	4.76	10.3	8.2

Source: Air Emission Inventories of Vehicles According to WHO (Unit: g/km)

4) Dust from temporary roads and unpaved road surfaces

It is expected that a considerable quantity of flying dust generated from the movement of construction vehicles on the unpaved access road would cause significant impact to the surrounding areas.

5) Asphalt smoke

Construction of road, interchanges, and tunnels requires a huge amount of asphalt and cement. THC, TSP and BaP generated from the asphalt paving are the main causes of air pollution. In addition, burn of garbage and wastes such as nylon bags, rubber, plastic, organic materials, and domestic wastes will also cause the air pollution.

6) Tunnel construction

It is expected that a considerable quantity of fine particulates will be generated during the construction of tunnel (drilling, blasting, transporting and disposing of soil, cement spray, etc.). In particular, fine particulates (PM_{10}, etc.) are considered harmful to construction workers' health.

However, under the most frequent stability conditions, the CO, NOx and SO_2 concentrations within 100 m from the expressway can meet the standard of the Ambient Air Quality Standard TCVN5937-2005.

4.3.2 Surface Water Pollution

Transportation and stockpiling of construction materials, disposal of construction wastes, construction of bridges and worker camps, etc. would cause unavoidable impacts to the surrounding water bodies.

1) Surface water pollution caused by transportation and stockpiling of construction materials

If the construction materials such as asphalt, fuel, oil and chemicals are not well preserved, they may be washed away into rivers causing water pollution. During the construction of road sections adjoining the rivers, if without proper care, soil from the road base construction or road surface would be washed out and run to the river because of rainfall.

2) Surface water pollution caused by the bridge construction

The construction of 4 long bridges (i.e. Ky Lam, Chiem Son, Tra Bong, and Tra Khuc) and more than 70 small-and-medium bridges is planned under the Project.

Construction works of bridge, such as piling, foundation construction, installation of temporary supports, etc. may exacerbate the river water quality. Riverbed sediments may be disturbed and cause increase in suspended solid (SS) load in the river water. According to experiences obtained from similar projects, the SS load within 100m radius of the site would be significant. The SS load would be dispersed and reduced gradually with distance from the site. At the distance 200-300m away from the construction site, the impact may become insignificant.

During the construction works of cast-in-place concrete piles, bentonite slurry may be used to cooling the drill bit, lubricating the drill bit and drill rods, increasing the stability of the borehole, etc. A part of the original bentonite slurry may be recycled and reused, while the remaining slurry may spill out to the watercourses. If the bentonite slurry is not properly collected and treated, it will contaminate the adjacent watercourse.

Although bentonite is not toxic in term of chemical properties, it is harmful in term of physical properties. With its fineness, bentonite may paralyze the entire respiratory system of creatures in the river/sea bed under its coverage. In addition, to increase the viscosity and some other features for improving efficiency of boring work, some toxic chemical additives are usually mixed with bentonite. Therefore, it needs to carefully handle bentonite slurry to prevent them spilling to the adjacent watercourse.

Oil leakage from the operation of machinery during the bridge construction may also cause river water pollution. Loose materials such as cement and lime stockpiled near the river may also cause river water pollution during rainfall. In addition, domestic wastewater generated from construction camps may also cause water pollution unless it is properly controlled and treated at the site.

3) Surface water pollution caused by tunnel construction

A tunnel (with length of about 530m and located at the section from km22+470 to km23+000) is planned under the Project. There is an irrigation canal located at km21+850, and a river (Duy Loc River) located at km23+290.

Wastewater runoffs from the tunnel construction work generally contain slurry, sand, cement, oil, etc. and tend to be alkaline. If this wastewater is discharged directly into the canal and river, it would exacerbate their water quality.

4) Surface water pollution caused by construction camps

During the construction phase, construction camps, warehouse, and material stockpile sites are planned to be set up along the proposed road. Domestic wastewater generated from construction camps may include fecal sewage and would be a potential source of water pollution. It is expected that the large camps will have about 200 workers; 120 workers in middle camp, and 80 workers in small camp. Assuming that a worker will use 80 litters of water in one day, the total wastewater generated from these camps in one day would be 11.2m^3; 6.72m^3 and 4.48m^3 respectively. Main pollutants in domestic wastewater are COD and BOD5. This wastewater would pollute the surrounding water bodies if it is discharged directly into these water bodies without treatment.

5) Surface water pollution caused by construction sites

During the construction phase, wastewater from the construction sites is mainly generated from the concrete watering, pier foundation drains, and sand washing. A medium size construction site generally generates about 20 tons/day of wastewater with high level of turbidity and pH. If this wastewater is discharged directly into the surrounding water bodies, it would pollute these water bodies.

Wastes usually used in construction works such as lubricant oil, heavy oil, organic solvent, acid and alkali, oil paint, etc. are listed in the national list of hazardous wastes. If these hazardous wastes are not properly managed, stored, transported and disposed of, it will cause serious impacts to the surrounding water bodies.

4.3.3 Groundwater Pollution

Construction of bridges may cause impact to groundwater level and quality. The piles driven into the ground with multi layers to the depth of about 40 ~ 50 m (bottom of the quaternary deposits), would penetrate the aquiclude/aquitared and then cause the risk to pollute the water quality of the aquifer.

According to Vietnamese geological and mineral plans (scale of 1/200.000 published in 1996) and based on the geologic structure especially of soil and rock, groundwater contains complexes at the site of tunnel construction (km21+00). Thus, during the construction, if not properly treated or protected, water burst could occur causing engineering difficulties.

4.3.4 Waste, Hazardous Waste

Wastes generated from construction camps include mostly waste from office activities like paper, plastic, and ink. Most of the office wastes should be collected and reused as much as possible.

Wastes from construction sites generally consist of oily rags, chemicals, metal scrap, metal dust, lubricants, oil, solvents, paints, tires, wood, soil, etc. Notably, most of these wastes are classified as hazardous waste.

Poorly designed waste and hazardous waste management plan may cause contamination of the environment and risks to the people health and safety.

4.3.5 Soil Erosion and Contamination

The expressway is planned to pass through Da Nang City, Quang Nam Province, and Quang Ngai Province. The areas along the expressway are characterized as vulnerable to soil erosion including surface erosion, gulley, and gravitational erosion which are caused mainly by wash away effects.

The total area of strong soil erosion and critical soil erosion accounts for 11 % of the total area of Hoa Vang, Dien Ban, and Duy Xuyen Districts; the area of mild erosion accounts for 45% of the total area.

The total area of strong soil erosion is represented by 12.1% of the total area of Binh Chanh District; the area of mild erosion accounts for 38.5% of the total.

The total area of strong soil erosion accounts for 10.5% of the total area of Nghia Ky District; the area of mild erosion accounts for 32.9% of the total.

Therefore, it may conclude that soil erosion in the project area is quite severe. Measures to mitigate impact of soil erosion at the spoil disposal sites, high cutting and deep filling road sections, road side slopes and access roads, etc. should be carefully considered.

4.3.6 Noise and Vibration

Major noise sources during construction phase are construction equipments and transportation vehicles. Although the noise arising from these sources is temporary, it may affect the adjacent receptors if without stringent control measures.

In the Project, construction technique involved is complicated and it will require to use many kinds of large-sized and medium-sized machinery and equipment. Machinery frequently used in road construction includes transport vehicles, road graders, large-scale mixers, pile drivers, excavators, etc. as well as other construction machinery such as compressors, steam hammers, etc. This construction machinery would generate excessive and regular noise, which would cause significant impact to the sensitive receptors such as villages, populous residential areas, schools, hospitals, temples, etc. near the construction site. Noise levels due to various kinds of construction equipment are generally as shown in Table 4-3. Noise level generated by the pile driver is particularly high. Residents living near the construction sites of Tra Bong Bridge and Tra Khuc Bridge would be affected by excessive noise during a certain period of the construction phase.

Table 4-3 Typical Level of Noise from Construction Equipment

No.	Construction equipment	Measurement distance (m)	Level of noise (dBA)
1	Bulldozer	5	86
2	Loader	5	90
3	Truck	7.5	89
4	Grader	5	90
5	Roller	5	86
6	Scraper	5	93
7	Spreader	5	87
8	Vibrator	15	81
9	Tamper	15	90
10	Mixer	2	90
11	Excavator	5	84
12	Mobile crane	7.5	89
13	Pile driver	15	100

Source: U.S. Environmental Protection Committee. Noise from construction equipment and plant NJID, 300.1, 31 – 12 – 1971

Road construction noise has its own characteristics, as follows:

+ The construction machinery is diverse, there are different types of construction machinery at different or same construction stages.

+ Noise source of different equipment is different; which causes impact on people in different levels.

+ Noise source of construction is different from general fixed noise sources and moving noise sources. The noise of construction machinery can be regarded as point acoustic source.

In the course of the actual construction, many sets of machinery may work at the same time in one place, then noise impacted coverage will be larger than the predicted value. Considering that the actual conditions are comparatively complicated, it is difficult to include sound level superimposition for the estimations.

Noise from construction will have a certain impact on the acoustic environment along the expressway; this kind of noise impact mainly appears in a range 267 m from construction site in daytime and 4,700 m from construction site in nighttime. By the calculated result, the most serious construction machinery of noise pollution is pile driver and tamper, which generally speaking will be used in sub-grade and bridge construction, while other construction machinery noises are relatively low.

In the Project, there are 110 sensitive spots/structures identified along the planned expressway (see Appendix 2~3). In particular, the following 3 schools and 1 pagoda would be significantly affected by excessive noise during both construction phase and operation phase of the Project (Table 4-4).

Table 4-4 Sensitive receptors to be affected by noise (construction phase and operation phase)

Sensitive receptor	Location	Side	Distance from the centerline (m)	Remarks (numbering in Appendix 3)
Ngo Quyen Primary School	Km 13+900	East side	200	No. 15
Nghia Dien 2 Primary school	Km 131+900	West side	100	No. 102
Nghia Trung Secondary school	Km 137+180	East side	140	No. 107
Duc Long Pagoda	Km 137+400	East side	120	No. 108

Source: D/D Study Team

4.3.7 Impacts on ecosystem

Impacts on Vegetation

Impacts on Terrestrial Plants due to Land Acquisition

The expressway is planned to cross through 41 communes, 12 districts in Da Nang City, Quang Nam Province and Quang Ngai Province. The boundary of land to be acquired for the Project is generally 10 m from the toe of embankment slope. The scope of land to be permanently acquired along the expressway (with 140 km of extension) is identified based on the design of the road during D/D and the cadastral maps of affected communes.

Permanent acquisition of land for the Project will lead to the loss of some vegetation cover. Field research indicates that within the lands to be permanently acquired, there are plants as follows:

– In plain terrain:

Planted agro-ecosystem, mostly includes plants around villages and along riversides. Main types of plants are: *mango, jackfruit, Melia azedrach, Dendrocalamus membranaceu, Spiny Bamboo - Bambusa spinosa, banana, orange, roseapple, Averrhoa carambola, Ricinus communis; Ficus hirta; Mimosa pigra; Bidens bipinnata; Eupatorium odoratum; Ageratum conycoides; Musa sp; Imperata cylindrica; Euphorbia thymifolia, Muntingia calabura; and some other Rubiaceae species.*

– In low mound hill terrain:

Scrubs, trees in bald hills include mainly some heliophilous species belonging to *Euphorbiaceae and Alangiaceae family*, and species belonging to *family Poaceae*. Plant composition in the area includes: *White eucalyptus, Acacia, yellow flower senna, coconut, bamboo, banana, Melia azedrach, Dendrocalamus membranaceus, Ageratum conycoides and some species belonging to family Asteraceae, Arecaceae, Fabaceae, Convolvulaceae.*

Vegetation composition along these road sections consists of paddy, fruit trees, pepper, peanut, sesame, cassava, watermelon, sweet potato trees, etc. A total of about 23,000 fruit/

timber trees; and 836,000 industrial trees shall be cut off, and both economic activities and tree biomass in the local areas would be affected.

In general, the impacts of land acquisition on the vegetation cover are not high level because the biodiversity value of the trees to be cut down is low and the quantity of trees affected is relatively low.

Impacts on Vegetation Due to Road Construction

During the construction phase, particularly at the sites around the bridge and tunnel, there will be considerable flow of workers and trucks that will lead to the reduction of vegetation cover, if the construction is not well managed.

Presence of trucks hauling loose materials which generates air-borne dust will pose a detrimental effect on the growth of plants near the proposed road. The dust accumulating on the leave surface of plants will prevent the photosynthetic function.

The lime and cement will produce hardpan soil if they are dumped to the soil. Although these impacts are short term, a certain period of time is required to restore the vegetation cover after the works are completed.

In general, impacts caused by construction works to the vegetation cover are insignificant and at low level because the biodiversity values of the vegetation to be cut down are low, and the quantity of affected vegetation cover is low. The vegetation cover may be recovered soon after the complication of construction works.

Impacts on Terrestrial Animals during Construction Phase

The vibration of equipment, blasting operation, noise, wastewater and exhausts gas are often considered to be disturbances to animals. These could drive animals away from their current habitats. However, impacts caused by construction works to terrestrial animals are considered manageable, due to the fact that the amphibians found along the planned expressway inhabit mainly in the cultivated farmlands or brooks.

During the construction phase, trees around the construction sites may be cut down and cause damage to the habitat of wild animals. Illegal hunting may also occur and pose the threat to wild animals. The practice of consuming wild animals as food may widespread. It promotes catching and hunting wild animals such as reptiles (frogs, snakes), birds and beasts (hare). Biodiversity loss is usually observed as one or both of: (1) reduced area occupied by species and community types and (2) reduced abundance of species or condition of communities & ecosystems. The likelihood of any biodiversity component persisting – or surviving – in the long term declines with both lower abundance and reduced habitat area. If biodiversity loss is out of control, it will trigger off over-exploitation of the natural biological resources and even exhaust the resources. However, this potential negative impact can be mitigated by the provision of environmental training with information on the importance of biological diversity, and its relationships with sustainable development. These potential impacts can also be mitigated by setting up and implementation code of conducts to workers, including no catching or hunting fish and wildlife, and no consumption of wildlife products.

Ditching and construction of temporary construction sites and access roads may lead to damage and deterioration of local ecosystems. It is likely that the development of the expressway will generate significant quantities of spoil materials which will be required to be removed off-site and either disposed-of or contained in stable storage and dumping areas. This will include temporary and permanent dumping areas, which will need to be managed with respect to landslide stability, embankment stability, drainage control, erosion protection (wind and water) and sediment. Spoil stockpiling in small valleys or river banks will directly affect the habitat of animals. However, these animals may find alternate habitats in the areas around the proposed expressway, and return to their previous habitat when the vegetation is recovered after the completion of construction.

During construction phase, air pollution, wastewater, and solid waste generated by the construction works may also deteriorate the animals' habitat, and may force them to evacuate to other habitat. As an example, the construction of bridges may cause degradation of river water quality, loss of habitat, loss of food sources for reptiles, amphibians, fishes, etc.

However, according to the baseline survey, most of the fauna species in the project area are commonly found in Vietnam and none of these has significant biological values.

Impacts on Aquatic Animals and Plants during construction phase

Impacts on Plankton and Benthos Organism

The water courses may be contaminated by the pollutants generated from the construction sites and workers' camps, such as sediments in wastewater discharged from excavated areas, nutrients and biological contents in domestic sewage discharged from worker's camps, and oil and grease leaked from construction machineries. Water pollution may change the dominance and the composition of the plankton. Water pollution will reduce species numbers and relative abundances of populations. Construction materials stored near the watercourses, uncovered excavated soil, stone dumps, and construction wastes may be easily washed out and flow into the water sources by rainfall, thus pollute the watercourses, change the water's pH value and deteriorate the aquatic animals' habitats. This can lead to plankton and benthos deaths and aquatic biomass reduction in the construction areas. However, impacts to plankton and benthos are considered insignificant. Plankton organisms can easily survive in water bodies with marginal water quality requirements, and benthos may move to other similar habitat near the bridge piers.

Impacts on Fish Species

The proposed project will include four long bridges crossing the rivers of Thu Bon, Ba Ren, Tra Bong, and Tra Khuc. The construction of bridges may lead to the loss of aquatic animal habitat due to increased turbidity, decreased dissolved oxygen in the water, and reduction of food sources including temporary decline of plankton and benthos organisms. Increase in suspended solids in the rivers would drive fishes away from the bridge construction sites during the construction phase. However, these impacts are short-term, reversible, and happen only during the construction phase. Fish populations would be restored after the bridges are built.

Impacts to Phu Ninh Reservoir and Its Protected Area

The Phu Ninh Reservoir is located near km70+000 of the planned expressway (with distance of about 2~3 km from the expressway in the west). Quang Nam Province PC intends to propose the Phu Ninh Reservoir and the forests in the upstream watershed (23,409 ha) as a designated natural reserve. However, only privately-managed plantations are existing in the areas between the reservoir and the planned expressway. Because of these features, construction of the expressway would not pose any threat to the Phu Ninh Reservoir and its protected area. On the contrary, the Project may create favorable conditions for local eco-tourism development.

Impacts on Agricultural Crops

It is estimated that 961 ha of land would be acquired for the Project, Of which 437 ha are cultivated land and account for 45.5% of the total land area to be acquired for the Project. In addition, paddy fields and crop lands near the construction sites, construction yards, waste disposal sites, etc. would be affected by polluted surface water and air pollution caused by the construction activities. Thus, land acquisition and construction activities would cause the decrease in local agricultural production.

4.3.8 Impacts on Hydrological System

The planned expressway will cross 5 large river basins of Vu Gia, Thu Bon, Tam Ky, Tra Bong and Tra Khuc (see Figure 4-1). The catchment areas of these rivers are 5,793 km^2 (Vu Gia River), 3,588 km^2 (Thu Bon River), 267 km^2 (Tam Ky River), 577 km^2 (Tra Bong River) and 2,928 km^2 (Tra Khuc River). Other small river basins which are crossed by the planned expressway are Tuy Loan, Yen, Ly Ly, etc. Details on the hydrological characteristics of these river basins are described in the Hydrological Analysis Report made by the D/D Study Team in February 2012. Many areas in the project area are prone to flood every year. During flood season, the expressway with high road embankment may work as a dyke that hinders the flow of flood water from the upstream of the river basins. Section 4.4.1 will describe in further detail about the impacts of flood that may be caused by the Project.

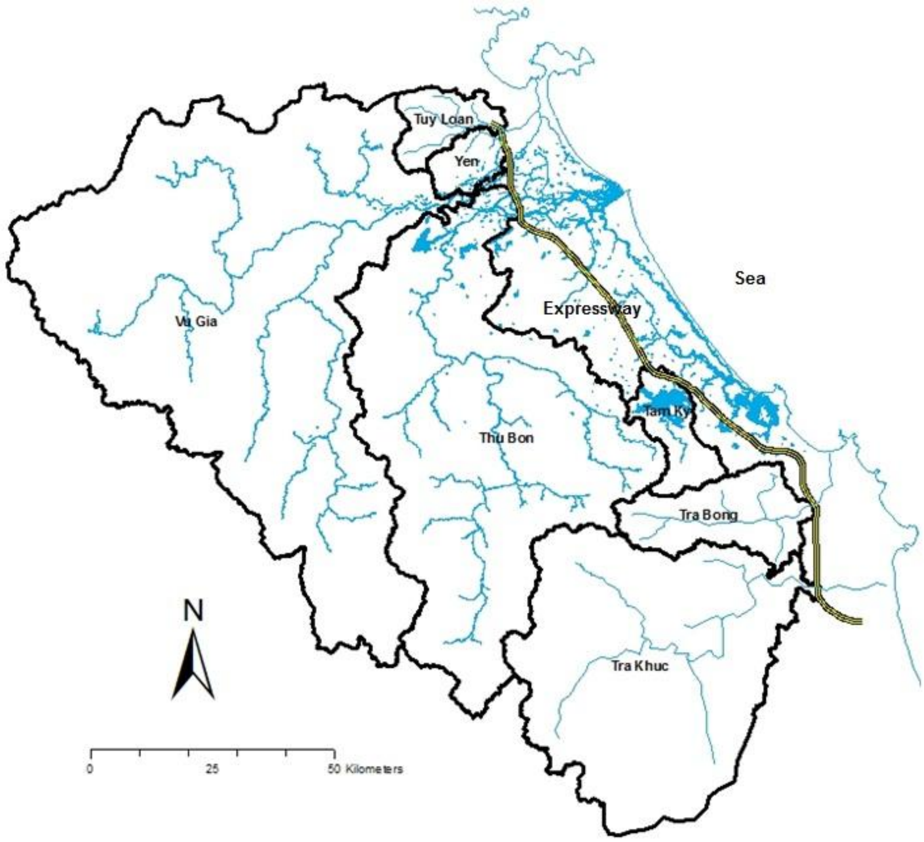


Figure 4-1 Rivers and their basins

4.3.9 Impacts to Religious, Cultural, Archaeological Properties

Impact to Archaeological Relics

An archaeological investigation was carried out by the Institute of Archaeology of the Vietnamese Academy of Social Sciences in 2010 (see the "Report of the Archaeological Investigation (Stage 1) Along the Da Nang - Quang Ngai Expressway, May 2010".

According to this investigation, there is a group of Champa architectural ruins that may be affected directly or indirectly by the Project. These ruins are located in Chiem Son Tay Valley of Chiem Son Hamlet, Duy Trinh Commune, Duy Xuyen District, at section Km 21+800 - Km22+450 of the planned expressway (Figure 4-2). These ruins (namely Go Gach, Go Loi, Trien Tranh and Chua Vua) have been recognized and ranked as provincial-level archaeological sites under the Decision No. 754/QĐ UB on March 13, 2006 of Quang Nam Province Committee.

The ruins of Go Gach and Trien Tranh would be encroached seriously by the road alignment proposed in F/S (see Figure 4-3). However, in D/D, the alignment had been modified and consequently the encroachment to Go Gach Ruin is avoided. A part of the Trien Tranh Ruin remains to be encroached by the alignment proposed in D/D.

The Trien Tranh Ruin lies in the western residential area of Chiem Son Hamlet, belonging to the Uc Dap mountain foot (the Eo mountain foot) in the Southeast of Chiem Son Tay Valley. The mound is about 10m high over the paddy field, and has relatively steep slope currently-covered by the eucalyptus trees and high dense shrubs. There are several large deep holes on the mound those were dug by people looking for gold and ancient relics. On the mound surface, it can observe a large number of bricks which are usually used for Champa architecture. The carefully whittled sandstones, similar to the stone used to make other Champa tower bases, are frequently found. According to result of the site observation, it suggests that there may be a collapsed Champa tower here, and the tower foundation might still be buried deeply in the ground.

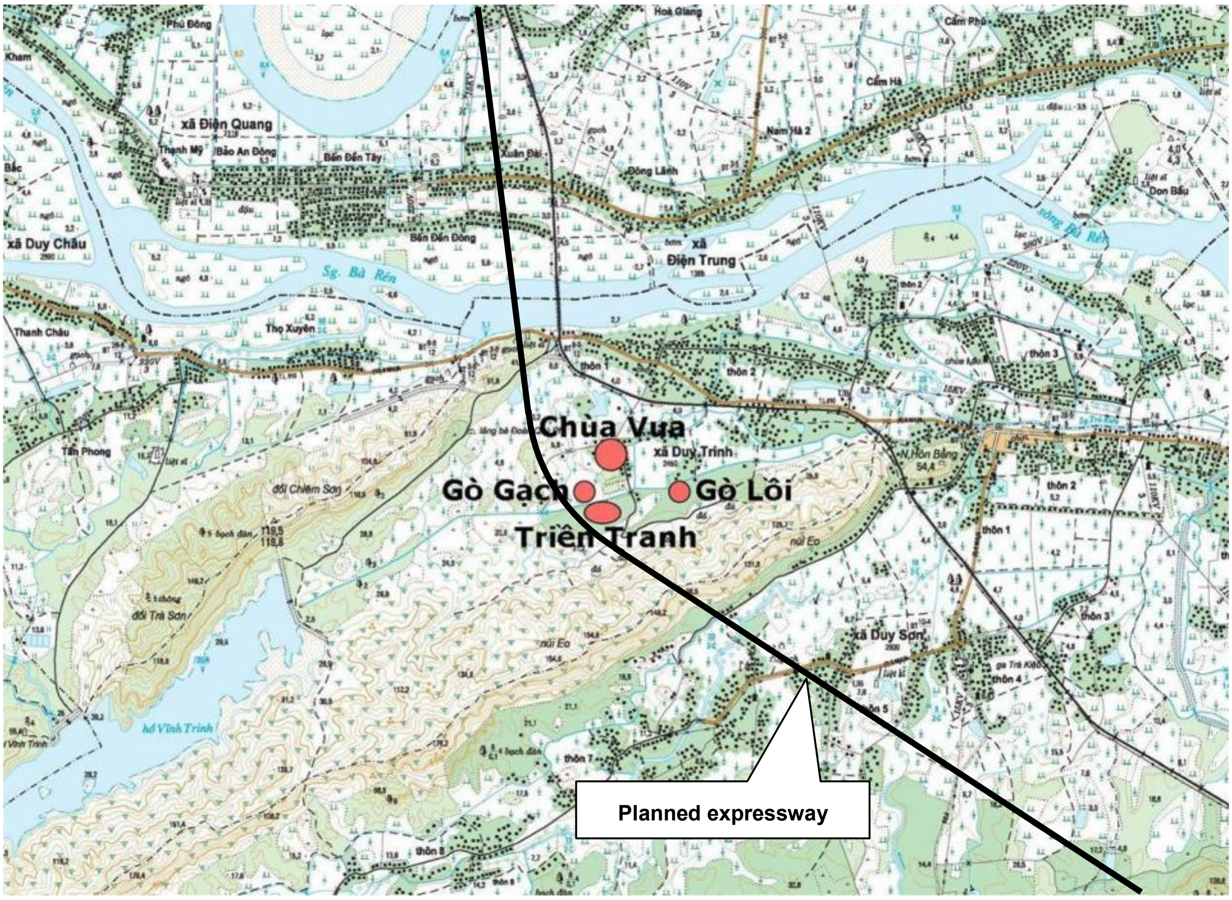


Figure 4-2 Distribution of Champa ruins in the valley of Chiêm Sơn Tây

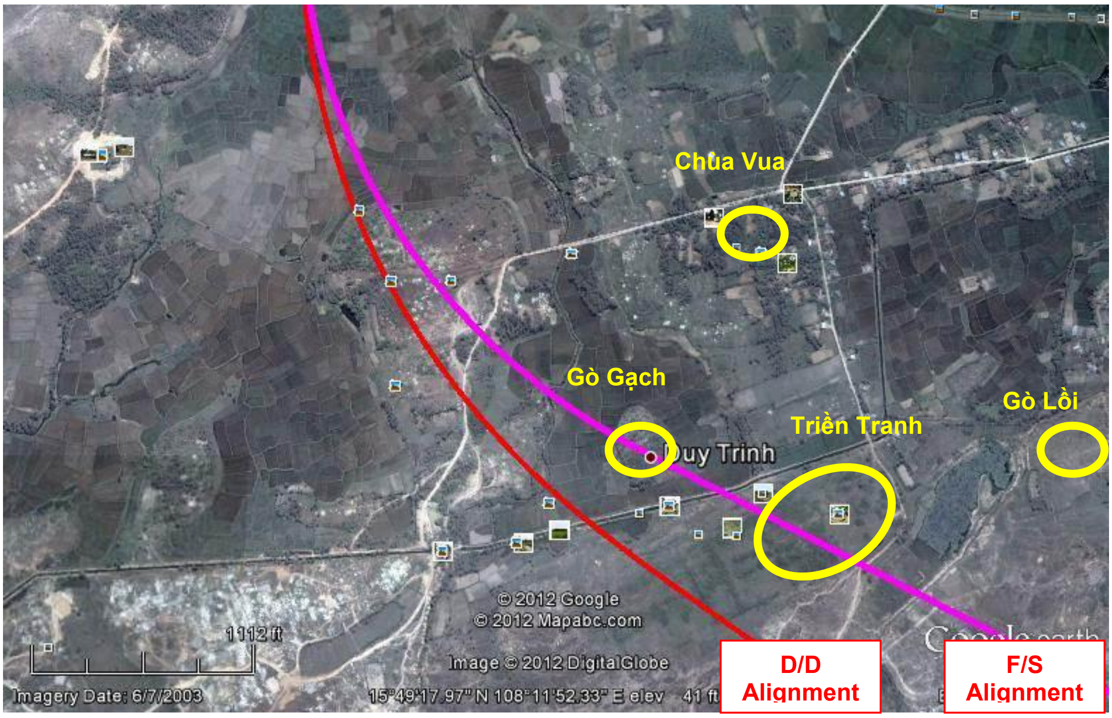


Figure 4-3 Location of Champa ruins, F/S and D/D alignments.

A part of the site where the route crosses

Tower bricks observed in the hole walls

Stone architectural materials

A stone altar found at Triền Tranh site

Figure 4-4 Some archaelogical artifacts found at Trien Tranh site

The Trien Tranh Ruin has preliminarily been studied by the Service for Culture, Sport and Tourism of Quang Nam and the Bureau of Culture of Duy Xuyen District. A considerable number of decorated bricks and big-sized stones with architectural sculpture signs, particularly one rectangular stone altar decorated with four elephants at four sides, have been collected.

The planned expressway will pass through the western part of Trien Tranh Mound from Km21+800 to Km22+150 and distance between the ROW to conservation area of Trien Tranh Ruin is about 70m. Measures to avoid/mitigate impact to this site should be carefully examined before and during construction phase.

During operation phase, the above-mentioned Champa ruins would be affected by vibration caused by running vehicles on the expressway. However, these impacts are considered insignificant, because these ruins are under the ground and relatively far from the expressway (distances from the expressway to Go Gach, Go Loi and Chua Vua are 120m, 400m and 450m respectively).

Besides, several significant archaeological artifacts of the ancient "My Thien Pottery Kiln" have been found scattered on the bank of Tra Bong River in Binh Trung Commune, Binh Son District. Quang Ngai Province (Km 108+400 ~ Km 108+600). They have been collected and stored in the local museum or in local residents' houses as private collections.

In addition to the identified cultural and historical sites and establishments, there may be some unknown cultural and historical artifacts buried in the project areas. The excavation works for road construction might damage those unexplored archaeological sites and artifacts.

The Vietnamese Government has issued the Law on Cultural Heritage and several regulations for preservation of the heritages. They prohibit a project proponent from changing original constituents of heritages by adding, moving/exchanging artifacts in monuments, or renovating/restoring, and taking other acts without permission from the Ministry of Culture, Sport and Tourism. Besides, a project proponent is banned from changing surrounding environments and landscapes of heritages by illegally cutting trees, breaking stones, digging, excavating and constructing and other activities which negatively impact the relics. The Law on Cultural Heritage also requires a project proponent on construction at places affecting relics to coordinate with the MOCI and to create conditions for the MOCI to supervise the process of construction. If a project proponent realizes that there may be relics, antiques or national precious objects in the project areas, he/she must temporarily stop the construction works and promptly inform the MOCI.

Impacts to Religious, Cultural Properties

A number of religious/cultural properties located within the land to be acquired for the project (land acquisition demarcation line, or "GPMB line" in short) or near the planned expressway would be affected directly or indirectly by the project. Detailed information of project-affected religious/cultural properties is in RAP report.

4.3.10 Impacts on Local Social - Economy

Traffic Congestion and Traffic Accident

Project construction requires large and diverse construction equipment such as bulldozers, excavators, asphalt concrete finisher etc. and especially large dump trucks transporting construction materials and disposal wastes. Besides, during construction phase, a part of roads around the project site may be temporarily blocked and cause traffic congestion at some sections. During construction phase, traffic congestion and accident on the roads surrounding the project area would increase, due to the increased traffic volume and road blocking. Local residents may be forced to use through traffic or take different routes.

The rising risk of accidents is anticipated especially around the populous residential areas, and at the interchanges with the existing roads such as NH14B, NH 14E, PR 605,PR 609, PR610, PR616, PR617, PR 623, PR625, PR624, District Road 59, District Road 55, and interchanges adjacent to the industrial, economic zones including Cam Son, Dung Quat, Chu Lai, Tam Ky, Quang Ngai. Mitigation of such impacts shall be strictly enforced.

Impacts to local business

The planned expressway would cause significant impact to about 30 stores/business entities located at the front sides of Provincial Road 623B where it will cross with the planned expressway at km128+610. In addition, the business entities located along the access roads would be affected by noise, air pollution, vibration, etc, caused by the construction vehicles and machinery. Transportation of goods, products, materials, etc. around the project area would also be impeded by vehicles involved to the construction work.

Construction work will cause adverse impacts to residents in the surrounding areas, due to the removal of electric poles, electric cables, water supply pipes, drainage pipes.

Impacts to Land Use and Economical

The construction of the project will improve the traffic condition thoroughly including Danang City, Quang Nam and Quang Ngai provinces. Technology and information drawn by the expressway will help develop a series of industrial projects. In addition to developing the local economy the project can bring more job opportunities for local people, such as working along the project site. As a result, it can reduce the number of people migrating to other cities or provinces to work. After completion, it will help improving public services, such as, better transportation system for local people. It also will help increase the quality of life of residents through improvements in health and safety by reducing the number of road accidents, and decreasing traveling time.

Residential land, agricultural land, plantation and other land are the main types of land that would be lost by means of the project. Agriculture land lost accounts for the highest area compared to others, which is 4,374,723 m2 (45.5%) of the total land acquired by the project. There is large area of affected plantations 1,838,252 m2 (19.1%) without any or low biodiversity value used either by the people or public sector agencies. The area of Residential land and other land, which are affected by the project, is 726,385 m2 (27.8%) and 2,666,499 m2 (7.6%) of the total land acquired by the project.

The resettlement issue is the most serious concern expressed by the local communities during the fieldwork. The process of resettlement is likely to cause considerable stresses among those who need to be resettled. The resettlement may also require children to transfer to another school, which also may produce additional stress among those children and their family. In addition, relocation may make it impossible for the people to keep their current employment, and can cause loss of productive assets such as agricultural land and roadside kiosks as well as disruption of productive activities.

The most disruptive aspect of resettlement is where affected people will lose full or partial access to agricultural land. There is no surplus agricultural land anywhere in the Project area and potentially affected people worry they will not be able to restore their livelihoods to the pre-Project level. It is not an issue of whether the Project represents an opportunity for affected people to improve upon their livelihoods but rather they do not wish for there to be deterioration in their livelihoods, which also may produce additional stress among their children and family.

In particular, given that the Project area has a large number of those who can easily fall (back) into poverty when hit by external shocks, the potential disruption of productive activities as well as the loss of productive assets can have tremendous negative impacts on the well-being of the population. The Resettlement Plan should takes into account these potential negative impacts and offer measures to minimize the potential adverse effects of involuntary resettlement.

4.3.11 Public Health and Order

It is anticipated that a large number of outside laborers involved in the project who come from rural areas may disrupt the local social order around the project area, causing social tensions. When construction workers go into worker camp sites and construction areas, they live there during the construction period, interacting with the local population.

An increase in the transmission of HIV/AIDS and other sexually transmitted diseases, particularly via prostitution, are risks commonly linked with major construction projects. Associated risks also include illegal trade of humans and drug usage.

4.3.12 Risks Due to Residual Unexploded Ordinances and Tunnel Construction

Da Nang – Quang Ngai areas have been burdened with lethal weapons since the Vietnam War, notably bombs and mines. Workers may be injured (even get killed) by unexploded ordnance in the project areas and in rivers such as Thu Bon – Vu Gia, Ba Ren, Tra Bong, Tra Khuc. Thus, clearance of unexploded ordnance should be done before commencement of construction work to avoid dangerous situations and casualties.

To ensure the safety of people and equipment involving construction and operation of the project, VEC and PMU85 will be responsible for unexploded ordnance clearance, which is expected to be implemented at the same time of land acquisition progress. This is a special task, which shall be done by military agency. At this moment, this task has been completed for the whole alignment.

Residual unexploded ordnance clearance is stated in Decision No 96/2008/QD-TTg dated 4/5/2006 and in Article No 11, Chapter IV of Decision No 3037/QD-BGTVT dated 14/10/2003.

Construction of the tunnel also poses safety risk for the workers due to accident such as collapse of the tunnel. Constructors must follow the safety regulation and they must have action plan on emergency case, especially for tunnel construction. The Emergency Action Plan is a subject of approved by client and Engineer.

4.3.13 Impacts of Waste Soils (Transportation and Disposal of Spoils)

The road and tunnel construction would generate a variety of wastes. They can be divided into two categories: construction and demolition waste, and surplus excavated soil and bored pile materials.

- *Construction and Demolition Waste :* Construction and demolition debris are composed of inert materials such as soil, rock, concrete, brick and asphalt etc., and non–inert materials including metal, timber, paper, glass and general garbage. The volume of the waste will depend on operating procedures and site practices. In this project, a number of houses and structures existing on the land for the planned expressway or in the construction yards, etc. should be demolished, and it would generate a desirable quantity of construction and demolition debris. They should be reused and recycled as much as possible. With respect to the waste which cannot be reused and recycled, they would be properly collected and disposed.

- *Excavated and Tunneled Materials:* Construction of the road bed will generate a desirable quantity of excavated soils. The best way to manage the excavated soil is to re-use it on site, filling the low lands along the road, or forming land in the construction yards, interchanges, ect. However, if re-use is difficult, properly managed disposal is the last resort. If the residual soil is not treated appropriately, it may cause deterioration to the environment through illegal dumping on private/public land.

The excavated soil would be temporarily stockpiled for reuse. Rainwater may induce considerable soil erosion at the exposed soil surface. Release of the excavation and filling materials into the watercourses would increase the suspended solids, turbidity and nutrient levels of water flow.

Volume of excavated soil to be disposed is estimated as below. A detailed plan for reuse/recycle and disposal of these soils are described in Section 5.2.13 of this report.

Estimation of volume of waste soils generated by the Project

Method to estimate the volume of waste soils generated by the Project is as following.

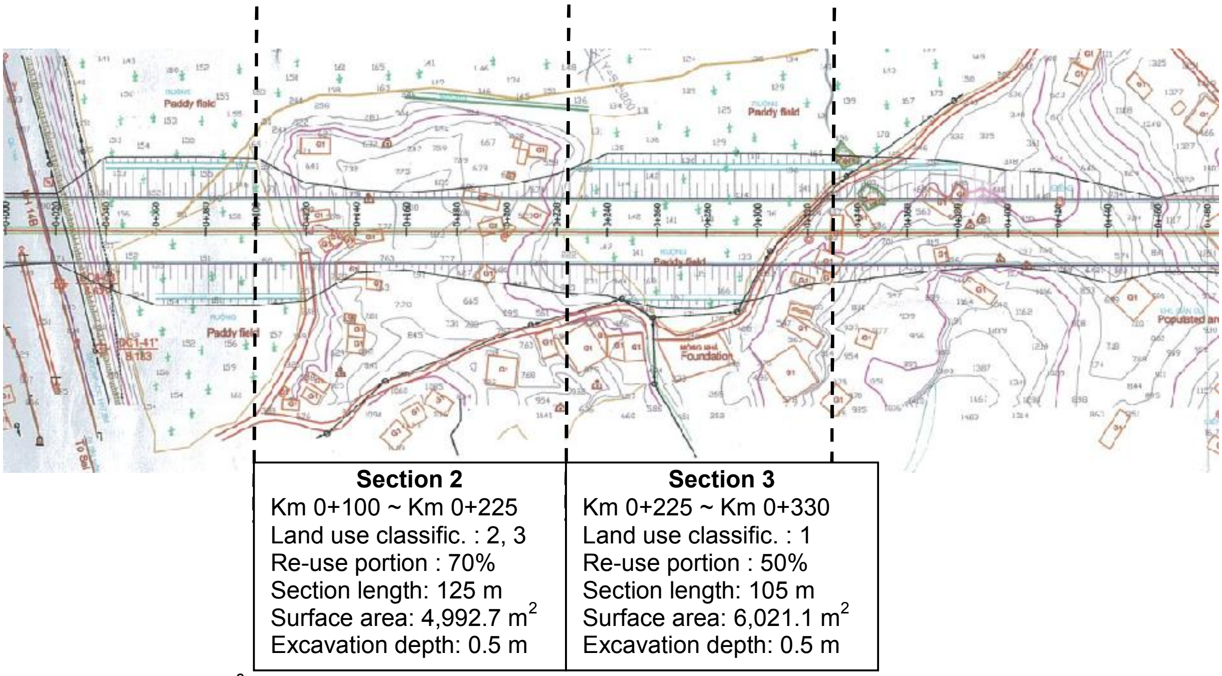
1) Division of affected land into sections depending on its current land use.
   For convenience, the affected land (where the expressway is planned to pass through, from Km 0+000 to Km 139+263) is divided into 344 sections depending on its topographical characteristic and its current land use as described in Table 4-5. For each classified land use, the portions of reusable waste soil and disposed waste soil are also estimated (see Table 4-5).

Table 4-5 Current land use classification and estimated portion of reusable volume

No.	Land use classification	Re-use(%)	Disposal (%)
1	Paddy field	50	50
2	Build-up area (residential area)	50	50
3	Crop land	90	10
4	Secondary forest	90	10
5	Water courses	50	50
6	Rock quarry site, tunnel	100	0

Source: D/D Study Team

2) Determine the volume of waste soil generated by each section to be disposed
The volume of waste soil generated by each section, and of which, the volume of waste soil to be disposed are estimated as following.



Note: Surface area (m^2) of a section is calculated as the area within the toe of the road embankment
[Volume of excavated soil generated in a section (m^3)] = [surface area of section] x [excavation depth]
[Volume of disposed waste soil (m^3)]=[volume of excavated soil] x [dispose percent]
Source: D/D Study Team

Figure 4-6 Method to calculate the volume of waste soil to be disposed in a section (an example)

3) Calculation total volume of disposed waste soil by construction package and by district.

Result of the estimation is summarized in Table 4-6 and Table 4-7.

Table 4-6 Estimated volume of waste soil to be disposed by package

Package	Length (m)	Quantities (m^3)		
		Total	Re-used	Disposal
PKG1	8,000	229,121	120,420	108,701
PKG2	8,880	278,868	139,434	139,434
PKG3A	1,220	29,969	14,984	14,984
PKG3B	3,400	89,907	48,884	41,023
PKG4	11,100	277,728	193,068	84,660
PKG5	9,400	238,898	186,510	52,387
PKG6	10,000	248,333	131,978	116,355
PKG7	13,000	303,410	197,435	105,974
PKGA1	16,150	380,494	268,845	111,650
PKGA2	19,135	454,029	349,592	104,437
PKGA3	9,815	233,767	136,439	97,328
PKGA4	14,600	379,901	293,913	85,988
PKGA5	14,563	253,727	126,864	126,864
Total	**139,263**	**3,398,152**	**2,208,367**	**1,189,785**

Source: D/D Study Team

Table 4-7 Estimated volume of waste soil to be disposed by district

District	Length (km)	Quantities (m3)		
		Total	Re-used	Disposal
Hòa Vang	7,965	228,064	119,892	108,172
Điện Bàn	13,150	391,125	199,493	191,632
Duy Xuyên	8,350	197,488	130,996	66,492
Quế Sơn	10,185	264,991	213,371	51,619
Thăng Bình	12,700	317,904	177,378	140,526
Phú Ninh	14,130	330,933	212,127	118,806
Tam Kỳ	1,945	54,349	33,125	21,224
Núi Thành	30,775	718,552	547,633	170,919
Bình Sơn	12,312	303,378	191,708	111,669
Sơn Tịnh	13,688	351,282	262,601	88,682
Tư Nghĩa	13,053	223,551	111,776	111,776
TP Quảng Ngãi	270	7,085	3,542	3,542
Nghĩa Hành	740	9,451	4,725	4,725
Total	**139,263**	**3,398,152**	**2,208,367**	**1,189,785**

Source: D/D Study Team

The transportation and disposal of spoil would cause air pollution, water pollution, noise impact, etc. to residents and lands along the roads and around the disposal sites, if without proper avoidance / mitigation measures.

4.3.14 Temporary Access Roads for Construction Works

The transportation of materials such as cement, timber, steel, asphalt, etc. will take place through about 30 existing roads as listed in Table 4-8 and Figure 4-7. Total extension of these entrance access roads is estimated to be 147,519 m.

Table 4-8 Selected Entrance Access Roads

PKG	No.	No. of EAR	Length	Existing width	Pavement	Structure
PKG1	1	No.1 (QL14B)	5,523m	22.5m(20.0m paved)	As paved	
	2	No.2	5,816m	6.0m	Aggregate	Bridge: 2 Culvert: 6
		TL605	8,000m	60.~9.0m	As pavement	
PKG2 PKG3A	3	No.3 (TL609)	8,828m	8.0m(6.0m paved)	As paved	Bridge: 1 Culvert: 4
	4	No.3-2	3,344m	6.0m(3.5m paved)	As paved	Bridge: 1 Culvert: 4
	5	No.3-3	992m	3.0m (need widening)	soil	
PKG3A PKG3B	6	No.4	9,540m	6.0m(4.0m paved)	As paved	Bridge: 1 Culvert: 4
	7	No.5 (TL610)	10,690m	8.0m(6.0m paved)	As paved	Bridge: 5 Culvert: 4
PKG4	8	No.5-2	2,474m	6.0m	As paved	
	9	No.5-3	1,256m	5.0m	Aggregate	Bridge: 1
PKG5	10	No.6 (TL611)	5,284m	6.0m(5.0m paved)	As paved	Bridge: 3
	11	No.6-2	1,229m	4.0m	soil	
	12	No.7 (QL14E)	5,018m	6.0m	As paved	Culvert: 1
		TL613	2,500m	6.0m	As paved	
PKG6	13	No.8	4,708m	6.0m	Aggregate	Culvert: 13
	14	No.9	4,903m	4.0m (need widening)	soil	Culvert: 3
PKG7	15	No.10(TL615)	5,558m	6.0m	As paved	Bridge: 2 Culvert: 5
	16	No.11 (TL616)	4,356m	6.0m	As paved	Bridge: 1 Culvert: 5
PKGA1	17	No.11-2	2,517m	6.0m	As paved	Culvert: 7
	18	No.12	4,356m	4.0m (3.5m paved)	As paved	Culvert: 4
	19	No.13	3,600m	4.0m	soil	Bridge: 1 Culvert: 4
PKGA2	20	No.14	3,134m	6.0m	Aggregate	Culvert: 2
	21	No.15(TL617)	4,177m	4.0m (need widening)	As paved	Culvert: 3
	22	No.16	3,719m	3.0m (need widening)	soil	
	23	No.17(TL622C)	2,911m	3.0m (need widening)	soil	
PKGA3	24	No.18	1,200m	3.0m (need widening)	soil	
	25	No.19	2,254m	7.0m	Aggregate	Culvert: 3
	26	No.20	1,834m	6.0m	Aggregate	Culvert: 1
	27	No.21 (TL622B)	1,805m	6.0m	Aggregate	Culvert: 2
PKGA4	28	TL622	3,000m		As paved	
		No.22	4,383m	3.0m	soil	Culvert: 3
	29	No.23(TL622C)	4,961m	6.0m	As paved	Bridge: 1 Culvert: 5
	30	No.24(TL623)	5,342m	6.0m	As paved	Bridge: 1
PKGA5	31	No.25(TL623B)	6,084m	6.0m	As paved	
		TL624	3,200m	6.0m	As paved	

Data source: D/D Study Team, Preliminary Construction Plan, September 2012.

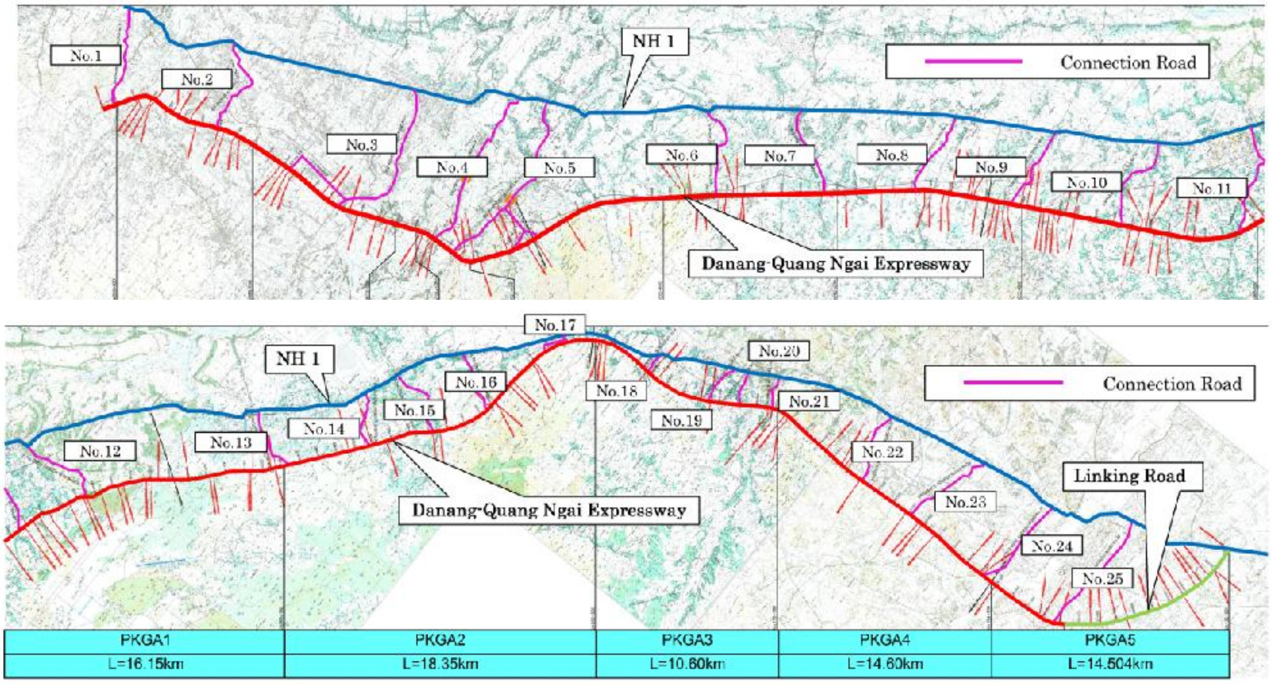


Figure 4-7 Selected Entrance Access Road

The following principles are applied in selecting the entrance access roads:

- First basis of selection
  - + It should be public road. (National road, provincial road)
  - + The road pavement width is more than 6 m desirably.
  - + The areas along the road are low density residential areas.
- Second basis of selection (if there is no road which satisfies the first basis)
  - + It should be public road. (District road)
  - + As for a road lot, not less than 8 m is desirable.
- Third basis of selection (If there is no road which satisfies the first basis and second basis)
  - + Rural road or forest road
  - + Widening of road width is feasible.

During construction phase, a significant number of trucks transporting construction materials would use these roads, and cause degradation of local residents' living conditions, increase in air pollution, noise, traffic jam, traffic accidents, etc. to the localities along the roads. In particular, traffic accident may be increased at the road sections near the schools. Dust generated by the trucks transporting construction materials would be the main cause of damage to the surrounding plants, vegetation, etc. and exacerbation of water quality of the surrounding water bodies. For the roads which need widening, local residents would be affected due to the land acquisition, loss of cultivated lands, etc.

4.3.15 Wastes from Construction Worker Camps

Solid waste generated from construction camps includes mostly waste from office activities like paper, plastic, and ink. Most of the office wastes needs to be collected and reused.

Solid waste generated from construction sites may include: oily rags, chemicals, metal scrap, metal dust, lubricants, oil, solvents, paints, tires, wood, soil, and other mineral construction waste or recyclable material. Notably, most of the waste at construction sites is classified as hazardous waste.

Poorly designed waste and hazardous waste management plans may cause contamination of the environment and risks to the health and safety. Therefore, wastes generated from construction camps and working sites should be adequately and regularly collected and transported to the waste disposal sites.

4.3.16 Impacts of Construction Materials Exploitation and Transportation

There are many borrow pits, sand pits, and quarries along the planned Expressway which are examined as potential sources of construction materials for the Project. List of these borrow/sand pits, rock quarries and distances to the construction sites are as shown in Appendix 9 (according to result of the materials sources investigation).

Exploitation of these construction materials would cause noise/air/water pollution, etc. to the areas around the pits/quarries. And transportation of these materials from the sources to the construction sites would cause air pollution to the areas long the roads, or water pollution to the waterways.

4.4 Impacts in Operation Phase

4.4.1 Impacts on Flooding

1) Flood Condition

When the discharge of a river increases, the main channel of rivers may become completely full. Any discharge above this level will result in the river overflowing its banks and causing a flood. Discharge is not linearly related to stage because discharge depends on both the depth and width of the stream channel, or more precisely, on the cross-sectional shape of the channel. Rainfall is one of the main factors that cause flooding. Furthermore, topography features of the terrain and the river morphology also influence flooding processes including slopes, width of river beds etc. In addition, if rainfall is heavier than normal in a particular area and infiltration, interception, and evaporation are low then runoff can be high and the likelihood of flooding will increase. The expressway project is located in area with high rainfall and frequent flash floods and downstream floods. Due to narrow terrain, variable slope, and short river bed the flood flow of the rivers coming from the upper reaches to the Trans-nation Railway in the lowlands may be divided into 3 stages:

Stage 1: This is a forming and accumulation process of the flow upstream (from the source to the mountain gorge). Flood features during this stage include sharp peak, high density, rapid rise, and subsequent decrease. Before running to the plain from the mountain gaps, the flood flow energy is rather plentiful and swept with a large quantity of alluvium including grains.

Stage 2: This is the stage when the flow changes from the foot of the mountain to the railway. Due to the low terrain and sudden expansion, the maximum load of mud and sand of the river is rapidly reduced. On the way to the lower section, a remarkable quantity of alluvium has been left behind by the flow forming grounds at the middle or on both sides. As a result, the bent and meander lobes are created (i.e., Thu Bon river section upstream of Ky Lam bridge). For this reason, the ability of the rivers to drain the flood is significantly limited, overflowing areas of the lower sections. There are different characteristics of the flow inside the riverbed and the river ground. Inside the riverbed, the flow transports alluvium with an imbalance of mud and sand. On the ground, little alluvium is taken with the flow so erosion rates will depend on the interrelation between the current velocity and the allowable current velocity of the river ground materials. As the current velocity is larger than the allowable velocity of the river ground materials, erosion is bound to happen.

Stage 3: This is the final stage when the current goes through the highway and railway headed for downstream. Because the alignment blocks the entrance of the flow as a dyke, the alignment gets impacted by the flow. As a result, during more than 100 years of existence many track sections of the Trans-nation Railway have been destructed by flood. The reason for the destruction is because these track sections are located opposite to the mountain gaps, where the largest flow energy source existed. The running state changes from fast running at the mountain gaps to smooth running at the plain. This change creates slanting flow and swirls on the ground. When the railway is reached they erode the pavement foundation, bridges, and roads. In addition, because the railway acts as a blocking dyke the water level upstream also rises increasing the potential energy of the flow which is turned into kinetic energy when it runs through the bridges and roads. The flow behind the works increases suddenly, its flow velocity is larger than the allowable non-corrosive flow velocity of the river bank geology (soft clay sand) consequently the river-bed gets eroded under at lower sections creating wide and deep dug holes, the so called "Heaven abyss holes" on the bridges of Trans-nation Railway namely Lo, Chau Lau, Bau Thinh, Ky Long, Xa Duyet, Bau Tai etc.

The shortcomings of the draining works of the Trans-nation Railway indicate the need to study more carefully local hydrographic and hydraulic issues in order to propose long term design solutions which will be properly included during the construction works of the Da Nang – Quang Ngai expressway in all sections subject to damage by flood.

The construction of a new route parallel with the railway, 2-6m higher than the natural ground, longer than 130 km, crossing over four big rivers (Thu Bon, Ba Ren, Tra Bong and Tra Khuc) crossing over many irrigation canals, lakes and swamps will limit the capability of water drainage of coastal and upstream areas. Furthermore, raising the road surface, and constructing bridges and culverts crossing rivers and canals will make the natural currents narrower, increasing the likelihood of inundations in the project area.

2) Flood Inundation Damage Risk Analysis

The flood potential on the Danang – Quang Ngai expressway is quite high, especially sections of the Thu Bon and Vu Gia rivers (Km 0 – Km 20). Hydrological survey data indicates that the project runs through the flood areas in Thu Bon and Vu Gia Rivers, where 2 – 3 m floods often occur.

A detail flood study in particular for this road section has been done and the output/recommendations have been included in the engineering design of the expressway to assure an adequate flood release capacity by providing sufficient culverts, underpasses, and bridges along the expressway alignment. The rationale of the cross structures should secure sufficient drainage capacity during/after flood in order to reduce adverse effects to agricultural products. Required structure types and/or numbers of structures determined based on inundation analysis by hydro-mathematical models. Conditions of flood inundation such as water level, water depth and duration will be changed under with and without Project conditions. The following approach is taken to clarify the shifting of flooding conditions between with and without Project conditions.

Criteria for inundation damage risk (Table 4-9) were set up in consideration of inundation water depth and duration with reference to the "Assessment manual on economic loss by flood disasters" (MLIT Japan, 2005). Based on the simulation results and the MLIT criteria, inundation damage risk of with and without Project conditions along the expressway were estimated.

Table 4-9 Provisional Criteria for Inundation Damage Risk

Inundation Depth	Duration of Inundation			
	0~1 day	1~2 days	2~3 days	More than 3 days
0.0 – 0.5m	Low	Low	Medium	Medium
0.5 – 1.0m	Low	Medium	Medium	Serious
1.0 – 2.0m	Medium	Medium	Serious	Serious
More than 2.0m	Serious	Serious	Serious	Serious

Reference:
The relation between the damage ratio and the inundation depth/duration,
"Assessment manual on economic loss by flood disasters" (MLIT Japan, 2005)

The typical damage risk will be shifting in major inundation sections from 1% flood without project scenario to 1% flood with project. The inundation analysis results shown that inundation damage risk increase and the risk becomes "Severe" at most flood prone sections of the expressway (considering 1.0 time, 1.5 times and 2.0 times of drainage openings). Incase, even we provide 2.0 times of drainage openings in the expressway, the risk still "Severe", therefore, sufficient drainage openings should be considered to not only mitigate inundation damage risk, but also appropriateness with actual condition. The inundation damage risks of 1% flood in cases of with the Project and without the Project are presented in Table 4-10.

Table 4-10 Typical Damage Risk Shifting in Major Inundation Sections

No.	Section	Location	Damage risk shifting				
			1% flood, without Project		1% flood, with Project		
					1.0 time	1.5 times	2.0 times
I	KM01+000 - KM21+000	KM05+760	Medium	→	Serious	Medium	Medium
		KM14+520	Medium	→	Serious	Serious	Serious
		KM12+500	Serious	→	Serious	Serious	Serious
II	KM38+000 - KM40+000	KM38+880	Low	→	Medium	Low	Low
		KM38+300	Medium	→	Serious	Medium	Medium
		KM39+660	Serious	→	Serious	Serious	Serious
III	KM54+000 - KM59+000	KM54+720	Low	→	Medium	Low	Low
		KM58+240	Medium	→	Serious	Serious	Serious
		KM57+220	Serious	→	Serious	Serious	Serious
IV	KM62+000 - KM70+000	KM63+680	Low	→	Medium	Medium	Medium
		KM69+100	Medium	→	Serious	Serious	Serious
		KM63+000	Serious	→	Serious	Serious	Serious

4.4.2 Impacts on Surface Water Quality

In operation phase, the traffic volume would increase year by year, and then, the vehicle's tail gas, oil and other harmful substances fallen on road surface would increase year by year. Once the above pollutants flow into water body with rainfall runoff, they will pollute the water body. In addition, domestic wastewater generated from the service areas, tollgate stations, and road maintenance facilities along the expressway can also cause partial pollution to surrounding water bodies. Furthermore, accidents involving vehicles hauling hazardous materials may cause significant water pollution.

The facilities to be constructed in the service zones during the first stage include Traffic Management Center, Expressway Operation Office, Parking Yards, Toll Stations, and Service Areas with stores, toilets, hotels, and maintenance services. Wastewater generated from these various facilities would contain pollutants such as coli form, grease, oil, solid suspended (SS), etc.

Besides, the following incidents may cause severe impacts to the surrounding water bodies:

- Accidental fuel leakage;
- Chemical leakage from truck accident;
- Truck carrying the hazardous, chemical and pesticide falling into the river during accidents.

In particular, the following rivers are considered very important for the urban areas in downstream: Tuy Loan and Yen rivers, Vu Gia and Thu Bon (including Ky Lam and Chiem Son) rivers, Tam Ky river, Tra Bong river, Tra Khuc river. Therefore, proper measures to prevent/mitigate impacts to water quality of these rivers should be carefully examined.

4.4.3 Noise and Vibration during Operation Phase

During operation phase of the expressway, noise and vibration is generated mostly by traffic flow. Due to the fact that there are many villages exiting along the proposed expressway, and many noise sensitive receptors such as: schools, pagodas, churches, etc … in these villages, it is necessary to conduct the noise monitoring during long term of operation phase. Reasonable mitigation measures would be developed based on result of monitoring and request raised by local people living along the expressway.

In short time, when the traffic volume is not so high, the noise impact is not serious. However, in long term period, when the traffic volume increases, the protection corridor of expressway shall be widened to 50m from the road edge. The receptors, which located in the protection corridors, should be removed in the future.

4.4.4 Impact on Air Quality

In operation phase, ambient air quality of the areas along the Expressway would be deteriorated by the following dust and toxic gas generated from vehicles running on the Expressway.

+ Dust (SPM) generated from the road surface dispersed to the air by vehicles running on the roads, and
+ Dust and toxic gases (NO_x, CO, VOC, etc.) generated from vehicle's engines when burning fuel.

In operation phase, according to result of the Simulation of Air Pollution Diffusion (Minutes of Discussion on the North – South Expressway Construction Project [Da Nang – Quang Ngai Section] between JICA and the Government of the Socialist Republic of Vietnam, October 21, 2010), the predicted concentrations of CO and SO_2 satisfy the Vietnamese standard and Japanese standard at 20m from the centerline (i.e. a location near the border of the Expressway and private land). The predicted concentration of TSP also satisfies the Vietnamese standard. (There is no international standard value for TSP).

The maximum predicted concentration of NO_x at 20m from the centerline is 353 $\mu g/m^3$ and it exceeds the Vietnamese standard (200 $\mu g/m^3$: QCVN05:2009). However, most international standards including Japanese standard and WHO standard (200 $\mu g/m^3$) are set for NO_2. Considering the ratio of NO_x to NO_2 (less than 50% of NO_x is NO_2), the predicted concentration of NO_2 satisfies the international standards.

For the tunnel section, since the distance from the tunnel to the nearest commune is more than 400m, no significant impact on ambient air is foreseen.

4.4.5 Wastes

Wastes generated in operation phase are mostly wastes from the services areas, parking areas, management centers and toll offices.

Poorly designed waste management plans may cause contamination of the environment and pose risks to people's health and safety. Wastes generated should be adequately and regularly collected and transported to the waste disposal sites.

4.4.6 Split of Communities and Accidents

The expressway route runs parallel to the NH1 and Trans-nation Railway, and it was adjusted to avoid as much as possible crossing the residential area. However in some locations, it is difficult to avoid split of villages or hindrance to residents in going to working places. Some of residential areas and agricultural land of the villages along the road would be divided into fragmented areas by the proposed expressway. Local residents' daily activities, production activities, etc. would be significantly affected. In several cases, the expressway would not only split the communities, but also cause hindrance to people in accessing to the schools, hospitals, markets, administrative agencies, churches, pagodas, etc. In case of Tinh Ha Primary School (Km124+100), the interchange will split the school with the village. This is considered as a major impact of the expressway during operation phase. The following populous area (or its access road) would be split by the planed expressway (Table 4-11).

Table 4-11 The villages affected by expressway

No	Station		Length (m)	Name of populous area	Notification
	From (Km)	To (Km)			
1	0 + 120	0 + 300	180	Phu Hoa	Split into two parts
2	0 + 480	0 + 700	220	Phu Hoa	Split into two parts
3	1 + 400	1 + 700	300	Cam Binh	Difficult to access to other areas
4	2 + 980	3 + 100	120	Thach Bo	Split into two parts
5	4 + 850	5 + 100	250	La Bong	Difficult to access to other areas
6	5 + 500	5 + 720	220	Le Son 2	Split into two parts
7	7 + 320	7 + 620	300	Thai Cam	Difficult to access to other areas
8	7 + 900	7 + 980	80	Thai Cam	Split into two parts
9	8 + 920	9 + 060	140	Thai Cam	Difficult to access to other areas
10	9 + 720	9+ 760	40		Difficult to access to other areas
11	10 + 680	10 + 840	160	Duc Ky	Difficult to access to other areas
12	14 + 040	14 + 500	460	Chau Thuy	Split into two parts
13	16 + 190	16 + 230	40	Bi Nhai	Split into two parts
14	16 + 660	16 + 940	280	Bi Nhai	Split into two parts
15	19 + 180	19 + 300	120	Xuan Dai	Split into two parts
16	19 + 560	19 + 600	40	Ben Den Dong	Split into two parts
17	23 + 950	24 + 280	330	Hamlet 5	Split into two parts
18	24 + 760	24 + 820	60	Hamlet 5	Difficult to access to other areas
19	28 + 860	29 + 100	240	Hamlet 2	Split into two parts
20	35 + 460	35 + 520	60	Hamlet 3	Split into two parts
21	37 + 230	37 + 280	50	Hamlet 4	Difficult to access to other areas

No	Station		Length (m)	Name of populous area	Notification
	From (Km)	To (Km)			
22	39 + 780	39 + 940	160	Quy Thạnh	Difficult to access to other areas
23	41 + 200	41 + 320	120	Quy Xuan	Difficult to access to other areas
24	41 + 600	41 + 740	140	Quy Xuan	Split into two parts
25	42 + 720	43 + 040	320	Hamlet 1	Split into two parts
26	45 + 060	45 +300	240	Hamlet 1	Split into two parts
27	46 + 180	46 + 300	120	Tu Tra	Split into two parts
28	47 + 100	47 + 500	400	Hamlet 4	Split into two parts
29	48 + 160	48 + 240	80	Hamlet 4	Difficult to access to other areas
30	48 + 680	48 + 780	100	Binh Hoi	Difficult to access to other areas
31	49 + 040	49 + 280	240	Binh Hoi	Split into two parts
32	50 + 200	50 + 360	160	Binh Quang	Split into two parts
33	50 + 480	50 + 600	120	Binh Quang	Difficult to access to other areas
34	51 + 020	51 + 120	100	Binh Quang	Split into two parts
35	53 + 180	53 + 280	100	Hamlet 7	Split into two parts
36	53 + 640	53 + 740	100	Hamlet 7	Split into two parts
37	54 + 060	54 + 160	100		Difficult to access to other areas
38	54 + 760	54 + 800	40	Hamlet 5	Split into two parts
39	55 + 760	55 + 870	110	Hamlet 1	Split into two parts
40	55 + 980	56 + 080	100	Hamlet 1	Difficult to access to other areas
41	56 + 500	56 + 540	40	Hamlet 1	Difficult to access to other areas
42	56 + 700	57 + 200	500	Hamlet 2	Split into two parts
43	59 + 640	59 + 820	180	Xuan Trung	Difficult to access to other areas
44	59 + 900	60 + 300	400	Xuan Trung	Split into two parts
45	61 + 720	61 + 960	240	Hamlet 1	Split into two parts
46	63 + 620	63 + 860	240	Hamlet 10	Split into two parts
47	65+ 000	65 + 140	140	Hamlet 3	Split into two parts
48	67 + 800	67 + 980	180	Hamlet 4	Difficult to access to other areas
49	68 + 600	68 + 980	380	Hamlet 5	Difficult to access to other areas
50	71 + 020	71 + 280	260	Hamlet 6	Difficult to access to other areas
51	72 + 620	72 + 760	140	Hamlet 6	Split into two parts
52	82 + 940	83 + 140	200	Ky Thạnh	Split into two parts
53	84 + 180	84 + 360	180		Difficult to access to other areas
54	86 + 720	87 + 020	300	Hamlet 4	Split into two parts
55	87 + 500	87 + 680	180	Hamlet 4	Split into two parts
56	89 + 120	89 + 200	80	Da Phu	Split into two parts
57	89 + 360	89 + 540	180	Da Phu	Split into two parts
58	93 + 360	93 + 480	120	An Thien	Split into two parts
59	96 + 120	96 + 160	40	Haa Dong	Split into two parts

No	Station		Length (m)	Name of populous area	Notification
	From (Km)	To (Km)			
60	98 + 180	98 + 420	240	Haa Van	Split into two parts
61	100 + 120	100 + 760	740	Tri Binh	Split into two parts
62	101 + 800	102 + 120	320	Nam Binh	Difficult to access to other areas
63	105 + 560	105 + 800	240	Phu Le	Split into two parts
64	105 + 900	105 + 940	40	Phu Le	Difficult to access to other areas
65	106 + 580	106 + 860	280	Phu Le	Split into two parts
66	107 + 780	107 + 800	20	Phu Le	Difficult to access to other areas
67	108 + 080	108 + 440	360	Tien Dao	Split into two parts
68	108 + 560	108 + 640	80	Tien Dao	Split into two parts
69	109 + 760	109 + 840	80	An Thuan	Split into two parts
70	114 + 580	114 + 680	100	Hamlet 3	Difficult to access to other areas
71	116 + 460	116 + 600	140	Tho Tay	Split into two parts
72	116 + 740	116 + 880	140		Split into two parts
73	119 + 920	120 + 040	120	Van Hoa	Split into two parts
74	121 + 120	121 + 180	60	Tho Nam	Difficult to access to other areas
75	121 + 580	121 + 720	140	Lam Loc	Split into two parts
76	123 + 840	124 + 140	300	Ha Trung	Split into two parts
77	124 + 900	125 + 000	100		Split into two parts
78	125 + 780	126 + 040	260	Xuan Pho	Split into two parts
79	128 + 000	128 + 240	240	An Hoi	Difficult to access to other areas
80	128 + 360	128 + 680	320	An Hoi	Split into two parts
81	128 + 780	128+780	-	An Nam	Difficult to access to other areas
82	129 + 400	129 + 400	-		Difficult to access to other areas
83	130 + 660	130 + 800	140	Dieu An	Difficult to access to other areas
84	131 + 700	132 + 450	750	Dieu An	Split into two parts

Along of the common sections of the expressway, a fence will be erected between the Expressway and the frontage road, to prevent local residents, local vehicles or animals from entering to the expressway. Therefore, the risk of occurrence of accident caused by vehicles running on the expressway to local residents is assessed negligible.

4.4.7 Landscape (aesthetics and visual effects)

Structures attached with the expressway, such as: tunnel, viaducts, bridges auxiliary facilities, etc. would cause slight negative effect on landscape. The following sections might present minor impacts on local artificially and natural landscape.

Road side slope: as the road will pass through a highly region, if the side slope of the road is not planted with vegetable cover, the side slope will be exposed to the natural green, causing strong visual impact.

Auxiliary facilities: they often affect surrounding environment through the shape of structures and greening status of themselves.

Bridge: simple adverse impact. The bridge design will consider the bridge location and surrounding environment in term of style, color, and bridge structures to minimize adverse visual impact.

Tunnel inlet and outlet should be designed to match local landscape and to mix in with the surroundings to the extent possible.

Chapter 5 Impact Mitigation Measures

5.1 Impact Mitigation Measures in Pre-construction Phase

During pre-construction phase, the main impact is caused by land acquisition and resettlement. It is anticipated that more than **961 ha** of land will be permanently acquired, more than **6,000** households will be affected, and more than **2,200** households have to be relocated. Measures to mitigate these impacts are considered very important, especially the "Livelihood Restoration Program". That program is included in the Updated Resettlement Action Plans (RAPs) to be prepared by Resettlement Team in D/D stage.

5.2 Impact Mitigation Measures in Construction Phase

5.2.1 Mitigation of Impacts of Air Pollution

During construction phase, main sources of air pollution are:

- Temporary dust emissions due to exposure of slope surface, uncovered stockpiling area and excavation activities;
- Dust emission due to blasting;
- Dust from vehicles and unpaved access roads;
- Gases emissions from batching plants and concrete mixing stations;
- Gases emissions during payment of road surface by asphalt plant; and
- Exhaust fumes from construction plant and vehicles.

The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities, and shall implement the measures to control air pollution that shall include, but not be limited to the followings:

1) Construction materials shall be supplied only from the quarries that have exploitation license and operated under a good environmental management.
2) Earth, rock or debris shall not be deposited on public or private right of way as a result of Contractor's operations, including any deposits arising from the movement of construction plant or vehicles.
3) Provide water spray vehicles to water the unpaved ground, storage piles and other areas where airborne dust may originate. The water spray operation should be carried out in dry and windy day, at least twice a day (morning and afternoon).
4) Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition. The tarpaulin shall be properly secured and shall extend at least 300 millimeters over the edges of the side and tailboards.
5) Trucks transporting construction materials should meet allowable exhaust gas emission standards (stated in Decision 249/2005/QĐ-TTg on October 1, 2005), and should be carefully covered.

6) Site for stockpiling soils and sand should be located far more than 300m from the populous residential areas.
7) All soils excavated from the land surface during the works to construct road foundation shall be transported as soon as possible to the sites for reuse or disposal.
8) Concentration of construction machinery and vehicles near the populous residential areas should be avoided.
9) Measures to control air pollution at construction yards:

    a) Debris, construction wastes, vegetation or other materials shall be not burned on the site.
    b) Conveyor belts shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners.
    c) Where dusty materials are being discharged to vehicles from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust fans shall be provided for this enclosure and vented to a suitable fabric filter system.

10) Measures to control air pollution at concrete batching plant, asphalt melting stations, etc.

    a) Concrete batching plants, crushing plant sites and their ancillary areas shall be frequently cleaned and watered to minimize any dust emissions.
    b) Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters.
    c) A suitable air pollution control system shall be installed and operated whenever the batching plant is in operation.
    d) All stockpiles of sand and aggregate within the batching plant site shall be enclosed on three sides with geotextile sheets (if they are greater than $20m^3$), and shall be enclosed on three sides with walls extending above the stockpile and 2000mm beyond the front of the stockpile (if they are greater than $50m^3$).
    e) The asphalt melting station should be equipped with flue gas control device, operation of asphalt melting will be in enclosed mode; cement and concrete will be mixed within an enclosed structure.
    f) Cement and other such fine-grained materials delivered in bulk shall be stored in closed silos fitted with a high-level alarm indicator. The high level alarm indicators shall be interlocked with the filling line such that in the event of the hopper approaching an overfill condition, an audible alarm will operate, and the pneumatic line to the filling tanker will close.
    g) All air vents on cement silos shall be fitted with suitable fabric filters provided with either shaking or pulse-air cleaning mechanisms. The fabric filter area shall be determined using an air-cloth ratio (filtering velocity) of 0.01 - 0.03 m/s.

11) Measures to control air pollution at construction site:

    a) Use temporary barriers to control dust around the construction sites near the populous residential areas.
    b) All vehicles shall have their engine turned off while parked on the site.

c) Construction machinery should be located as far as possible from the construction site boundary.
d) Areas within the construction site where there is a regular movement of vehicles shall have a hard surface and be kept clear of loose surface material to the satisfaction of the Engineer.
e) Construction roads should be paved with gravel or asphalt to reduce generation of air-borne dust, and mitigate impacts to residential areas.
f) All roads within the construction sites and roads leading to the sites shall be sprayed by using water bowers with spray bars, hose pipes etc. to control dust to the satisfaction of the Engineer.
g) Wheel washing facilities shall be provided at the exit of all construction sites to prevent dusty material from being carried off-site on vehicles and deposited on public roads. Wash-water shall have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of wheel wash operations.
h) On site vehicle speeds shall be restricted to a maximum of 15km/hour to reduce dust re-suspension and dispersion by traffic within sites.
i) Heights from which excavated materials are dropped shall be controlled to the minimum practical to limit the fugitive dust generation from unloading.
j) Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to limit the creation of wind blown dust.
k) To minimize dust emissions, the amount of spoil exposed and the dust generation potential shall be kept as low as possible, this can be accomplished by surface compaction, temporary fabric covers, minimizing the extent of exposed soil and the prompt re-vegetation of completed earthworks.
l) During breaking/crushing or demolition works watering shall be implemented to control dust. Water sprays shall be used during the handling of excavated material and at active cuts, excavation and fill sites. Excessive watering should be avoided.

5.2.2 Mitigation of Impacts of Surface Water Pollution

The following key issues on water pollution are anticipated to happen during construction phase:

- Wastewater generated from construction equipment (e.g. uncontrolled release of bentonite from boring machine);
- Wastewater from bored piling locations. Re-suspension of bottom sediment and mud caused by construction of bridge foundation within water courses;
- Soil erosion / flush away from uncovered stockpiling locations, uncovered excavation site and unprotected slope surface during adverse weather conditions;
- Uncontrolled surface water run-off carrying sediment laden discharges directly into natural water bodies such as river estuaries and local irrigation channels;
- Domestic sewage generated by construction workers, such as kitchen, shower, etc.

The Contractor shall undertake at all times to prevent water pollution as a result of his activities, and shall implement the measures to control water pollution that shall include, but not be limited to the followings:

1) The Contractor shall comply with the Vietnamese legislation and other regulations

currently applied in Vietnam insofar as they relate to water pollution control.

2) Protection of the water environment shall be recognized as a key constraint for any construction work. The Contractor shall devise and arrange methods of working to minimize water quality impacts to the satisfaction of the Engineer.
3) The Contractor shall at all times ensure that all existing water courses and drains within, and adjacent to, the Site are kept safe and free from any debris and any excavated materials arising from the Works.
4) For construction of the bridge piers bundled site boundaries shall be established to prevent any wastewater discharging directly to the water body environment.
5) The earthwork sites where exposed land surface is vulnerable to runoff, etc. shall be consolidated and/or covered;
6) The Contractor shall ensure that rain run-off from the construction sites is not deposited directly into any watercourse or the marine environment.
7) All drainage facilities and erosion and sediment control structures shall be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms.
8) Wastewater shall be collected, re-used and/or disposed of off-site after oil/grease removal and settlement of suspended solids. Sediment tanks of sufficient capacity, constructed from pre-formed individual cells of approximately 6-8m3 capacity shall be used at all sites for settling waste-waters prior to disposal.
9) Construction wastes shall be collected and re-used wherever possible. Otherwise should be disposed in the small deposit area invulnerable to surface run-off, along with soil erosion prevention measures.
10) The material stockpile sites shall be located far away from water bodies and areas prone to surface run-off. If some must be placed near bridge construction sites, the stockpiles should be surrounded by interception ditches or retaining structures to prevent the erosion and materials into the water bodies. The loose materials should be bagged and covered.
11) The fuel storage and equipment maintenance yard should have weather/rain protection and should be on concrete pads to prevent dripping and leaking oils from entering the water bodies via surface runoff. All spoil soil disposal sites should only be allowed in the dedicated areas where will be erosion control measures and landscaping plan following the disposal operations.
12) For construction for bridges, there should be strict waste control plan to restrict discharge or dumping of any directly discharge of wastewater, slurry, waste, fuels and waste oil into the water. All these materials should be collected and disposed at the banks. The slurry and sediment should be pumped to the banks for disposal and should not be allowed to discharge to the rivers directly.
13) Drainage from vehicle maintenance areas, plant servicing areas and vehicle wash bays shall be passed via a petrol interceptor prior to discharge.
14) The Contractor shall ensure that no tools or machinery are washed in any water source or areas that drain into an existing watercourse or to the marine environment.
15) The Contractor shall weekly check all equipment for prevention of oil and or lubrication leaks and ensure that all equipment oil and lubrication replacements are performed only in bounded maintenance and repair areas.

5.2.3 Mitigation of Impacts of Groundwater Pollution

The wastewater produced during tunnel construction should be discharged into settling tanks to remove solids with the sediments cleared and transported on a timely manner and the supernatant being recycled into the process of construction. The surface water body without beneficial use or functions can be used to receive the discharge of supernatant, but it is forbidden to discharge it into the river without any proper treatment.

5.2.4 Mitigation of Impacts of Waste, Hazardous Waste

The domestic wastes and hazardous wastes should be kept separately. The hazardous wastes should be stored separately following the instructions given by the producer of the chemical and the regulations set by authorities.

Collection, store, and transportation of domestic wastes and hazardous wastes should be done properly in accordance with the regulations of Vietnam. Transportation of wastes from the generation sources to the treatment sites or disposal sites should be done in cooperation with the approved and authorized companies/entities.

Cars and other transportation equipment should be maintained and washed only at the sites having impermeable protective layers and collection system for oils, lubricants, detergents, solvents. The use of solvents and detergents should be avoided/minimized.

5.2.5 Mitigation of Impacts of Soil Erosion and Contamination

Rainfall is often considered to be one of the triggering elements for soil erosion at gravity which include water erosion, collapse and landslide. As the project is located in an area with adequate rainfall which often concentrates in a certain period, proper measures such as well scheduled construction and improvement of drainage system might considerably reduce the soil erosion that would occur due to land disturbance by road construction.

During construction phase, the Contractor shall undertake at all times to prevent soil erosion, and shall implement the measures to control soil erosion that shall include, but not be limited to the followings:

1) The Contractor is required to reuse the excavated soil as much as possible unless the soil is considered not suitable for filling. Fertile soil (or surface soil) shall be distributed free to local people who need it for their own purpose. The residuals shall be reused to form the ground around the interchanges, the areas along the expressway within the acquired land, or recover the vegetation in some affected areas due to the expressway project (such as: borrow pit, temporary sites...)
2) The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable.
3) Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor. Particular attention shall be paid to the control of surface runoff during storm events, especially for sites located near steep slopes.

4) In rainy season, prior to construction of roadbed, culverts will be completed with drainage system. The storm water interception and drainage system should be constructed before construction of side slopes.
5) Riprap or rock material should be used to embed the surface of the road sideslopes. Planting at the surface of the road sideslopes is also recommended. Retaining structures such as gabions, cribs, or other types of green barricades and grid work should be used to batter back against the cutting slopes.
6) At the sections involving high filling, the construction of road should be scheduled to avoid rainy season. If can not, drainage system will be improved to ensure that storm water be drained smoothly and quickly, and the working surface will be covered.
7) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.
8) The earthwork sites where exposed land surface is vulnerable to runoff, etc. shall be consolidated and/or covered.
9) The material stockpile sites shall be far away from surface water bodies and areas prone to surface run-off. Loose materials shall be bagged and covered. Open ditch shall be built around the stockpile sites to intercept wastewater. If necessary, retarding basins shall be constructed to remove sands and other solids in storm water before it reaches the downstream rivers.
10) Open stockpiles of construction materials (e.g. aggregates, sand and fill material) of more than $50m^3$ shall be covered with tarpaulin or similar fabric during rainstorms. Measures shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.
11) At the start of site establishment, perimeter cut-off drains to direct off-site water around the site shall be constructed and internal temporary drainage works and erosion and sediment control facilities shall be implemented.
12) Cut-off drains should be built near sensitive areas to catch rainwater before it reaches the critical areas, and diverging drains should be built to avoid excessive concentration of rainwater flow. Concrete dissipation structures should be built to slow down storm water in drains, and hence reduce its downstream erosive potential.
13) Channels, earth bunds, netting, tarpaulin and or sand bag barriers shall be used on site to manage surface water runoff and minimize erosion.
14) All exposed earth areas shall be completed and revegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces shall be protected by temporary drainage measures.
15) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.

5.2.6 Mitigation of Impacts of Noise and Vibration

There will be a wide range of noise causing by construction activities during project construction works (e.g. concrete mixers, backhoes, bulldozers, cranes, lorries, air compressors, batching plant, generators, earth work, piling, transportation, construction vehicle movement, etc.). The EIA have identified the following noise sources:

- Operation of the various equipments during construction (air compressor, powered mechanical equipment, bulldozers, excavators, etc);
- Materials from vehicle transporting within construction site and beyond the construction boundary; and
- Piling activities during construction of foundations / piers.

During the pre-construction phase, the route network for transportation of construction materials and waste soils should be properly planned to avoid/mitigate impacts of noise, air pollution, and vibration to residential areas and other acoustically sensitive receptors.

During construction phase, the Contractor shall undertake at all times to prevent noise and vibration generated by his activities, and shall implement the measures to control noise and vibration that shall include, but not be limited to the followings:

1) The Contractor shall abide by the provisions of the Conditions of Contract regarding environmental protection and Vietnam's Law on Environmental Protection, as well as other relevant legislations.
2) The Contractor shall at its own expense take all appropriate measures to ensure that work carried out (including works by sub-contractors), whether on or off the site, will not cause any unnecessary or excessive noise.
3) Construction activity near residential areas should be scheduled in daytime only, and the noisy equipment should be prohibited from night operation. During construction in daytime, the construction site should be fenced.
4) The Contractor shall select, use and maintain his plant and equipment, and adopt such methods for construction that the maximum vibration levels, measures on any building or structure outside or within the site limits, do not exceed the permitted levels specified in TCVN 6962-2001.
   The above are limits for transient vibrations. For continuous or sustained periods of vibrations, the permissible peak particle velocity shall be equal to two thirds (2/3) of the value given above.
5) The Contractor shall be responsible for repairing any damage caused as a result of vibrations generated from or by the use of his equipment, plant.
6) Although construction shall be banned in night time some may still occur for technical and other reasons (e.g., bridge piles required continued, around clock concrete pouring). If the work is occurred in the night time and near villages and other residential areas, which would result in particularly significant impacts, the Contractor shall submit to the Engineer a noise statement including full and comprehensive details of all powered mechanical equipment proposed for use during night time hours 22:00 to 06:00 hours and the proposed working methods and noise level reduction measures. The noise statement shall include detailed noise calculations to demonstrate the anticipated noise generation. Special measures (such as use of noise barriers) shall be proposed if excessive noise and vibration is anticipated. The noise statement shall be submitted to the Engineer at least seven days before the planned start of any works. No work shall be carried out until the Engineer has notified the Contractor in writing of his consent based on the noise statement submitted in relation to such work. Such consent of the Engineer shall not in any event relieve the Contractor of its obligations under the Contract or Vietnamese law.

7) Restriction of rock drilling to the shortest period possible.
8) Blasting works shall be restricted to a defined hour i.e. mid day, and all affected residents shall be prewired of the blasting schedule.
9) All powered mechanical equipment used in the works shall be effectively sound reduced using the most modern techniques available in Viet Nam. Equipment shall be selected with due consideration for having lowest noise levels, and ensuring that these equipment are regularly maintained to keep such levels during its operation.
10) All equipment, engines and motors shall be equipped with proper silencers or mufflers during construction.
11) Positioning air compressors for various construction plant / caisson foundations on rubber sheets.
12) Construction equipment should be well maintained to keep it in a best operating conditions and lowest noise levels.
13) The Contractor shall ensure that all equipment engines and motors are equipped with proper mufflers.
14) Restrict long heavy vehicles and speed in the areas near the populous areas.
15) Transportation of construction equipment and materials on existing roads shall be carefully designed to minimize adverse impact on residents, as well as traffic on the existing road. The transportation vehicles should be required to slow down and banned from horning when passing populous residential areas.
16) Notice boards will be erected at all construction sites providing information about the project, as well as contact information about the site managers, environmental staff, telephone number and other contact information so that any affected people can have the channel to voice their concerns and suggestions.
17) The use of temporary noise barriers, or acoustic screens or enclosures shall be properly examined at the road sections close to the populous residential houses to shield residences from road traffic noise.
18) After completion of road construction, trees which can be grown well in infertile areas (such as white eucalyptus, red eualyptus, cajuput, acassia aneura, pine, etc.) shall be planted along sections of road near the populous residential areas to mitigate impact of traffic noise to residents living along the road.
19) For workers who must work with excessive noisy machines such as piling, explosion, mixing, etc., ear pieces should be provided for noise control and workers protection.

5.2.7 Mitigation of Impacts on Ecosystem, Biodiversity, and Landscape

The majority of ecological impacts, landscape and visual impacts would cause by the Project during construction are related to:

- Site clearance, formation and removal of vegetation at the beginning of construction which results in loss of habitat and vegetation;
- Disturbance of soil profile during earth moving activities and disturbance to sediment and aquatic environment due to works near the water courses;
- Temporary and permanent land occupation;
- Poor/inadequate aesthetic design and landscaping design of the proposed road structures;

- Poorly implemented temporary mitigation measures and slope protection measures during excavation and slope works.

During pre-construction phase, locations of construction camps and sites should be carefully planned. The use of farmlands for construction camps and sites should be avoided when it is possible. Construction plan should be carefully prepared to reduce the time for land occupation.

During the construction phase, in order to mitigate impacts to ecosystem and landscape, in addition to measures to mitigate impacts on surface ambient air, water quality, and soil erosion (Sections 5.2.1, 5.2.2 and 5.2.5), the Contractor shall also undertake the following measures:

1) Education about environmental protection including avoidance of encroachment to local flora and fauna shall be provided to construction workers.
2) Plan to reuse excavated top soil should be properly examined. Excavated top soil should be carefully stockpiled and protected from erosion, and reused for reclamation and/or re-cultivation of temporarily-occupied sites after construction completion..
3) No vegetation of any type shall be removed from lands outside the works boundary.
4) Site fencing shall be erected on the border of construction sites, storage areas, etc. to avoid unnecessary off-site damage to vegetation, trees and landscape.
5) All trees within the works boundaries shall be preserved if they are outside the permanent works areas and do not interfere with construction or operation of the Project.
6) Exposed embankments and slopes created during the works shall be stabilized, ideally by hydro-seeding (grass planting using a spray to disperse seed) to minimize erosion.
7) After completion of road construction, trees (such as white eucalyptus, red eualyptus, cajuput, acassia aneura, pine, etc.) shall be planted along sections of road near the populous residential areas to mitigate impact of traffic noise to residents living along the road, and to improve landscape along the road.

5.2.8 Mitigation of Impacts to Religious, Cultural, Archaeological Properties

As described in Section 4.3.9, the Champa archaeological ruins near Km 22+000 would be affected indirectly by the planned expressway.

During the pre-construction phase, the following measures were recommended by the Institute of Archaeology of the Vietnamese Academy of Social Sciences (see the "*Report on Results of Archaeological Investigation – Stage 1 – Along the Highway Route of Da Nang – Quang Ngai"* prepared in May 2010 by the Institute).

Measure to mitigate impacts to the Champa archaeological ruins recommended by the Institute of Archaeological in May 2010:

- *Solution 1: Adjust the Alignment*: The route can be adjusted to avoid the impact on the population of Champa tower architectural ruins in the Chiêm Sơn Tây Valley. However, as we have all been aware that the land of Duy Xuyên District as well as the whole Quang Nam Province possess the Sa Huynh and Champa sites in very high density and wide distribution. Therefore, even the route adjustment is carried out, we are not sure that the route will not run through any other archaeological sites in Duy Xuyên and other regions. In cases that other archaeological sites are found influenced by the new route (a high possibility), another archaeological survey should be conducted again across the region and the solutions proposed subsequently would become more confused and complicated accordingly.

- *Solution 2: Comprehensive studies of all sites* should be conducted prior to the route construction. All sites will be studied under such disciplines as history, archaeology, ethnography and so on. After the landmark (land acquisition demarcating line) is set up to define the working area, the archaeological consultative group will carry out thorough survey on each site as well as the whole group of sites in Chiêm Sơn. These studies as a practical action will help better elucidate the past and preserve the national cultural heritages. Archaeologically, test excavations should be implemented at all sites to assess the size of sites and the impact intensity from the construction. The official excavations and artifact displacement to the provincial museum will then be launched after requirement of all necessary legal procedures is met. After that the working area will be handed over to the construction project.

According to the consultative group, the second solution is the most feasible in present circumstance. This is because it harmoniously combines two objectives of developing the economy and preserving and promoting cultural tradition. In addition, other feasible solutions can also be performed, for example, building up the memorial stone stelea about the sites on the roadside or building temporary vehicle stops for a break that are observed in Hue city (as for the site of Con Rang) and at Xa Dan road of Hanoi capital city (as for the site of Dan Xa Tac). If these solutions are done, there is no need to adjust the road.

During D/D, the proposed road alignment had been modified and it avoids direct impacts to Go Gach Ruin, Go Loi Ruin and the conservation area of Trien Tranh Ruin. The distance between the land acquisition line (ROW) and the conservation area of the Trien Tranh Ruin designated by Duy Xuyên district PC is about 70m (Figure 5-1).

According to the Law of Cultural Heritage, if significant high value cultural relics or artifacts are unearthed during construction phase, the Contractor shall stop all works immediately at the location where cultural relics or artifacts are found, and wait until having permission granted by local authority responsible for preservation of heritage.

No one can be sure that there is no archaeologically-valuable remain/artifact being buried under the area where will be encroached by the Expressway. Therefore, there is a risk of delay of construction work if such remain/artifact is unearthed by chance during construction. Consequently, in the meeting at Duy Xuyen on September 26, 2012, representatives of Quang Nam Province (Department of Culture, Sport and Tourism), Duy Xuyen District (Division of Culture, Sport and Tourism), and Duy Trinh Commune (People's Committee) had raised the request to carry out a test excavation in the area of Trien Tranh Mound where it is encroached by the Expressway during pre-construction phase (Appendix 4). However, PMU85 has reported this matter to Quang Nam PC and proposed test excavation would be conducted in construction stage in case relicts are found in compliance with the change finding procedures in the approved EIA.

During construction phase, some archaeologically-valuable artifacts or sites would be unearthed in chance. According to the regulations of the Law of Cultural Heritage, a procedure as recommended in EMP should be prepared before hand to minimize impacts to these artifacts or sites. If any relics are discovered, the local related departments should be notified immediately. The excavation should be stopped until the authorized department identifies the relics.

Solutions to the riverside of Tra Bong: From the Km 108+400 to Km 108+600 (at Gò Cây Da area, Đông Thuận Hamlet, Bình Trung Commune, Bình Sơn District, Quảng Ngãi) where the expressway crosses, the consultative group proposes a plan of searching for miscellaneous findings prior to the highway construction. This means that additional test excavations should be conducted here within the archaeological investigation stage 2, and from the results obtained, the consultative group can propose better solutions regarding cultural aspects. In case, a new site is found, we still have sufficient time to study and displace it without obstructing the construction progress.

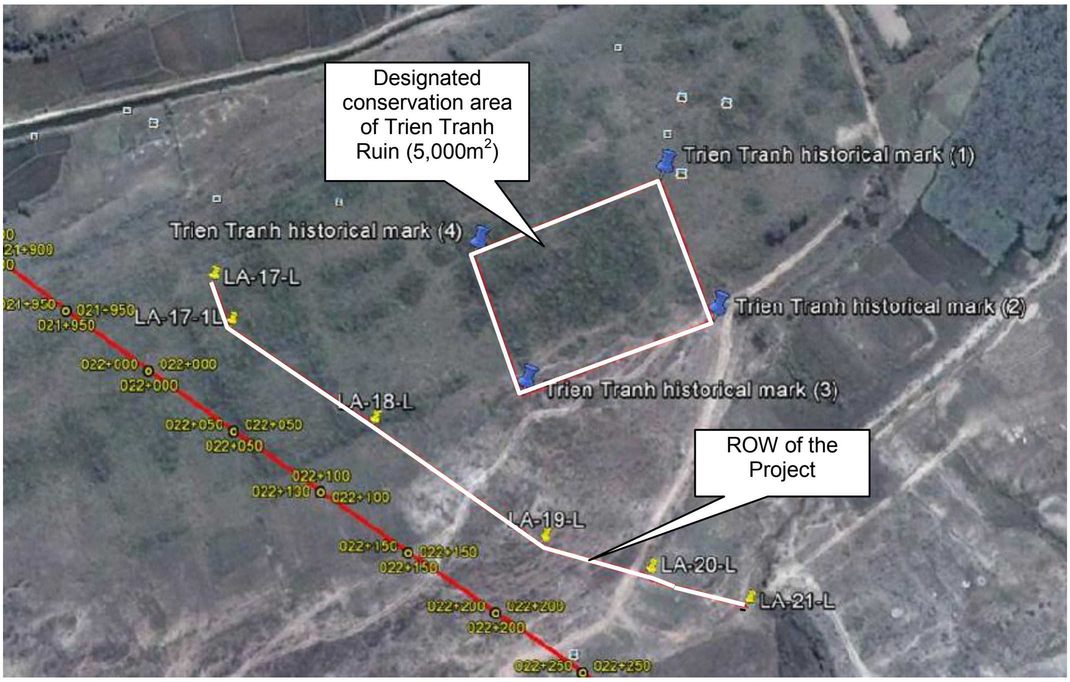


Figure 5-1 Location of the Designated Trien Tranh Conservation Area and Project's ROW

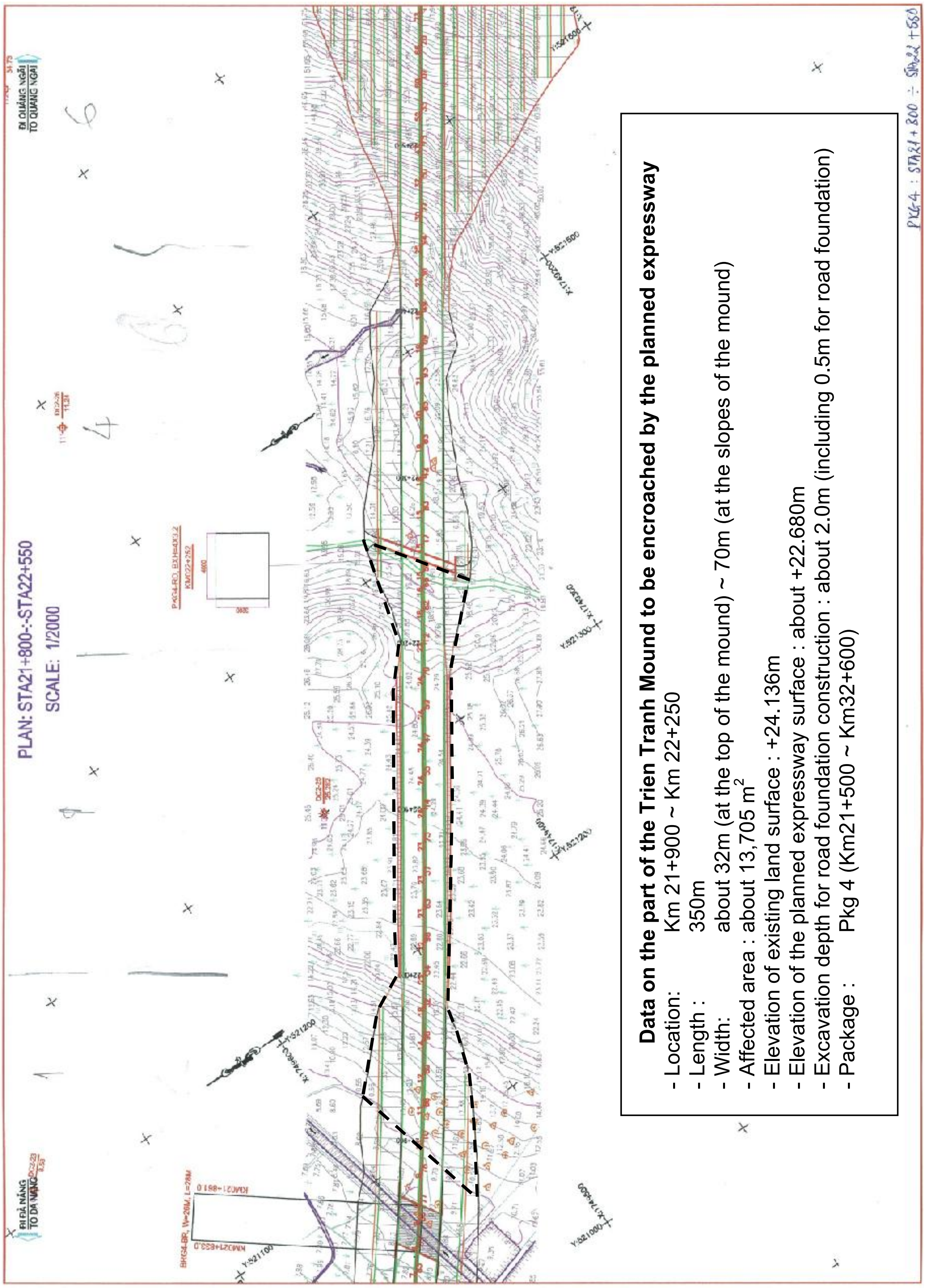


Figure 5-2 Part of the Trien Tranh Hill to be encroached by the Project

5.2.9 Mitigation of Impacts on the Local Economy

During the pre-construction phase

- Consultation meetings with local governments, local communities, and residents affected by the project should be organized to dismiss information about the project, collect opinions of local people about the project, and to promote their participation into the project implementation.
- The contract between the project owner and contractors should define the contractor's responsibility and obligation to implement mitigation and protection measures.
- Occupation of fertile farmland and woodland should be minimized;
- After completion of construction, the land used for temporary purposes should be reclaimed for agricultural development;
- In order to minimize obstruction to local residents' movement, the project should properly design underpasses, overpass bridges at the sections where the expressway crosses the local roads, rural roads.
- The Resettlement Plan should be prepared to address the impacts of relocation, decrease in income, and loss means of livelihood caused by the project to local residents. Local authorities and VEC should ensure that any involuntary resettlement will be carried out in accordance with the agreed Resettlement Action Plan, World Bank Operational Policies (OP 4.12, OP 4.10), and the Government's laws and regulations on involuntary resettlement. The resettlement sites should be well developed with physical infrastructures and social services, such as approach roads, water supply system, electric power supply system, drainage and sewage water treatment systems, etc.
- The Livelihood Restoration Programs should be developed to ensure that living and livelihood of the severely-affected Displaced Persons (DPs) and vulnerable groups will be restored at least to the level similar to those before resettlement. Results of consultation with DPs and other stakeholders, especially local NGOs should be duly taken into consideration during the preparation of the programs. To meet the World Bank Policy requirements, payment for all assets (including land, structures, crops, and other assets) must be based on the replacement cost with the assets value at full market price. DPs' assists should be restored at least to the level similar to those before resettlement.

During Construction Phase

Mitigation Measures Regarding Impacts on Community Health

The need for preparation of an HIV/AIDS Prevention Program had been agreed among JICA and GOV as described in the "*Minutes of Discussions on North-South Expressway Construction Project (Da Nang – Quang Ngai Section) between Japan International Cooperation Agency and the Government of the Socialist Republic of Vietnam*" signed on October 21, 2010, considering that the Project would gather a lot of workers for civil works during the implementation stage, which may raise risk of HIV/AIDS infections.

It is also agreed that HIV/AIDS activities for the whole section of the project, including both Japanese ODA Loan portion and the WB Loan portion, will be financed under the WB loan.

The objectives of the above mentioned activities are several folds: (i) lower the risk of HIV/AIDS transmissions among targeted groups: road agency staff, construction works, sex workers, and residents in the project affected areas; (ii) reduce in the rate of HIV infections among the targeted groups; and (iii) support institutional strengthening with MOT by increasing awareness of the importance of HIV/AIDS in the transport sector. Main activities of the HIV/AIDS Prevention Program are described in Attachment 15 of the Minutes of Discussions.

Based on the HIV/AIDS Prevention Program, the project should address the needs for better dissemination of information about HIV/AIDS and other risks such as drug abuse and human trafficking. The Program should contain awareness campaigns at the construction sites and in the communities, as well as developing peer educators and community monitoring combined with the prevention of human trafficking, awareness on safe migration, etc.

Traffic Accident Management and Prevention

Traffic volume on NH14B, NH14E, PR605, PR610, PR616, PR617, PR623, PR602 near the interchanges with the expressway and on other adjacent local roads shall be increased due to the involvement of construction materials transportation vehicles resulting to potential traffic accidents, especially for children and students. To minimize risks, the road safety awareness program should be included in the Project. Safety facilities of the expressway shall include guardrails, fences, prevention dazzle with opposite lights, traffic signs, and lighting systems.

5.2.10 Construction Site Safety

During construction phase, safety should be appropriately considered, particularly when the construction site is close to local communities and schools, because of the nature of the construction, the construction sites cannot be completely fenced off from the public.

The following measures should be taken by the Contractor during construction phase:

1) Provide construction workers with sufficient personal protection equipment (PPE) such as hard hats, earpiece, safety shoes, and others;
2) Provide seminars on safety issues for local public, particularly for school students;
3) Install warning signs whereas the potential dangers are present;
4) Erect temporary fence around high risk areas to control public access and light them at night if that is on the regular roads used by the locals;
5) Assign construction staffs on or near places where construction vehicles are crowded to ensure safety.

Contractor should prepare Emergency Action Plan, including but not limited of Safety Control Plan and Flood Control Plan …

The Contractor's Safety Control Plan shall consist a complete plan for implementation and monitoring of the necessary measures that the Contractor shall perform to control the work safety and guide how to do incase of accident is happened, especially accident happened in tunnel.

The Contractors' Flood Control Plan (FCP) shall consist of a complete plan for implementation and monitoring of the necessary measures that the Contractor shall perform to control and protect the Project area, and any other area that is affected by the flood.

The Contractor shall prepare and submit "Flood Control Plan" to the Engineer for review and approval. The "Flood Control Plan" that shall be implemented during the work execution, and shall be monitored on a daily basis during the flood season (from August to January).

The "Flood Control Plan" shall include, but not be limited to, the following:

+ Detailed action plan of the Constructor in case of flood will coming in 6 hours, 12 hours, 24 hours, and 48 hours;
+ Lines of Communication: The organizational structure shall show direct lines of communication and reporting.
+ Daily contact system (during flood season) with related agencies, especially local flood control authorities, the hydrological gauging stations and hydropower stations, to monitor and forecast the food.
+ Provided the emergency hotline to related agencies to get alerts from these agencies.

5.2.11 Mitigation of Impacts on Public Health and Public Order

Health and well-being of local communities may be affected by:

- Spread of disease due to poor house keeping and accumulation of domestic waste within the construction site;
- Stagnant water may result in mosquitoes breeding;
- Threats of spreading HIV/AIDS, as there will be a large construction force in the relatively remote areas during construction for a significant period time. This force is highly mobile and unsafe sex conduct could bring the HIV/AID risk to the local communities;
- Affected living standard and income of local residents due to occupation of lands for cultivation, aquaculture, etc.;
- Traffic safety.

Since the affected communities may have not experienced about large-scaled project near the locality in the past, they would be prone to the impacts caused by the Project. The following measures should be taken by the Contractor during construction phase to mitigate impacts to health and well-being of local communities.

1) In order to minimize impacts of an influx of new people into the local community, wherever possible, suitable local companies and organizations should be involved. For unskilled manual labor, men and women in the locality should be employed.
2) Should there be a large influx of new people, then they are likely to be housed on the site. Adequate living standards with suitable services (water supply, sanitation and power supplies) should be provided for these temporary housing areas. Effluents discharged from these premises should be treated properly before discharged to the surrounding water bodies.
3) Opportunities to use local services (e.g. for food supplies etc) should also be

encouraged so that the local population benefits from an influx of new people.

4) Temporary obstruction of traffic should be avoided or minimized by:

- Carefully preparing the construction plan in order to minimize the area and period of road occupation/ closure, and avoid concentration of construction vehicles;
- Providing prior notices to local residents on the road occupation / closure through sign boards and mass media;
- Specifying road occupation sites, construction sites, etc. to avoid vehicles mistakenly enter the sites;
- Allocating personnel at place vulnerable to traffic congestion to instruct detour.

5) Infectious diseases should be prevented or controlled by the following measures:

- Obligate Contractor to duly implement the HIV/AIDS Prevention Program (to be prepared by the entity in charge of Project Implementation Support for VEC or PIS) during construction stage;
- Obligate Contractor to prepare and execute the health education plan for construction workers;
- Obligate Contractor to periodically report about the health education activities carried out by the Contractor;
- Health education activities carried out by the Contractor should be monitored by the environmental supervision consultant;
- Contractor should submit periodical reports about health education activities to local health authorities.

5.2.12 Mitigation of Risks Due to Residual Unexploded Ordnances

To ensure the safety of people and equipment involving in construction works, VEC and PMU1, PMU85 shall be responsible for unexploded ordnance clearance, which is expected to be implemented at the same time of land acquisition progress.

Residual unexploded ordnance clearance is done under Decision No. 96/2008/QD-TTg dated May 4, 2006, and in Article No 11, Chapter IV of Decision No 3037/QD-BGTVT dated October 14, 2003. Residual unexploded ordnance clearance is a special task, which shall be done by military agency.

5.2.13 Mitigation of Impacts of Waste Soils

Mitigation Impacts of Soil Deposit Pits and Spoil Disposal Sites

As described in Section 4.3.13, it is estimated that about 3.4 million m^3 of excavated soil would be generated by the project, of which 2.2 million m^3 would be reused in filling the low areas along the expressway or filling the opened areas around interchanges, or utilized by the third parties. The estimated volume of waste soils remaining after being reused is about 1.2 million m^3. These residual soils should be disposed somewhere in a proper manner.

The criteria for selecting the locations for soil deposit pits and spoil disposal sites should include the requirement of the project, topographical and geological conditions, as well as the requirements for environmental protection and soil conservation.

During the D/D Study, attempts were made to maximize the reuse of waste soils in filling the areas within the land acquisition demarcation lines (GPMB lines) along both sides of the expressway works where tree planting is possible to mitigate impacts of air pollution and noise. Reuse of waste soils was also taken into consideration in the design of the interchanges with aim to use waste soils to fill the areas around the interchanges for tree planting and grassing.

The D/D Study Team had also carried out a survey on the candidate sites for disposing residual waste soils. The selection and use of these sites was agreed by the relevant commune PCs and district PCs. Details about these waste soil disposal sites are as follow:

Table 5.1 List of Disposal Site

No.	Package	Location	Co-ordinate	Area (ha)	Volume (m3)	Note
1	P1	Tuy Loan interchange at Hoa Nhon commune, Hoa Vang district, Danang city	N:16° 0'12.33"; E:108° 8'50.03"	19.43	388,566	Interchange
2	P1	Hoa Tien 1 - Disposal at La Bong hamlet, Hoa Tien commune, Hoa Vang district, Danang city	N:15°58'21.37"; E:108°10'4.70"	0.30	6,000	
3	P1	Hoa Tien 2 - Le Xuan 1 hamlet, Hoa Tien commune, Hoa Vang district, Danang city	N:15°57'38.06"; E:108°10'39.93"	0.50	15,000	
4	P1	Hoa Tien 3 - La Bong hamlet, Hoa Tien commune, Hoa Vang district, Danang city	N:15°58'16.04"; E:108°10'23.56"	1.00	10,000	
5	P2	My Son interchange at Dien Tho commune, Dien Ban district, Da Nang city	N:15°53'32.19"; E:108°10'32.85"	6.97	97,600	Interchange
6	P3B and P4	Duy Trinh 1 - Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district	N:15°49'47.60"; E:108°11'48.85"	0.50	20,000	
7	P3B and P4	Duy Trinh 2 - Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district	N:15°49'13.50"; E:108°11'9.94"	1.50	22,500	
8	P3B and P4	Duy Trinh 3 - Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district	N:15°49'7.36"; E:108°11'3.66"	2.00	40,000	
9	P3B and P4	Duy Trinh 4 - Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district	N:15°49'38.52"; E:108°11'20.81"	1.00	80,000	
10	P3B and P4	Duy Trinh 5 - Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district	N:15°49'40.74"; E:108°11'23.44"	2.00	240,000	

No.	Package	Location	Co-ordinate	Area (ha)	Volume (m3)	Note
11	P5	Ha Lam interchange - Binh Quy commune, Thang Binh district, Quang Nam province	N:15°42'38.11"; E:108°19'54.68"	2.92	65,648	Interchange
12	P6	My Tra disposal site - My Tra hamlet, Binh Chanh commune, Binh Son district, Quang Ngai province	N:15°40'3.60"; E:108°22'5.50"	0.50	20,000	
13	P7	Tam Ky interchange at Tam Thai commune, Phu Ninh district, Quang Nam province	N:15°32'7.75"; E:108°27'12.91"	2.85	113,828	Interchange
14	PA1	Aton – Go Du disposal site - Tam Anh South, Nui Thanh district, Quang Nam provice	N:15°28'58.76"; E:108°34'19.72"	4.00	80,000	
15	PA1	Public Area of My Son hamlet at Tam Anh South commune, Nui Thanh district, Quang Nam provice	N:15°29'14.24"; E:108°34'42.55"	0.65	6,500	
16	PA1	Dong Ho Disposal at Tam Anh South commune, Nui Thanh district, Quang Nam provice	N:15°29'32.51"; E:108°33'37.81"	10.00	100,000	
17	PA1	Go Vang disposal site - Tam Anh South commune, Nui Thanh district, Quang Nam provice	N:15°29'28.64"; E:108°33'53.94"	20.00	300,000	
18	PA2	Chu Lai interchange - Tam Hiep commune, Nui Thanh district, Quang Nam province	N:15°26'23.63"; E:108°35'28.16"	3.18	33,378	Interchange
19	PA2	Tam My East 1 at Phu Qui 3 hamlet, Tam My East commune, Nui Thanh district, Quang Nam province	N: 1524'46.89" E: 108°37'59.5"	1.00	25,000	Temporary Disposal site
20	PA2	Tam My East 2 at Da Phu 2 hamlet, Tam My East commune, Nui Thanh district, Quang Nam province	N: 15°24'13.4" E: 108°38'28.15"	3.00	60,000	
21	PA2	Tam My East 3 at Da Phu - Tra Tay hamlet, Tam My East commune, Nui Thanh district, Quang Nam province	N: 15°24'53" E: 108°38'52.32"	2.00	10,000	
22	PA3	Dung Quat interchange - Binh Nguyen Commune, Binh Son district, Quang Ngai province	N:15°21'7.43"; E:108°43'34.66"	3.32	34,817	Interchange
23	PA3	Binh Nguyen 1 at Tri Binh hamlet, Binh Nguyen commune, Binh Son district, Quang Ngai province	N: 15°21'01.8" E: 108°43'38"	1.00	20,000	

No.	Package	Location	Co-ordinate	Area (ha)	Volume (m3)	Note
24	PA3	Binh Nguyen 2 at Nam Binh hamlet, Binh Nguyen commune, Binh Son district, Quang Ngai province	N: 15°20'43.7" E: 108°43'54.2"	1.20	24,000	
25	PA3	Binh Nguyen 3 at Ngo Vo residence are, Binh Nguyen commune, Binh Son district, Quang Ngai province	N: 15°19'04.4" E: 108°44'06.6"	0.30	6,000	
26	PA3	Binh Nguyen 4 at Hung garden, Binh Nguyen commune, Binh Son district, Quang Ngai province	N: 15°19'06.7" E: 108°44'26.9"	0.50	5,000	
27	PA3	Binh Long 1 at premaritally shool of Binh Long, Binh Long commune, Binh Son district, Quang Ngai province	N: 15°16'32.9" E: 108°46'13.5"	0.35	8,750	
28	PA3	Binh Long 2 at Long Binh hamlet, Binh Long commune, Binh Son district, Quang Ngai province	N: 15°16'26.6" E: 108°47'24.9"	0.20	4,000	
29	PA4	Tinh Tho 1 at Tho Nam hamlet, Tinh Tho commune, Son Tinh district, Quang Ngai province	N: 15°11'59.5" E: 108°45'08.3"	2.00	24,000	
30	PA4	Tinh Tho 2 at Tho Tay hamlet, Tinh Tho commune, Son Tinh district, Quang Ngai province	N: 15°12'37.6" E: 108°44'39.7"	4.00	40,000	
31	PA4	Tinh Tho 3 at Tho Tay hamlet, Tinh Tho commune, Son Tinh district, Quang Ngai province	N: 15°14'53.6" E: 108°44'51.1"	3.00	75,000	
32	PA4	Quang Ngai North interchange - Tinh Ha commune, Son Tinh district, Quang Ngai province	N:15° 9'31.62"; E:108°44'57.62"	5.85	112,571	Interchange
33	PA5	Quang Ngai interchange - Nghia Dien commune, Tinh Nghia district, Quang Ngai province	N:15° 6'8.94"; E:108°45'48.56"	2.03	56,708	Interchange
34	PA5	Nghia Dien 1 at Dien Chanh hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province	N: 15°05'27.5" E: 108°46'40.5"	15.00	150,000	
35	PA5	Nghia Dien 2 at Dien Long hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province	N: 15°05'49.4" E: 108°45'47.4"	3.00	15,000	
36	PA5	Nghia Dien 3 at Dien Chanh hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province	N: 15°05'17.3" E: 108°49'53.5"	2.00	50,000	

No.	Package	Location	Co-ordinate	Area (ha)	Volume (m3)	Note
37	PA5	Nghia Dien 4 at Dien Hoa hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province	N: 15°05'28.2" E: 108°47'40.6"	7.00	105,000	
38	PA5	Nghia Trung 1 at Dien Trang hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province	N: 15°04'19.4" E: 108°48'46.6"	0.5	4,000	
39	PA5	Nghia Trung 2 at Tan Hoi hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province	N: 15°04'38" E: 108°47'49.9"	0.3	3,000	
40	PA5	Nghia Trung 3 at An Hai 3 hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province	N: 15°04'21.2" E: 108°49'02.3"	0.3		Temporary Disposal site
41	PA5	Nghia Trung 4 at Dien Trang hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province	N: 15°04'23" E: 108°49'17.2"	1	25,000	
	Total				**2,496,867**	

During the construction phase, the Contractor should be obligated to:

- The Contractor should be obligated to use the designated waste soil disposal sites for that purpose. If the Contractor intends to use the sites other than the designated ones, he should obtained approval from the Environmental Supervision Consultant and agreements in written from relevant local commune PCs and district PCs.
- The Contractor should negotiate and pay proper compensation to the user of the land to be used as waste soil disposal site.
- These sites should be adequately planned; the design (based on the 1/5000 topographic map) should include a retaining wall with enough strength, slope protection; drainage facility, and access road.
- For the waste soil disposal site near the river, the retaining wall should be built and the waste soil should be piled up from coarse soil in the bottom and fine soil to the top;
- For the site located near a creek or a ditch, structures such as pipe culvert should be used to prevent wash out of the spoil during rainstorm;
- Structures such as mortar rubble masonry pavement and grouted rubble toe protection form should be used to sure the stability of the site.
- Drainage ditch will be built around the site.
- For the site near the residential area, transportation of waste soil at night should be prohibited, and the access road should be frequently watered on the dry days to control dust flying.

5.2.14 Mitigation of Impacts of Temporary Access Roads

A construction plan is to be prepared during the D/D Study. According to this construction plan, about 30 local roads are selected as entrance access roads to be used temporarily during construction phase for transportation of construction materials, waste soils, etc. (see Section 4.3.14). These entrance access roads should be properly used and managed as follows:

– The entrance access roads selected and described in the construction plan prepared by the D/D Study Team should be firstly used. Widening of existing roads and development of new access road should be avoided.
– If the Contractor proposes new access roads, these will be checked/approved by the Da Nang City PC, or Quang Nam Province PC, or Quang Ngai Province PC, and agreed by the commune PCs. The new road should be designed so as large volume excavations is avoided, and the width of the road is strictly controlled.
– Compensation to farmers should be done efficiently and fairly if land acquisition is required for the newly-built access road.
– All newly built and improved access roads should be designed with the proper drainage system, road slope retaining structures, etc.
– Warning signs, speed bumps should be placed at the road sections near the sensitive receptors such as schools, hospitals, pagodas, markets, etc. to reduce risk of traffic accident.
– Contractors should formulate proper construction materials transportation plans to mitigate impacts to local residents and environment.
– Nocturnal transportation and construction activities are prohibited at the road sections near the residential areas.
– For unpaved access roads, contractors shall spray water on the roads 2 – 3 times a day during the dry season.
- Pavement of linking roads must be regularly maintained during construction phase to reduce impacts of dust, noise, and risk of traffic accident.

5.2.15 Mitigation Impacts of Wastes from Construction Worker Camps

Waste is generated due to construction activities such as those listed below:

- Surplus excavated materials requiring disposal due to earth moving activities;
- Disposal of used wooden boards, scaffolding steel material, site hoarding, packaging materials, containers of fuel, lubricant and paint;
- Waste generated by demolition of existing houses / buildings affected by the project or breaking of existing concrete surface;
- Waste from on-site wastewater treatment facility (e.g. treatment of bentonite from boring works by sedimentation process);
- Disposal of hazardous waste/chemical waste such as spent waste oil, spent lubricant, contaminated soil material due to leakage of hydraulic oil / fuel from construction plant / vehicles; and
- Domestic waste generated by construction workers, construction campsite and canteen.

During construction phase, the Contractor shall undertake at all times to manage generation of waste, and shall implement the measures to mitigate impacts of waste that shall include, but not be limited to the followings:

- Raw material requirements shall be planned at the outset of each construction activity to avoid excess material storage and wastage on-site.

- Wastes shall be stored and handled in dedicated areas with bounded sides such a way as to avoid loss or leakage and subsequent pollution. Waste storage sites shall be located away from sensitive areas such as: residential, surface/groundwater. Designated waste storage areas shall be well maintained and cleaned regularly.
- No burning of debris, construction wastes or vegetation shall be allowed on-site.
- The Contractor shall segregate construction waste materials on-site to facilitate re-use, recycling and waste disposal practice in accordance with the best available technology, as follows:
    + For construction waste deemed by the Engineer to be suitable for reclamation or land formation: the Contractor shall liaise with the licensed companies to determine the appropriate location for reuse. Reuse shall not have a detrimental impact on the environment.
    + For construction waste deemed by the Engineer to be unsuitable for reclamation or land formation: the Contractor shall classify wastes on-site with dedicated areas for each waste stream including but not limited to: wood/timber, metals and plastics.
- The Contractor shall enter into a contract with the local environment companies for the collection of domestic refuse. To facilitate waste collection the Contractor is required to designate locations on-site shielded from wind and rain.
- The Contractor shall enter into a contract with the licensed companies for the collection of asbestos waste arising from demolition works.
- Waste oils, chemicals, paints and other such materials used for machinery maintenance and construction shall be collected and stored in bundled areas on-site for resale/re-use or managed disposal without resulting in damage or pollution of the environment.
- In locations remote from the site offices the Contractor shall provide latrine pits in suitable locations for the convenience of the construction workforce.
- Sewage from site toilets, kitchens and similar, shall be discharged to a septic tank and soak-away system. Grease traps shall be installed where canteen waste is collected and shall be capable of providing at least 20 minutes retention during peak flow, prior to discharge.

5.2.16 Mitigation of Impacts of Construction Materials Exploitation and Transportation

As described in Section 4.3.16, construction materials (i.e. soil, sand, rock, etc.) would be exploited at many pits/quarries located near the Expressway. During D/D, a survey had been carried out to confirm the validity of these pits/quarries (i.e. quality of the materials, supply capacity, legal exploitation license, environmental protection commitment, etc.). Pits/quarries without legal exploitation license (issued by competent local authority), or decision approving EIA report, or environmental protection commitment (issued by competent environmental management agency) would be screened out from the list of valid candidate materials supply sources.

Besides, transportation of construction materials would be mainly by roads and partly by waterways. During transportation, these materials would be spilled out and cause pollution to the areas along the roads or the water courses.

Whenever transportation of materials is done on the existing roads, impact mitigation measures including the followings should be taken.

- Construction materials shall be supplied only from the quarries that being operated under a good environmental management.
- Earth, rock, sand shall not be deposited on public or private right of way as a result of Contractor's operations, including any deposits arising from the movement of construction plant or vehicles.
- Provide water spray vehicles to water the unpaved ground, storage piles and other areas where airborne dust may originate. The water spray operation should be carried out in dry and windy day, at least twice a day (morning and afternoon).
- Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition. The tarpaulin shall be properly secured and shall extend at least 300 millimeters over the edges of the side and tailboards.
- Trucks transporting construction materials should meet allowable exhaust gas emission standards (stated in Decision 249/2005/QĐ-TTg on October 1, 2005), and should be carefully covered.
- Site for stockpiling soils and sand should be located far more than 120m from the populous residential areas.

In addition, to mitigate water pollution caused by transportation of materials by waterways, the following measures should be applied.

- Materials carriers should be equipped with surrounding wall barriers to avoid spillage of materials into the watercourses.
- Fine materials which are easily dispersed by wind should be well covered by sheets, etc. during transportation.
- Transportation of excessive large quantity of materials which overloads the capacity of the vessels should be forbidden.
- Use only vessels which are in compliance with standards for waterway transportation.

5.3 Impact Mitigation Measures in Operation Phase

5.3.1 Flood

A detail flood study particular for inundation sections has been done and the output/recommendations have been included in the engineering design of the expressway to assure an adequate flood release capacity by providing sufficient culverts, underpasses, and bridges along the expressway alignment. The rationale of the cross structures should secure sufficient drainage capacity during/after flood in order to reduce adverse effects to the agricultural products. Required structure types and/or numbers of structures shall be determined based on inundation analysis by hydro-mathematical models.

The opening of cross structures including bridges, culverts, and underpasses shall be keep as wide as possible to ensure the back water in the upstream is negligible. The list of cross structures is shown in the detail design report of each package.

5.3.2 Mitigation of Impacts of Air Pollution

As describe in Section 4.4.4, according to result of the simulation of air pollutants diffusion, concentrations of CO, SO_2, NO_x, TSP (at 20m from the centerline of the Expressway) are predicted within the allowable limits state by Vietnam standard or/and international standards.

Therefore, it can conclude that no structural measure is needed to mitigate impacts of air pollution in operation phase. However, the following measures should be applied to reduce dust generated from the road surface when the vehicles move on.

- The road and bridge surface should be maintained periodically to limit dust generated from the aged asphalt layer. Spraying water onto road surface should be done at least 10 days/time in long-lasting-sunny hot or dry seasons.
- The ejector of water spraying vehicles should be properly designed so as the water flow is strong enough to push mud and soil onto tracks at the road sides, avoiding muddiness creation on the road surface.

5.3.3 Mitigation of Impacts on Water Environment

During operation period, the vehicle's tail gas, oil and other harmful substances fallen on the road surface would be flushed with the road surface runoff into the surrounding water bodies and cause pollution to these water bodies. In addition, the facilities to be constructed along the Expressway such as Traffic Management Center, Expressway Operation Office, Parking Yards, Toll Stations, Service Areas with stores, toilets, hotels, and maintenance services; will generate waste water and would cause pollution to the surrounding water bodies.

Waste water generated from these facilities should be treated before discharged to the surrounding water bodies. Because of main pollutants in sewage of service areas are BOD5 and COD, it is suitable to adopt biochemical treatment method. Outlet water quality should meet class B limit of national Technical Regulation on Domestic wastewater QCVN14:2008/BTNMT. In order to guarantee the outlet water quality, these waste water treatment facilities should be properly operated and maintained.

Vehicle transporting hazardous materials may generate leakage accidents on the bridges crossing the rivers. Among the rivers crossed by the Expressway, the followings are important sources of water for the populous urban areas in the downstream.

- Yen, Tuy Loan and Vu Gia rivers supplying water to Danang city;
- Tam Ky river supplying water to Tam Ky city;
- Ky Lam and Chiem Son rivers supplying water to Hoi An city and Nam Phuoc town;
- Tra Bong river supplying water to Chau O town;

- Tra Khuc river supplying water to Quang Ngai city.

In order to prevent such leakage accidents, the main bridges crossing major rivers of this project, especially the above mentioned are required to have guardrails strengthened and reinforced. The surface runoff from the desk of bridges shall be collected and treated, so that they will not flow into the water bodies directly. The drainage system at the bridges should be designed so as, when accident happens, leaked material can be drained to the big hole (tank) located far from the river. Leaked materials then will be removed to disposal site, or properly treated before being discharge to the river.

5.3.4 Mitigation of Impacts of Noise and Vibration

During operation phase of the expressway, noise and vibration are generated mostly by traffic flow. During operation phase, to ensure the good quality of acoustic environment, mitigation measures including engineering measures, management measures and planning requirements should be implemented.

In short time, when the traffic volume is not so high, the noise impact is not serious. However, in long term period, when the traffic volume increases, the protection corridor of expressway would be extended to 50m from the road edge. The receptors, which located in the corridors, should be removed in the future.

Since there are many noise sensitive receptors located near the Expressway, it is necessary to conduct the noise monitoring during operation phase. Reasonable mitigation measures will be developed based on result of noise monitoring and local resident's request. The measures would be as follows:

- Relocation of affected receptors: this measure is a most effectiveness method. However it is costly and lead to resettlement. The option is feasible if there is good cooperation with local authorities and local people. This method is recommended where the school or hospital is located near by the road, such as Tinh Ha primary school (Km124+100). After relocation the Tinh Ha School, the lands shall be used for another purpose, such as resettlement site.
- Installation of noise barrier: this measure is costly. This option is applied where a number of receptors densely located near the road. However, it is recommended that the noise barrier shall not be applied immediately after construction. Post-evaluation shall be carried out 3 years after construction and noise barriers shall be installed base on result of post-evaluation.
- Tree planting: this option will not only help to protect the village from the noise impact but also clean the air, improve landscape and eco-system. This option shall be applied at all road sections near the populous areas. Trees shall be planted along the road section near the populated areas, and in the space between the ROW and the toe of talus. In order to effectively mitigate impact of noise, trees shall be planted in strip with its length covering the populated area plus 100m more at both sides of the populated area (see Figure 5-3).

In addition to the above mentioned measures, the use of horn shall be prohibited at the sensitive section of the road, and antiskid layer shall not be installed in the interchanges.

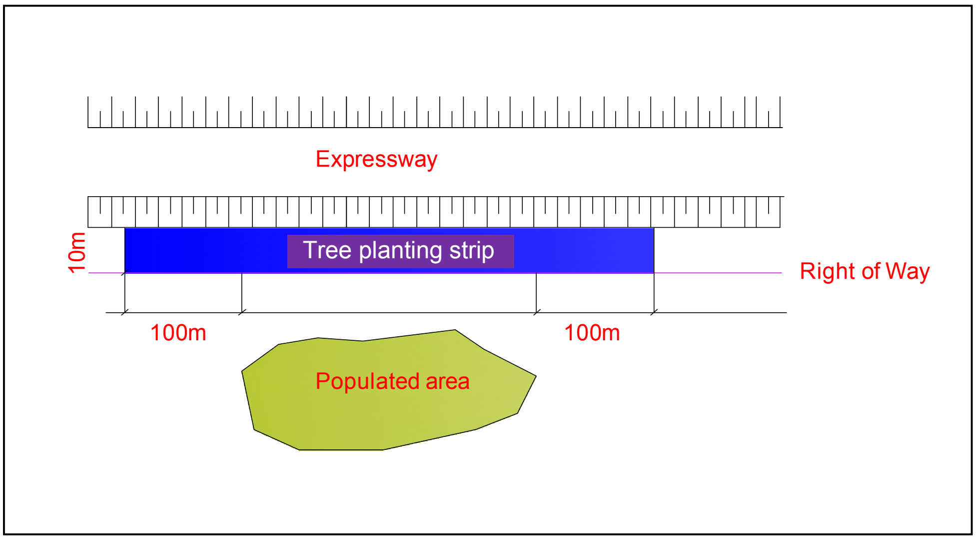


Figure 5-3 Proposed scope of the area to plant trees

5.3.5 Mitigation of Impacts of Waste

The domestic waste and hazardous waste should be kept separately. The hazardous waste should be stored separately following the instructions given by the producer of the chemical and the regulations set by authorities.

Collection and transportation domestic waste and hazardous waste off the site should be done by licensed entities. All waste shall be regularly collected, stored, and transported to disposal sites or reused in accordance to the regulations of Vietnam.

Cars and other construction equipments shall only be maintained and washed only at the sites which are equipped with impermeable protective layers and apparatus to collect oils, lubricants, solvents, detergents. The use of detergents and solvents should be avoided or minimized.

5.3.6 Mitigation of Impacts of Split of Communities

During the D/D study, efforts have been paid to avoid split of communities by modification of road alignment. Besides, a number of cross structures (underpass and overpass) and side roads (collector roads) for local residents and local vehicles are designed. The locations of underpasses/overpasses have been carefully determined based on existing and future condition of local areas, and result of consultation with local communities.

There are 188 cross structures (underpass, overpass, interchange and pass under the bridges) designed under the Project. Except viaducts and water bodies sections, the average distance between the passes is about 560m. The cross structures combining with the collector roads would help to mitigate impact of the Expressway to local resident's movement. Important road such as province road, district road, main road of commune, and main road of village, road to the dam, to the forest and to military camp should be keep clearance for trucks and fire truck can pass in emergency cases, especially if that road is an only road to the area.

In case of Tinh Ha Primary school (Km124+100) which will be difficult to access due to the appearance of Quang Ngai North Interchange, as described in Section 5.3.4, relocation on the school is recommended.

5.3.7 Solution for 126 household in Dien Quang Commune

There is a special impact caused by the Project to Dien Quang Commune (KM16+500 ~ KM19+500), Dien Ban District, Quang Nam Province (Figure 5-4). At this section, the planned Expressway will run parallel to the existing railway at the distance about 200m from the railway.

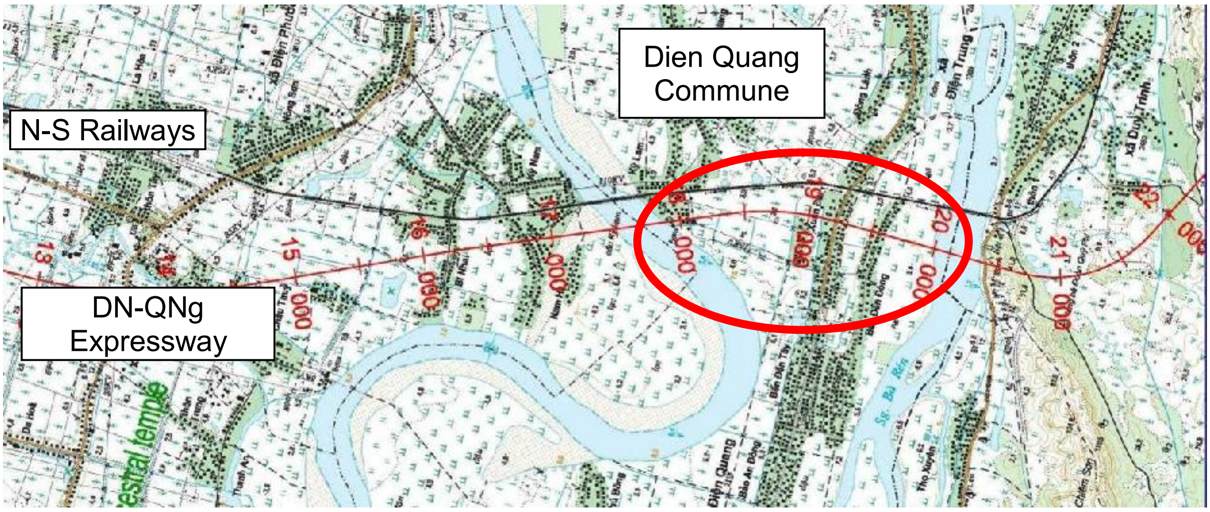


Figure 5-4 Alignments of the Expressway and Railways near Dien Quang Commune

At this section, serious flood and inundation occurs annually and poses severe risk to local residents' life and properties. Affect of flood can be observed at the areas in downstream of the openings of the existing railway. Frequently occurring flood usually causes strong water flows through the openings of the railway, and leads to significant soil erosion (scour) at the areas in downstream of the openings of the railway. Consequently, we can see relatively large pond (or hollow) in the area downstream of the opening of the railway (Figure 5-5).

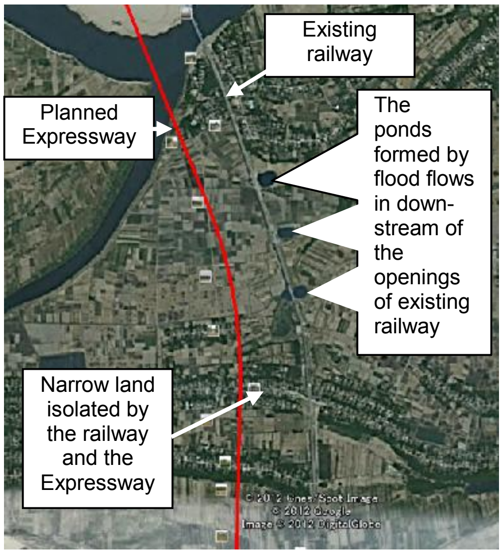


Figure 5-5 Affected of flood observed at downstream of the openings of the existing railway.

The Expressway after being constructed would function as a dam in upstream of the railway. According to the inundation analysis, in case of "with-the-project", the maximum flood water level would be 0~1.0m higher than that in case of "without-the-project", especially at the section KM10+000 ~ KM21+000. Therefore, culverts with opening larger than these ones proposed in F/S should be provided at suitable sections of the Expressway in order to drain much more flood water towards downstream. If openings (culverts, viaducts, etc.) under the Expressway at this section are not properly designed, the areas in its downstream would be eroded, and form the ponds/hollows as we can see at the areas in downstream of the openings of the railway. Residents living in this area would be significantly affected by the loss of cultivated land, loss of life, loss of properties, etc.

There are 126 households (of which, 28 HHs in Ky Lam Village, 45 HHs in Xuan Dai Village, 53 HHs in Ben Den Dong Village) living in the area enclosed by the planned Expressway (in the West), the existing railway (in the East), Thu Bon River (in the North), and Ba Ren River (in the South). These households are living outside of the Right-Of-Way (ROW) of the Project, and would not be affected directly by land acquisition due to the Project. But they will be forced to reside in the narrow and isolated area bounded by the Expressway, the railway, and the rivers. It would be more difficult for them to access to the western side of the Expressway. And damages by flood would be more severe.

Under such situation, in order to mitigate impacts caused by the Expressway to these households, during the public consultation meetings organized in Dien Quang Commune, people here strongly addressed expectations such as: (i) relocation of all households living in this area to the resettlement sites if not constructing viaducts, (ii) construction of appropriately-long viaduct structure at this section, (iii) provision of open space for local residents to evacuate during flood.

Relocation of affected residents in this area was considered as an option. However, it would cause significant secondary impacts such as resettlement, deterioration of living, loss of means of livelihood, etc.

Therefore, in order to mitigate impacts of the Project to these people, the following 3 alternatives were examined during D/D: (1) provision of short viaducts as proposed in F/S, (2) provision of long viaducts and a high space for evacuation during flood, and (3) provision of long viaduct for the whole section (Table 5.2).

Table 5.2 Alternatives for Mitigating Impacts to 126 Households in Dien Quang Commune

No	Proposed Structure	Remarks
Alternative-1	Provision of five (5) short viaducts No provision of space for evacuation during flood.	Same as F/S
Alternative-2	Provision of three (3) long viaducts (910m in total), and a 760m-long viaduct over TL610B. Provision of a space for evacuation during flood.	
Alternative-3	Provision of long viaduct for the whole section (L=1,650m)	

In Alternative 2, an evacuation space with surface area of about 1,000m² is planned at the roadside of the Expressway bound to Da Nang. People can use this place as a shelter during heavy flood time, and can use ambulance cars or other transportation means to go to Da Nang city in case of emergency.

Comparison of these 3 alternatives was carried out based on a number of environmental aspects as followings (Table 5.3).

Table 5.3 Comparison of alternatives based on environmental aspects

Aspect	Alt-1	Alt-2	Alt-3
Community separation/split	-----	--	-
Scour in downstream (loss of agricultural and residential lands)	-----	--	-
Adverse effect of backwater in the upstream	-----	--	-
Land acquisition, compensation, resettlement, etc.	-----	--	-
Noise	---	--	-
Provision of evacuation space	+++	++	---
Landscape degradation	---	--	-
Sunshine shading and radio wave interference	-	--	---
Recommendation	3	1	2

Alternative-1 is not recommended because the openings are considered not enough to drain flood water (the flood level in case of "with-the-project" is estimated to be 1.0m higher than that in case of "without-the-project", and the high embankment would cause significant impacts of community separation/split, scour in downstream areas, higher backwater in upstream areas, more loss of agricultural land and residential land, etc.

Alternative-3 has many advantages from the environmental point-of-view. However, its disadvantage is the difficulty to construct an evacuation space, and the high cost.

Alternative-2 has not so many advantages comparing to Alternative 3. But, it allows to construct an evacuation space that is considered very important for local residents during flood. Therefore, Alternative 2 is recommended as the optimum measure to mitigate impact of the Project to affected people in Dien Quang Commune.

5.3.8 Mitigation of Impacts on Landscape (aesthetics and visual effects)

During the pre-construction phase, harmonization with the surrounding natural scenery was taken into consideration when designing bridges, tunnel, auxiliary facilities, etc. Large-scaled mountain cut and filling were avoided by the use of tunnel and elevated viaducts, and the following measures were carefully examined for the design of major structures on the expressway.

- *Tunnel*: The tunnel exits would design so as its visual and style will be harmonized with the surrounding environment to the maximum extent possible.

- *Large filling and deep cuts:* Large filling and deep cuts would be avoided when possible with the proper alignment planning. Indigenous plants those can grow well under local climatic conditions would be planted to quickly recover the original landscape and vegetation at the cutting roadsides. Vetiver grass is recommended to use for the slope stabilization.

- *Service areas*: The architectural shape and color of the buildings in the service areas would be harmonized with the surrounding scenery. The indigenous trees would be planted in the service area to make its landscape in harmonization with the surrounding scenery.

- *Interchanges:* The interchanges would be properly designed so as it can be conformable with the existing land form topographically to the extent possible. The toll stations would be reasonably located with the structure and color conformable with the surroundings. Trees and grasses would be planted around the toll stations and in the vacant lands around the interchange as much as possible.

- *Bridge:* the style and color of the bridge would be designed so as it will be conformable with the surrounding areas.

Chapter 6 Public Consultation

The Da Nang – Quang Ngai Expressway is planned to pass through more than 40 communes in 14 districts of Da Nang City, Quang Nam Province, and Quang Ngai Province.

A. Public Consultation during F/S stage

During the F/S stage, public consultation meetings were organized in all project-affected communes. The public consultation has been divided into following phases:

+ From December 2008 to May 2009: carried out public consultation along the proposed alignment.
+ From December 2009 to January 2010: carried out public consultation along the 3 realignment sections.

The summary of public opinion during F/S is as follow:

+ **Land acquisition and resettlement:** They tended to clearly know about the policies related to land acquisition and resettlement, particularly on compensation to relocated people and those who have lost farmland. They wanted to know whether the compensation could be directly paid to them in cash; they asked about the livelihood of restoration measures; they required the resettlement to be scheduled in such a way so as to avoiding the crop planting or harvesting seasons.
+ **Road blocking:** They were concerned about the possibility that the daily outing and travel will be affected; whether they would have to cross the expressway directly without any safety measures; the tunnel location and length was considered adequate.
+ **Construction Activities:** The farmers were concerned about potential detrimental impacts on the irrigation facilities, and the flow of wastewater into farmlands during road construction; they also were concerned about construction workers stealing vegetable crops.
+ **Noise:** They required that the construction activities must be scheduled in a reasonable manner and the construction at night must be managed well in order to eliminate noise disruptions on the road side residents; mitigation measures must be provided to reduce noise impact to an acceptable level during the operation phase.

+ A long the proposed alignment, two schools Nghia Trung secondary school (Km 137 + 500), Nghia Dien 2 Primary school (Km 132 + 200) were identified as the key sensitive receptors. Therefore the EIA team visited the schools to solicit opinions and concerns from the schools. The schools are supportive of the project as it may promote the local economy. However, they worried about potential adverse impacts on the school such as noise, safety and air quality. Thus, mitigation measures will be developed and provided to sufficiently mitigate these impacts to an acceptable level during Construction and Operation phases. All schools near by the linking roads worried about the potential adverse impact such as the traffic safety, air and noise pollution in the daily school time, especially in opened and closed school times. The distance between those sensitive areas and linking roads is from 30-150m. The linking roads will have to bring additional traffic to the area in construction and operation phases of the Project, there will be incremental increase in noise level, air emissions and traffic accident. Thus mitigation measures must be developed and provided to sufficiently mitigate these impacts to an acceptable level.

+ **Land clearance and resettlement policies:** People's committees of communes suggested land clearance needs to be worked out promptly as a requirement for resettlement places and support for people' stability and order. Compensation for people' houses and graves must be transparent, satisfactory and unambiguous, so that any damage could be avoidable. Resettlement shall be carry out as soon as possible.

+ **Prevent flood:** Local leaders and people all agree that, it is important to have a system of culverts, and a drainage channel to minimize potential effects of floods being blocked by the road. The project should include bridges to avoid flood and facilitate the drainage system so that traffic and irrigational works would operate normally in construction stage.

+ **Natural environment protection:** Garbage, dust, and waste water need to be properly controlled to minimize environmental pollution. The governmental authorities and people proposed to spray water at roads near intersections and crowded residential areas, especially during construction stage, which can limit dust emissions. Construction shall not be allowed at night near crowded residential areas.

Disclosure of the original EIA approved in F/S stage was made at commune level for all the communes affected by the expressway during March 2011.

B. Public Consultation during D/D stage

During the D/D Study, public consultation meetings were organized in all project-affected communes as required by the World Bank. Participants to these meetings were local stakeholders who include: PAPs, leaders of the hamlets/communities, representatives of mass organizations and unions (such as women's association, association of farmers, youth union, veterans' organization, etc.,) and NGOs. Representatives of local authorities (provincial, district, and commune levels) who are responsible for land acquisition, resettlement, natural resources and environment, communications and transport, industry and trade, agriculture, etc., representatives of PMUs, District Land Fund Development Centers, and members of the D/D Study Team (include Resettlement Team, Social & Environmental Team, Road Design Team, etc.) were also participated to the meetings as the project executors.

Contents of the public consultation meetings are generally as followings:

- Diffusion of information on the project, on technical design, environmental and social impacts, on the land acquisition, compensation and resettlement, etc. to the local stakeholders;
- Discussion with the local stakeholders on the environmental and social issues that may be caused by the project to the commune, as well as other issues concerned by the local stakeholders;
- Collection of local residents' comments and requests on the project plan, and other information necessary for preparation of the impact mitigation measures.

6.1 Organization of Public Consultation Meeting

With aim to diffuse information on the Project to local residents, promote local residents' understanding about the Project, and collect local residents' comments/opinions on the project design and impact mitigation measures, the SAE Team had co-worked with the Resettlement Team in organizing the public consultation meetings at the project-affected communes. Information such as project outlines, impacts that may cause by the project to the commune, proposed impact mitigation measures, etc. are explained to local people during these public consultation meetings. It is also an opportunity for local residents to raise questions, comments, opinions, etc. on the Project, and for the SAE Team to collect more information on the environmentally-sensitive spots/structures. Comments and opinions raised by participants in the public consultation meetings are also useful and contributable for the SAE Team to plan the impact mitigation measures that match with the actual natural and socio-economic conditions of the localities.

The following parties are invited to the meetings:

- Leaders of People Committee;
- Fatherland front;
- Affected Household;
- Representative of: villages, veterans, woman ...
- District representative;
- Client: PMU85, PMU1.

The schedule of public consultation is show in Tab. 6-1.

Table 6-1 Schedule of public consultation meetings

No	Location			Meeting date	
	Province/City	District	Commune	AM	PM
1	Da Nang	HoaVang	Hoa Nhon	*14/06/2013*	
2			HoaPhong	12/4/2012	
3			Hoa Tien	13/4/2012	
4	Quang Nam	Dien Ban	Dien Tien	13/01/2012	
5			DienTho		11/01/2012
6			Dien Quang	12/01/2012	
7		DuyXuyen	Duy Trinh	09/10/2012	
8			Duy Sơn		09/10/2012

No	Location			Meeting date	
	Province/City	District	Commune	AM	PM
9			Duy Trung	10/10/2012	
10		Que Son	Que Xuan 2		08/04/2013
11			PhuTho		09/11/2012
12		ThangBinh	BinhQuy	26/11/2012	
13			BinhChanh	26/11/2012	
14			BinhQue	27/11/2012	
15			Binh An		27/11/2012
16		PhuNinh	Tam Thanh		21/11/2012
17			Tam Phuoc	21/11/2012	
18			Tam Đan	22/11/2012	
19			Tam Thai	23/4/2012	
20			Tam Đai		23/4/2012
21		Tam Ky	Tam Ngoc	19/4/2012	
22		Nui Thanh	Tam Xuan 1	20/4/2012	
23			Tam Xuan 2	21/4/2012	
24			Tam AnhBac	04/01/2013	
25			Tam Anh		08/01/2013
26			Tam Hiep		04/01/2013
27			Tam My Tay		09/01/2013
28			Tam My	08/01/2013	
29			Tam Nghia	09/01/2013	
30	Quang Ngai	BinhSơn	BinhChanh	07/11/2012	
31			Binh Nguyen	10/11/2012	
32			BinhTrung	07/11/2012	
33			BinhChuong	10/11/2012	
34			Binh Long		14/3/2012
35		Son Tinh	TinhTho	15/3/2012	
36			Tinh Ha	16/3/2012	
37		TuNghia	NghiaKy		23/3/2012
38			NghiaĐien	19/3/2012	
39			NghiaTrung	20/3/2012	
40			NghiaThuong	21/3/2012	
41		NghiaHành	HanhThuan		22/3/2912

6.2 Public Opinions

Generally, the public opinion during D/D stage is similar to the opinion of F/S stage. However, at the moment of meetings, the Right of way (ROW) is clear and most of questions are concerning compensation and resettlement. The typical issues frequently raised in the public consultation meetings organized in the project-affected communes are as following (Table 6-2).

Table 6-2 Typical issues frequently raised in the consultation meetings

No.	Issue	Description
1	Compensation	The compensation price (for the loss of land and property) issued by Provincial People's Committees is too low compared to the market price. If it's not adjusted appropriately, the PAPs will not be able to restore their life and livelihood. According to Vietnam laws and regulations, residents living in the project's safety corridor will face many constraints and difficulties in using their lands and rebuilding their houses. At present time, there is no valid policy regarding this issue. However, it should be considered as a remarkable adverse impact caused by the project, and the corresponding mitigation measures should be properly prepared.
2	Resettlement	The maximum surface area of a land plot in the resettlement site is 300m^2 as planned by the local authorities. It is said not enough for displaced farmers for re-establishing their production, particularly husbandry. In addition, many residents who will lose land for the project are very worried about their remaining land which will be not enough to help their children in sustaining living in the future. Construction of resettlement sites should be completed before relocation. Resettlement sites should have clean water resource for daily use. Relocation should be planned in dry season and not disturb local people's agricultural activities. Most of residents living close to the planned expressway want to be relocated because they think that it is hard to maintain their daily life. Budget for construction of the resettlement sites has not been determined clearly.
3	Living condition and livelihood	The expressway will cause obstruction to many local roads and deteriorate local people's transportation. Many farmers will have to transport (with or without bulkily agricultural stuffs and

No.	Issue	Description
		productions) to/from their fields via certain underpasses. Therefore, it needs to consult with local people on the proper design of the underpasses. Farmers who lose most of their agricultural land will be rather difficult to find out alternative livelihoods, particular the elders. Some especially vulnerable households should be provided with special supports in order to maintain their living and livelihood. Budget for implementing the Income Restoration Programs has not been determined clearly.
4	Construction works	Construction works normally causes many impacts such as: air pollution, excessive noise, road degradation, crop damage, etc., but contractors normally don't undertake proper measures to mitigate these impacts. Therefore, the contractors are requested to duly manage their construction works as well as their employed workers.

Data: Summary Note on Outcome of Consultation Meetings for Updating Resettlement Plan, Resettlement Team, D/D Study Team.

6.3 Information Disclosure

During Public Consultation, the followings materials have been disclosure to the local authorities and PAPs:

- Project brochure;
- Basic design information;
- Land acquisition policies;
- Compensation and Assistance policies;
- Resettlement policies;
- Major Impact on natural environment and Mitigation Measures;
- Major Impact on social condition and Mitigation Measures;
- The scheme of information disclosure and reply;
- The contact list of responsible persons and organizations.

In addition to explanatory materials delivered to participants of the public consultation meetings, a booklet had been printed and distributed widely to residents living along the expressway (about 9.000 copies). The booklet (A4 size, 24 pages) consists of the following information:

- Outlines of the Project

- Tentative implementation schedule
- Technical specification and major structures
- Environmental Management Plan
- Legal framework for compensation, support, and resettlement
- Resettlement site arrangement
- Livelihood restoration program
- Special supports to vulnerable people affected by the Project
- Tentative schedule for implementation of compensation, support, resettlement
- Opinions and complaints receiving and redressing mechanism
- Contact addresses of concerned agencies/entities.

Re-disclosure of the updated EIA in D/D stage shall be conducted also at commune level, expected during July 2013, after the updated EIA is officially approved by the WB".

Chapter 7 Overview of Environmental Management Plan (EMP)

This chapter provides an overview of the project environmental management plan, which is fully presented in a separated project document, the Environmental Management Plan (EMP) of the project. The related parties involved in the project implementation, including the project owner and contractor, are required to follow the project EMP.

7.1 Purpose of the Environmental Management Plan

An Environmental Management Plan (EMP) is a practical and achievable tool to ensure that any negative environmental impacts are minimized and any possible environmental, safety and efficiency benefits are maximized during the construction and operation phases of a development. This EMP therefore provides practical guidelines for environmental management to ensure all works undertaken by the developer, engineers, and contractors have minimal impact on the environment, and are in accordance with all relevant laws, regulations, technical guidelines and codes of practice of the Socialist Republic of Vietnam, and the World Bank's operational policies.

The EMP addresses all issues identified in the EIA by: (i) organizing all measures to mitigate environmental impacts during the construction and operation; (ii) establishing an organizational structure, procedures, and institutional responsibilities for implementation; and (iii) identifying the monitoring requirements needed for the successful implementation of the suggested mitigation measures, and a budget and source of financing for each activity.

The EMP will also assist different stakeholders in managing the environmental issues of the Project. It will assist: (a) the Project's executing authority in managing the implementation of the EMP; (b) the supervisors in ensuring that the EMP is properly implemented; (c) the environmental engineers in working with the Contractors to implement the EMP; and (d) the Contractors in developing the Contractor's Site Environmental Management Plan.

Simultaneously, the EMP is the summary of commitments by the project owner presented in the EIA and the related implementation process. The EMP will enable VEC, the World Bank and other relevant authorities in Da Nang City, Quang Nam and Quang Ngai Provinces to supervise the application of mitigation measures and compliance of commitments by the Contractors.

The Updated EMP has the following structure: (1) Introduction; (2) Project description; (3) Environmental legislative framework; (4) Majors Impact and Mitigation Measures; (5) Implementing Organizations; (6) EMP implementation; (7) Environmental monitoring; (8)

Specific environmental issues to be concerned for each civil package are summarized in Table 7-1.

Table 7.1 Mitigation measures to be focused in EMP for each contract package of civil work

Package No.	Station	Length	Characteristics	Focused major impacts and mitigation measures
PKG1	KM000+000 - KM008+000	8.00 km	- The expressway passes mainly through the flat low areas being used as paddy field, crop land, etc. - Five populous residential areas (with low to high population density) and some temples will be affected. - The expressway will include 4 bridges (30m, 724m, 163m, 38m, 97m and 13m).	- Water quality of Cau Do River would be degraded during construction phase and operation phase. Polluted runoff water from the bridge surface should be treated before discharge to the river. - NH1A is far from the expressway (about 5km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine.
PKG2	KM008+000 - KM016+880	8.88 km	- The expressway passes mainly through the flat low areas vulnerable to flood. - Four populous residential areas (with low to medium population density) and some schools will be affected. - The expressway will include 14 bridges (including 5 medium bridges and 9 small bridges). - Ngo Quyen Elementary School is located about 200m from the centerline at Km13+990 in the east.	- NH1A is far from the expressway (about 5km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Water quality of the rivers would be degraded during construction phase. Measures to prevent polluted water flowing to the rivers should be carefully examined. - Measures to mitigate impact of noise to Ngo Quyen Elementary School should be carefully examined. - Measures to mitigate impacts of flood should be carefully examined.
PKG3a	KM016+880 - KM018+100	1.22 km	-- The expressway crosses the Thu Bon River by a large bridge (1024m). - Two populous residential areas (with low to medium population density) will be affected.	- Water quality of Thu Bon River would be degraded during construction phase and operation phase. Polluted runoff water from the bridge surface should be treated before discharge to the river. - NH1A is far from the expressway (about 7km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine.
PKG3b	KM018+100 - KM021+500	3.40 km	- The expressway passes mainly through the flat low areas vulnerable to flood. - Two populous residential areas (with low to medium population density) will be affected. - The expressway will include 6 bridges (including 1 large bridge and 5 small bridges). - A war memorial monument is located about 50m from the centerline at Km20+450 in the east.	- Water quality of the Ba Ren River and others would be degraded during construction phase and operation phase. Measures to prevent polluted water flowing to the rivers should be carefully examined. - Measures to avoid impedance of movement for local residents, and to effectively use the land located between the existing railway and the expressway (300m@2000m) should be carefully examined. - NH1A is far from the expressway (about 7km). Measures to mitigate impacts caused by the transportation of construction materials to the

Package No.	Station	Length	Characteristics	Focused major impacts and mitigation measures
				construction sites should be carefully examine. - Measures to mitigate impacts of flood should be carefully examined.
PKG4	KM021+500 - KM032+600	11.10 km	- The expressway passes through a small valley, a rocky mountain, and low flood plain areas using for paddy field and crop land, and ends at the hilly mountains close to the existing railway. - Three populous residential areas (with low to medium population density) will be affected. - The expressway will include 1 tunnel (540m) and 11 small bridges. - Hoa Quang Temple is located about 120m from the centerline at Km24+080 in the east.	- An archaeological relic (Trien Tranh Hill in the Champa Ruins) located at Km22+000 will be encroached partly. Proper cautions should be paid during construction phase. - A large amount of soils and rock will be generated from the cutting work at hilly mountains. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 10km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined. - Measures to mitigate impacts to Hoa Quang Temple should be carefully examined.
PKG5	KM032+600 - KM042+000	9.40 km	- The expressway passes through hilly mountains, and several low crop lands. - Two populous residential areas (with low population density) will be affected. - The expressway will include 8 bridges (2 medium bridges and 6 small bridges). - Mieu Nang Temple (located 40m from the centerline at Km35+480 in the east), and a family ancestor shrine (located 70m from the centerline at Km39+980 in the east) would be affected.	- A large amount of soils and rock will be generated from the cutting work at hilly mountains. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 5km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined. - Measures to mitigate impacts to Mieu Nang Temple and the family ancestor shrine should be carefully examined.
PKG6	KM042+000 - KM052+000	10.00 km	- The expressway passes through foothill, and several low crop lands. - Five populous residential areas (with low to medium population density) will be affected. - The expressway will include 13 bridges (1 medium bridges and 12 small bridges).	- A large amount of soils may be generated from the cutting work at foothills. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 5km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine.

Package No.	Station	Length	Characteristics	Focused major impacts and mitigation measures
				- Measures to prevent polluted water flowing to the rivers should be carefully examined.
PKG7	KM052+000 - KM065+000	13.00 km	- The expressway passes through mainly foothills, and dispersed low crop lands. - Five populous residential areas (with low to medium population density) will be affected. - The expressway will include 13 bridges (2 medium bridges and 11 small bridges).	- A large amount of soils and rock may be generated from the cutting work at foothills. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 6km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined.
PKGA1	KM065+000 - KM081+150	16.15 km	- The expressway passes through foothills, forests, and dispersed low crop lands. - Five populous residential areas (with low to medium population density) will be affected. - The expressway will include 11 bridges (1 medium bridge and 10 small bridges).	- A large amount of soils and rock may be generated from the cutting work at foothills. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 3km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined.
PKGA2	KM081+150 - KM099+500	18.35 km	- The expressway passes mainly through foothills, hilly mountains, forests, and dispersed low crop lands. - Three populous residential areas (with low to medium population density) will be affected. - The expressway will include 11 bridges (1 medium bridge and 10 small bridges).	- A large amount of soils and rock may be generated from the cutting work at foothills, hilly mountains. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 3km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined.
PKGA3	KM099+500 - KM110+100	10.60 km	- The expressway passes mainly through foothills, hilly mountains, and dispersed low crop lands. - Three populous residential areas (with low to medium population density) will be affected.	- Water quality of Tra Bong River would be degraded during construction phase and operation phase. Polluted runoff water from the bridge surface should be treated before discharge to the river. - A large amount of soils and rock may be generated from the cutting

Package No.	Station	Length	Characteristics	Focused major impacts and mitigation measures
			- The expressway will include 7 bridges (1 large bridge and 8 small bridges).	work at foothills, hilly mountains. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 3km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined.
PKGA4	KM110+100 - KM124+700	14.60 km	- The expressway passes mainly through hilly mountains, foothills, and dispersed low crop lands. Several areas are vulnerable to flood. - Five populous residential areas (with low to medium population density) will be affected. - The expressway will include 10 bridges (1 large viaduct and 9 small bridges). - A school (located at Km123+970, 60m from the centerline in the west) would be affected.	- A large amount of soils and rock may be generated from the cutting work at foothills, hilly mountains. Measures to mitigate impacts caused by the waste soil transportation and disposal should be carefully examined. - NH1A is far from the expressway (about 5km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined. - Measures to mitigate impacts of flood should be carefully examined.
PKGA5	KM124+700 - KM131+500	6.80 km	- The expressway passes mainly through low paddy field and crop lands. Several areas are vulnerable to flood. - Three populous residential areas (with low to medium population density) will be affected. - The expressway will include 7 bridges (3 large bridges and 4 small bridges).	- Water quality of Tra Khuc River would be degraded during construction phase and operation phase. Polluted runoff water from the bridge surface should be treated before discharge to the river. - NH1A is far from the expressway (about 7km). Measures to mitigate impacts caused by the transportation of construction materials to the construction sites should be carefully examine. - Measures to prevent polluted water flowing to the rivers should be carefully examined. - Measures to mitigate impacts of flood should be carefully examined.

7.2 Implementing Organizations

A successful EMP requires active participation from all parties involved in the process of environmental management: (1) those responsible for organizing or implementing the EMP, and (2) those enforce the standards, laws and regulations relevant to the project, supervise the EMP and the overall environmental performance during the construction and operation of the project.

For the DQEP, the following agencies/organizations should be involved in the implementation and supervision of the EMP.

- Department of Natural Resources and Environment (DONRE) of Da Nang City, Quang Nam Province, and Quang Ngai Province, and other related local agencies
- The Vietnam Expressway Corporation (VEC), Project Management Units (PMU85 and PMU1)
- The Environmental Control Officer (ECO)
- The Environmental Monitoring Consultant (EMC)
- The Construction Supervision Consultant (CSC) and its Environmental Supervisors (ESs).
- The Contractors and its Environmental Officer (EO)
- The Ministry of Transportation (MOT)
- WB and JICA

The organizational structure for the EMP implementation and supervision during construction phase is shown in Figure 7.1.

The roles and responsibilities of these parties and the line of communication with respect to environmental protection works are described in detail in the EMP.

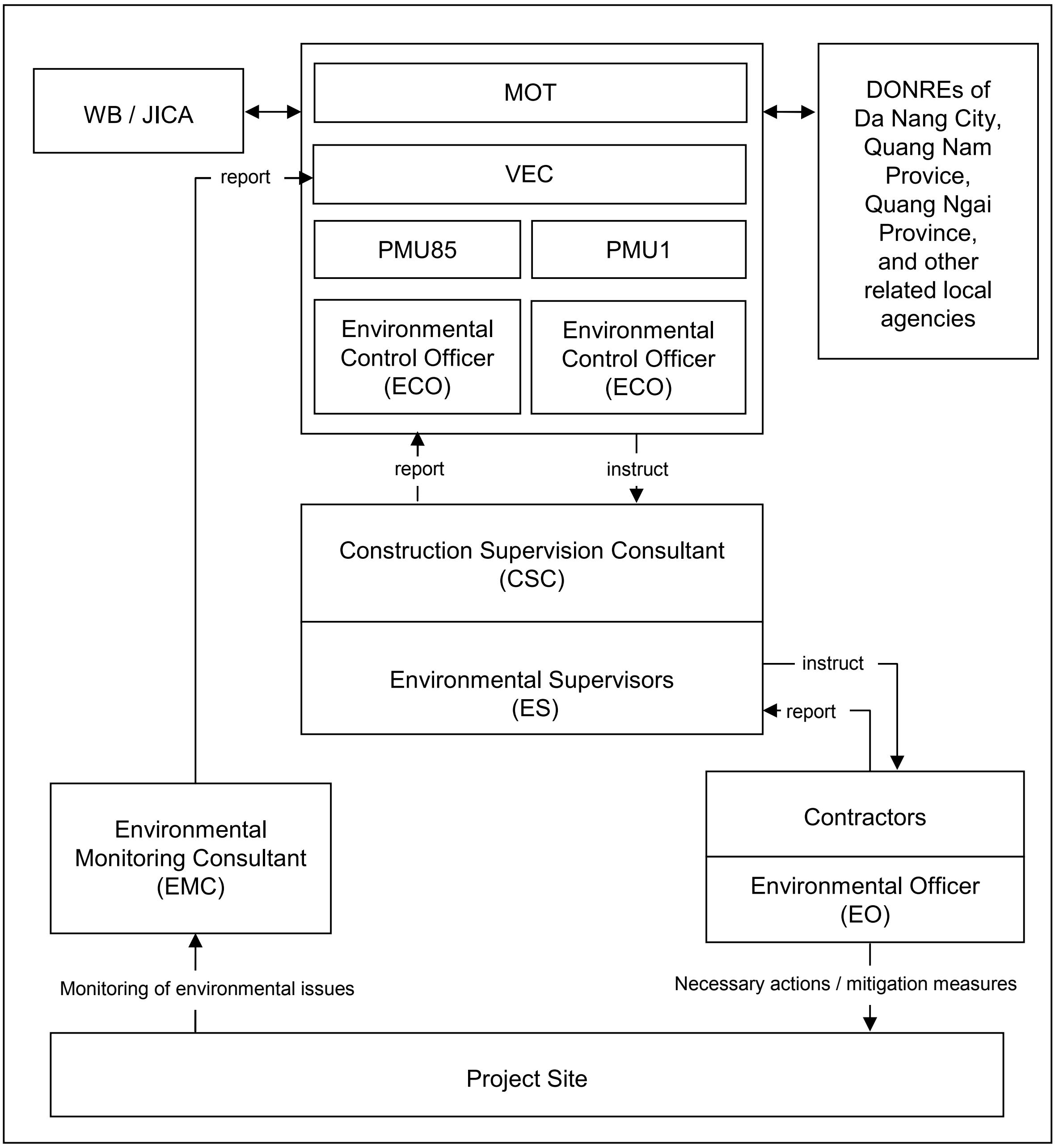


Figure 7.1. Organization Structure for EMP implementation and supervision (in construction phase)

7.2.1. Department of Natural Resources and Environment (DONRE)

The provincial Department of Natural Resources and Environment (DONREs) of Da Nang City, Quang Nam and Quang Ngai provinces are the project environmental supervision and administration. Their roles and responsibilities are:

- Supervise the implementation of the EMP;
- Enforce applicable laws, regulations and standards;
- Coordinate the environmental protection effort among departments concerned;
- Check and supervise construction, completion and operation of environment facilities.

7.2.2. Project Owner - VEC and Representatives - PMU1 & PMU85

Vietnam Expressway Corporation (VEC) as the owner of the Project, PMU1, PMU85 as project implementation agencies shall take overall responsibility for the implementation of the Project.

Under Vietnam environmental legislation, the Project owner is accountable for the potential impacts caused by their activities, and is responsible for managing these impacts. VEC therefore has overall responsibility to ensure that the implementation of this EMP complies with the relevant legislation.

This is a day to day management organization for management of all aspects of project preparation and construction. As such, it will also responsible for environmental management with, but not limited to, the following specific responsibilities:

- Prepare EIA for project development and appraisal, including supporting and supervising environmental assessment team to complete EIA and EMP to meet the regulatory and World Bank safeguard requirements and receive approval from the regulatory agency for the project and clearance of the safeguard documents from the World Bank.
- Ensure the interactions between the environmental assessment team and project planners and engineers for integrating mitigation measures and other environmental considerations and programs and requirements into project design with the necessary budgetary support as may be needed.
- Ultimately supervise for mitigation and other environmental protection measures during project construction, including incorporation of environmental requirements into construction contracts, organizing training for the contractors, enforce other environmental management programs and conducting periodical inspection of the construction sites.
- Engage and supervise environmental monitoring programs, receive and review monitoring reports from the monitoring consultant as well as from contractors on their regular reports for environmental performance.
- Consult and/or communicate to the local communities, project affected people, regulatory agencies, World Bank, JICA, and other stakeholders during the project preparation and construction to ensure them the full knowledge of the project progress, potential issues and mitigation actions, as well as to listen and respond to their concerns, suggestions and demands for environmental and community protection.

VEC will have full time professional staff in the field of environment and resettlement to directly lead the supervision and management effort for environmental management of the project preparation and construction.

7.2.3. Environmental Control Officers (ECO)

The Environmental Control Officers (ECO) are the persons responsible for the monitoring of the implementation of the EMP. This person will be appointed directly by PMUs, and must have adequate knowledge of the principles of Integrated Environmental Management as well as environmental legislative knowledge to understand and implement this management plan.

The ECO should ideally report to PMUs.

The ECO has the authority to stop works in his/her opinion if there is/may be a serious threat to or impact on the environment caused directly by the construction operations. This authority is to be limited to emergency situations where consultation with the Construction Supervision Consultant (CSC) is not immediately possible. In all such work stoppage situations the ECO is to inform the CSC on the reasons for the stoppage within 24 hours.

Upon failure by the Contractor or his employees to show adequate consideration to the environmental aspects of this EMP, the ECO may recommend to the CSC to have the Contractor's representative or any employee(s) removed from the site, or work suspended until the matter is remedied. No extension of time will be granted in the case of such suspensions and all costs will be borne by the Contractor. The ECO's duties will include the following:

- Assisting the VEC and PMUs in ensuring that the necessary environmental authorizations and permits have been obtained.
- Maintaining open and direct lines of communication between VEC and PMUs, and Contractors with regard to environmental matters.
- Monthly reporting on environmental issues at construction sites to PMUs.
- Reviewing and approving the Contractor's construction method statements.
- Regular site inspections of all construction areas with regard to compliance with the EMP.
- Monitoring and verifying adherence to the EMP at all times, monitoring and verifying that environmental impacts are kept to a minimum.
- Taking appropriate action if the specifications are not followed.
- Assisting the Contractors in finding environmentally responsible solutions to problems.

7.2.4. Environmental Monitoring Consultant (EMC)

Environmental Monitoring Consultant (EMC) will be engaged by VEC and will report to VEC directly. The main responsibilities of the EMC are:

- Engaged by VEC to monitor regularly environmental quality of the construction sites based on the Environmental Monitoring Plan (EMoP) and provide VEC with the monitoring reports;
- Upon request by VEC, conduct monitoring during environmental pollution accident investigation and provide VEC with the monitoring reports;
- Upon request by VEC, assist ECO conduct public complaint investigation and assessment.

7.2.5. Environmental Supervisor (ES)

Environmental Supervisors (ES) are generally included in the Construction Supervision Consultant and are responsible for overseeing the construction works of the project and monitor other works and activities undertaken by the Contractor(s) for ensuring compliance with the specification and contractual requirements. The responsibilities of the ES include:

- Review construction organization design to ensure compliance with project engineering design and the EMP with regard to environmental protection and impact mitigation. The construction may only be ordered to start after the review is completed and ES is satisfied with the environmental arrangement;

- Provide assistance to the ECO as necessary in the implementation of the environmental monitoring and supervising program;
- Regularly monitor the performance of the Contractor's environment staff, verifying monitoring methodologies and results. In case the ES considers that the Contractor's environment staff fails to discharge duties or fails to comply with the contractual requirements, instruct the Contractor(s) to replace the Contractor's environment staff;
- Instruct the contractors to take corrective actions within the ES determined timeframe;
- Supervise the Contractor's activities and ensure that the requirements in the EMP and contract specifications are fully complied with;
- Instruct the Contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified;
- If the contractor discovered cultural relics by chance, the ES will order site protection and report to the relevant authorities and VEC;
- Monitor Contractor's task of cutting trees in accordance with the pre-determined area, numbers, species, etc. ; and
- Adhere to the procedures for carrying out complaint investigation.

7.2.6. Contractors

Environmental management is a part of Contractor's on-site quality management.

Prior to the execution of the construction, the Contractor shall prepare the Site Environmental Management Plans to manage environmental protection issues during the construction process.

In the Site Environmental Management Plan, the Contractor shall propose measures to minimize environmental impacts during the construction process, and submit them to the ES for consideration. It will be reviewed if there are changes in legal aspect or adjustments to suit specific on-site cases.

In case of significant impact on the environment is observed, the Contractor will promptly inform the ES to get instructions and then take next steps.

The Contractor will appoint a competent individual as the Contractor's on-site Environmental Officer (EO). The EO must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management to all personnel involved in the contract.

The EO will be responsible for overseeing the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.

The duties of the Contractor(s) and EO include but not limit to:

- Daily site inspections.
- Supervision of work where environmental management is a key aspect (e.g. in sensitive areas, with high environmental risk, etc.).
- Strengthening the coordination with the ES and ECO.

- Providing and update information to the ECO and ES regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Completing start-up, weekly, monthly and site-closure checklists
- Keeping a photographic record of progress on site from an environmental perspective.
- Keeping a register of complaints in the site office and recording and dealing with any community comments or issues.
- Keeping a record of on-site incidents and accidents and how these were dealt with.
- Working within the scope of contractual requirements and other tender conditions;
- In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact;
- Stopping construction activities which generate adverse impacts upon receiving instructions from ES or ECO. Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental impacts.

7.3 Environmental Monitoring Program (EMoP)

7.3.1. Locations of environmental monitoring

The Environmental Monitoring Program (EMoP) will be implemented in 3 phases, namely: Pre-construction or preparation phase (baseline environment); construction phase (expected to last in 40 months); and project exploitation/operation phase (initial year of commercial operation). The locations of monitoring sites are showed in Table 7.2.

Table 7.2 Location of Environmental Monitoring Sites

No.	Location	Package
I	***Air Quality and Noise***	
1	Beginning point (Tuy Loan interchange)	PKG1
2	My Son interchange (PR609)	PKG2
3	Commune road at the (Km19+223)	PKG3A
4	Commune road at the (Km24+220)	PKG4
5	Ha Lam interchange	PKG5
6	Tam Ky interchange (PR616)	PKG7
7	PR617 (Km89+100)	PKGA2
8	Left Dike of the Tra Bong river	PKGA3
9	PR622 – Binh Son interchange	PKGA4
10	PR623 – Quang Ngai interchange	PKGA4
11	PR623B (Km128+610)	PKGA5
12	NH1 intersection (ending point)	PKGA5
II	***Surface Water Quality***	
1	Tuy Loan river	PKG1
2	Yen river	PKG1
3	La Tho river	PKG2
4	Thu Bon river	PKG3A
5	Ba Ren river	PKG3B
6	Ly Ly river	PKG5
7	Tam Ky river	PKGA1
8	Tra Bong river	PKGA3
9	Tra Khuc river	PKGA5
III	***Underground Water Quality***	
1	The residential area near Yen bridge	PKG1
2	The residential area near Ky Lam bridge	PKG3A
3	The residential area near Chiem Son bridge	PKG3B
4	The residential area near Tam Ky bridge	PKGA1
5	The residential area near Tra Bong bridge	PKGA3
6	The residential area near Tra Khuc bridge	PKGA5
IV	***Wastewater Quality***	
1	Construction site of North tunnel	PKG4
2	Construction site of South tunnel	PKG4
V	***Soil Quality***	
1	The paddy field at Km5+800	PKG1
2	The paddy field at Km47+800	PKG6
3	The paddy field at Km132 – Km133	PKGA5

7.3.2. Parameters and timing of environmental monitoring

The parameters, timing for environment monitoring are presented in Table 7.3. The locations of environmental monitoring are presented in Appendix 8.

Table 7.3 The parameters, frequency, etc. for environment monitoring

No.	Item	Baseline	Construction phase	Operation phase
I	***Air quality monitoring***			
	1. Monitoring parameter	TSP, PM10, CO, SO_2, NO_x, temperature, Humidity, wind velocity, wind direction	TSP, PM10, CO, SO_2, NO_x, temperature, Humidity, wind velocity, wind direction	TSP, PM10, CO, SO_2, NO_x, temperature, Humidity, wind velocity, wind direction
	2. Monitoring frequency and duration (at one monitoring site)	(1) One time, 4 samples/time (during at least one hour/time in 6:00 to 18:00) Before starting construction	3 months/time, 4 samples/time (during at least one hour/time in 6:00 to 18:00) During 40 months of construction	3 months/time, 4 samples/time (during at least one hour/time in 6:00 to 18:00) During the first year of operation phase
II	***Noise monitoring***			
	1. Monitoring parameter	Leq, L10, L90	Leq, L10, L90	Leq, L10, L90
	2. Monitoring frequency and duration (at one monitoring site)	One (1) time, 4 samples/ time (during 6:00 to 18:00). Measuring 3 rounds/sample Before starting construction	3 months/ time 4 samples /time (during 6:00 to 18:00). Measuring 3 rounds/sample During 40 months of construction	3 months/time 4 samples /time (during 6:00 to 18:00). Measuring 3 rounds/sample During one (1) first year of operation phase
III	***Surface water quality monitoring***			
	1. Monitoring parameter	pH, TSS, BOD_5, COD, oil, DO, Pb	pH, TSS, BOD_5, COD, oil, DO, Pb	pH, TSS, BOD_5, COD, oil, DO, Pb
	2. Monitoring frequency (at one monitoring site)	One (1) time before starting construction. At 200m of upstream cross-section and from 150-200m downstream cross-section. - For the Tuy Loan, Yen, La Tho, Ly Ly, Tam Ky rivers: 1 sample (surface level) at upstream cross-section, 1 sample (surface level) at downstream cross-section - For the Thu Bon, Ba Ren, Tra Khuc, Tra Bong rivers: 3 samples (surface level) at upstream cross-section, 3 samples (surface level) at downstream cross-section.	3 months/time During 40 months of construction. At 200m of upstream cross-section and from 150-200m downstream cross-section. - For the Tuy Loan, Yen, La Tho, Ly Ly, Tam Ky rivers: 1 sample (surface level) at upstream cross-section, 1 sample (surface level) at downstream cross-section - For the Thu Bon, Ba Ren, Tra Khuc, Tra Bong rivers: 3 samples (surface level) at upstream cross-section, 3 samples (surface level) at downstream cross-section	3 months/time During one (1) first year in operation phase. At 200m of upstream cross-section and from 150-200m downstream cross-section. - For the Tuy Loan, Yen, La Tho, Ly Ly, Tam Ky rivers: 1 sample (surface level) at upstream cross-section, 1 sample (surface level) at downstream cross-section - For the Thu Bon, Ba Ren, Tra Khuc, Tra Bong rivers: 3 samples (surface level) at upstream cross-section, 3 samples (surface level) at downstream cross-section

No.	Item	Baseline	Construction phase	Operation phase
IV	**Underground water quality monitoring**			
	1. Monitoring parameter	pH, SS, Nitrates, E.Coli	pH, SS, Nitrates, E.Coli	pH, SS, Nitrates, E.Coli
	2. Monitoring frequency (at one monitoring site)	One (1) time Before starting construction, 1 sample/time	3 months/ time During 40 months of construction 1 sample/time	3 months/time During the first one (1) year of operation phase 1 sample/time
V.	***Wastewater quality monitoring***			
	1. Monitoring parameter		pH, TSS, Pb, Zn, COD, BOD, oil, coliform, turbidity	pH, TSS, Pb, Zn, COD, BOD, oil, coliform, turbidity
	2. Monitoring frequency (at one monitoring site)		3 months/ time During 40 months of construction 1 sample/time	3 months/ time During the first one (1) year of operation phase 1 sample/time
VI.	**Soil quality monitoring**			
	1. Monitoring parameter	Cu, Zn, Pb, Cd	Cu, Zn, Pb, Cd	Cu, Zn, Pb, Cd
	2. Monitoring frequency (at one monitoring site)	One (1) time Before starting construction, 1 sample/time	3 months/ time During 40 months of construction 1 sample/time	3 months/time During the first one (1) year of operation phase 1 sample/time

7.3.3. Implementation Schedule

The baseline survey shall be carried out in the pre-construction phase.

Monitoring in construction phase shall be conducted every 3 months (a quarter) during 40 months.

Monitoring in operation phase shall be conducted in quarterly basic during the first one year of operation phase.

The general and detailed monitoring schedules are shown in Table 7.4 and 7.5.

Table 7.4 General Monitoring Schedule

Stage	Months																									
	1	2	3	4	5	6	7	…	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Baseline	B1																									
Construction Stage				C1			C2				C12			C13		F1										
Operation Stage																	O1			O2			O3			O4
	B1		Baseline 1																							
	C3		Construction 3																							
	F1		Final Report of Construction Stage (without monitoring)																							
	O2		Operation 2																							

Table 7.5 Detailed Monitoring Schedule

Procedure	Weeks			
	1	2	3	4
Preparation and Mobilization				
Field Survey				
Laboratory Test				
Data Analysis and Reporting				

7.4 Outline of the Updated Environmental Management Plan (in D/D)

The EMP contains guiding environmental principles and procedures for communication, reporting, training, monitoring and plan review to which all staff, engineers, consultants, supervisors, Contractors and sub-Contractors are required to comply with throughout the pre- construction, and construction stages of the project.

The EMP is structured as follows:

Project Description: summarizes the DQEP description, its justification and its main components

Environmental Legislative Framework: Outlines the major laws, regulations, national standards and technical guidelines, The World Bank Policies and the relevant clearance documents that may affect the Environmental Impact Assessment (EIA) process of the project.

Roles and Responsibilities for Environmental Management during Construction: defines the roles and responsibilities for environmental management for all actors involved in the project. It also gives a detailed description of the environmental duties of the actors directly involved in the project: PMUs, The Environmental Control Officer (ECO), the Environmental Monitoring Consultant (EMC), the Construction Supervision Engineers (CSE) and their Environmental Supervisor (ES), The Contractors, sub-contractors and the Contractor's on-site Environmental Officer (EO).

Overview of Environmental and Social Issues: summarizes the main environmental and social impacts identified in the EIA, the approach for identification of environmental issues along the Expressway alignment, and the mitigation measures needed to reduce or minimize negative impacts.

Environmental Compliance Framework: describes the minimum environmental and social issues that should be put into place, describes the content of the Contractor's Site Environmental Management Plan, the management of Contractors, the compliance with legal and contractual requirements, the compliance framework procedures and the penalties that shall be imposed for not compliance with the EMP.

Environmental Monitoring Requirements: describes the monitoring program that shall be carried out by the Contractor's on-site Environmental Officer (EO), the Environmental

Supervisors (ES) , and the Environmental Monitoring Consultant (EMC). It also describes how site inspections shall be carried out.

Environmental Training for Site Personnel: describes the training programs and methodologies that will need to be implemented for all actors involved in the environmental management of the project

Implementation Schedule: presents the general schedule for EMP implementation and the requirements and staffing needs for initiation of the works.

Reporting: describes the different reports that have to be prepared by Contractors, ECO, ES and EMC during the project construction.

Conclusions and Suggestions

Conclusions

The Danang –Quang Ngai Expressway is a part of the North-South Expressway located in parrallel with the existing NH1A and North-South Railway and passing through Danang City, Quang Nam Province and Quang Ngai Province. The main objectives of the Danang-Quang Ngai Expressway Project (DQEP) are to enhance efficiency and safety in traveling from Danang to Quang Ngai, and contributing to economic growth in the Central Region of Vietnam. Ministry of Transport (MOT) of Viet Nam is the Project approval agency, and the Vietnam Expressway Corporation (VEC) is the Project owner. The Project Management Unit 85 (PMU85) and the Project Management Unit 1 (PMU1) are assigned as the Project implementing agencies. The Project is planned with funds provided by the World Bank and the Japan International Cooperation Agency, and counterpart fund from the Government of Vietnam. The DQEP is designed to meet the standard for a 6-lane expressway (4 lanes will be built in the first stage) with travel speed of 120 km/h. The road has restricted access at the interchanges.

EIA Report for the Project was approved by Ministry of Natural Resources and Environment (MONRE) in 2008. And a supplementary EIA Report was approved by MONRE in 2010. However, during the D/D stage, a supplementary EIA study was carried out with aim to: (a) Evaluation of the adequacy/shortcomings in the choice of the alignment, and whether the alternatives and the alignment were evaluated and selected with adequate detailed engineering design, appropriate scale topographical maps and other information; (b) Assessment of the best way to finalize the comparative options for selecting the remaining short segments of the alignment, the adequacy of the proposed mitigation measures, and how best to incorporate the mitigation measures in the EA reports, the engineering design and the contract documents; (c) Review of the TOR for updating EIA Report and EMP, and in case of necessity, present proposals on the modifications of the TOR and resources allocated to remediate/modify the above deficiencies and how best to proceed with updating the final EAs.

This Updated EIA Report and the associated Updated Environmental Management Plan were prepared to summarize results of the supplementary EIA study carried out in D/D stage.

Process of alignment planning (comparison of alignment alternatives, selection of optimum alternative, appropriateness of topographic maps and information used for alignment planning, etc.) was reviewed. Field surveys were carried out at 110 environmentally-sensitive spots/structures, including 24 specified populous residential areas along the proposed alignment, to assess the validy of the proposed alignment and identify environmental issues, potential impacts that may be caused by the Project, as well as to examine proper measures to avoid/mitigate these impacts if necessary. Based on results of these review and field surveys, it came to conclude that the proposed alignment is likely the optimum alignment for the Project.

Public consultations meetings were organized in all project-affected communes to disseminate information on the Project, and discuss with local stakeholders on the anticipated impacts, the proposed impact mitigation measures, etc. Attempts were paid to collect local stakeholders' comments, opinions, requests, etc. during the public consultation meetings, and reflect them in the Project planning and design.

Impact assessment described in the approved EIA reports was reviewed. Almost all potential impacts had been described to some extent in these EIA reports, except for the impact caused by: (1) the excavation and transportation of construction materials; and (2) impact caused by the transportation and disposal of waste soils generated from the construction works of road, bridges, and tunnels.

Impact mitigation measures described in the EIA reports were also reviewed. As a result, efforts were concentrated in further examining: (1) mitigation measures for impact of noise and vibration (during design phase, construction phase and operation phase); (2) mitigation measures for impact of air pollution (during construction phase and operation phase); (3) mitigation measures for impact of waste water (during construction phase and operation phase) and polluted runoff water from road surface of large bridges (during design phase and operation phase); (4) mitigation measures for impacts caused by the transportation and disposal of waste soils and construction wastes (during design phase and construction phase); (5) mitigation measures for impact of inundation (during design phase and operation phase); (6) mitigation measures for impacts caused by the exploitation and transportation of construction materials (during design phase and construction phase); and (7) mitigation measures for impacts to local communities, such as split of communities, impedance of movements, etc.

The Environmental Management Plan (EMP) approved by WB in October 2010 was reviewed and updated.

Suggestions

The Project alignment had been carefully planned, and affects to a number of sensitive spots/structures along the alignment had been avoided. However, there are about 80 populous residential areas are to be affected by split of community and/or impedance in movement. In addition, about 30 spots/structures (such as local roads, watercourses, rocky mountain, dams, pagodas, schools, etc.) would be affected to some extent by the Project (Appendices 2~3).

During the D/D study, efforts had been paid to incorporate measures to mitigate impacts of flood, split of community, impedance in movement, etc. into the design of the bridges, viaduct sections, crossing structures (underpasses, flyovers), culverts, etc. Public consultation meetings were organized in the affected communes with aim to diffuse information on the Project to local residents, and collect local stakeholders' opinions/ comments/requests for reflecting to the Project planning and design. Updated Resettlement Action Plans (RAPs) were prepared for the affected districts, which describe measures to mitigate impacts of land acquisition, loss of source of income, loss of means of livelihood, etc. to local residents.

And measures to mitigate impacts of air pollution, noise, water pollution, soil erosion, wastes, deterioration of public order and security, etc. during construction phase are described in this Updated EIA Report and the associated Updated EMP. If these measures are duly implemented, it expects that almost adverse impacts of the Project in construction phase can be avoided, or mitigated, or compensated.

However, it needs to consider the issue related to Cham archaeological ruin in Trien Tranh Mound. The Expressway alignment planned in D/D would avoid causing direct adverse impact to the conservation area (5,000m^2 designated by local authorities of Quang Nam Province), but apart of the Trien Tranh Mound would be affected by the Expressway. No one can be sure that there is no archaeologically-valuable remain/artifact being buried under the area where will be encroached by the Expressway. Therefore, there is a risk of delay of construction work if such remain/artifact is unearthed by chance during construction.

Appendix 1: Phu Ninh Lake

Information Box		Lake view
Location	**Phú Ninh District, Quảng Nam Province**	
Coordinates	**15°29′07″N 108°27′26″E**	
Lake type	**Reservoir**	
Surface area	**3,433 ha**	
Water volume	**344,000,000 m^3**	
Islands	**30**	

Location

Lake Phu Ninh is 7 km from Tam Ky Town to the West, 70 km from Da Nang City and about 15 km from Chu Lai airport, Quang Nam Province. On its banks are villages belonging to Phú Ninh District and Núi Thành District.

Resource

Phu Ninh Lake water is the main source of water for living and planting of Tam Ky Town and other places in Phu Ninh and Nui Thanh districts. Lake Phu Ninh has a hot mineral spring water resource.

Hydroelectric power from Lake Phú Ninh contributes up to 3 million kwh per year. Annually, about 80 tons of fish are taken from Phu Ninh Lake.

Forest protection

The total protective area surrounding Phu Ninh Lake is 23,409 ha, belonging to Phu Ninh and Nui Thanh District. According to the Quang Nam Forestry Bureau (in 2000), the area included 15,768 ha of forest including 1,500 ha of plantation forest. There are 34 kinds of animal, 26 reptiles and 14 kinds of animal and plant which are recorded in Vietnam Red Book. It is the place to conserve hundred of plants and precious herbs with various zoology and plantation system. Phu Ninh Lake was recently awarded national historical heritage status.

Topography

The area is made up of low hills, average height 100 – 300m, but some are 500 – 700m above sea level. The average slope is 100m, sloping to the west, south west and north east to form a small valley. To the south are mountain ranges with Quang Ngai mountain with high peak, tilting hard (16-450) makes this area strongly separated. To the north and northwest are low mountains, small tilt (110-250) creates many flat and large valleys surrounding Phu Ninh Lake. The soil is mostly yellow red feralite soil on sand stone (occupies 61.11%) which is easily eroded and not conducive to growing vegetables and crops. Red yellow feralite soil on igneous rock (occupies about 20%) is often covered by forest. Fertile soil (occupies 15-17%) exists in valleys along the springs where concentrate the residential area and field.

Climate

Phu Ninh Lake's climate belongs to the Middle South climate area. It is not cold in autumn. Daily and yearly temperatures are both relatively low comparing to other areas in Vietnam. There are two seasons: rainy and dry in year.

Meteorological data observed at Tam Ky Weather Station show the following characteristics of the area:

- Yearly average temperature: 25.6°C
- Average high temperature: 29.7°C
- Monthly lowest average temperature: 22.7°C
- Monthly average temperature fluctuation: 7°C
- Monthly average approximate humidity 82%. From September to October, approximate humidity is 82%-88%. From April to September, monthly average approximate humidity is about 75%-81%
- Rainfall is concentrated from September to December
- Yearly average rainfall: 2,491 mm
- Highest yearly rainfall: 3,307 mm
- Lowest yearly rainfall: 1,111 mm
- Highest daily rainfall: 332 mm

Phu Ninh Lake has two main wind directions: East and Northeast. The east wind prevails from March to August. The northeast wind prevails from October to November.

- Average wind speed: 2.9 m/s; highest wind speed: 40 m/s (in stormy weather).
- Strong wind speed is from 14 m/s to 28 m/s
- Storms occur from September to October. There are 0.5 direct storm yearly and 2-3 indirect storms and tropical pressure.
- Hot and dry West wind: Southwest wind happens in May. From May to August, there are 10 to 15 hot and dry days.

Terrain

- Regenerated forest and mountain
- Low mountain
- Lake and small islands
- Field and residential area

Basic ecosystem

- Natural forest (regenerated)
- Plantation
- Water areas
- Vacant and paramour

Zoology and plantation system

1. Plant and forest: there are main kinds of plants as follows:

Plants on mountain includes thin forest (about 860 ha, cover to the South) and extremely thin forest (about 530 ha)

Bush, grass: total area is about 10,000 ha, covering everywhere. The soil is dry, low regenerated capability

Plantation: about 700 ha, mainly concentrate on the north boundary of the lake which is almost Eucalyptus.

In conclusion, forest surround the lake has the bad impact on environment due to the war effect left over and the consequence of exploitation nowadays.

2. Plants:

Phu Ninh forest has various plants, including about 369 kinds of plant among which are 10 plants recorded in Vietnam Red Book.

3. Plant resources value general estimation:

There are 250 worthy plants among which 211 medical plants, 85 wood plants, 66 ornamental and shading plants, 50 fruits and crops plants, 14 cotton and handicraft material plant, 22 rubber, oil, fragrant oil plants.

4. Animals: 3 main kinds of animal

Land vertebrate animal includes 4 main kinds: amphibians, reptile, bird, animal with 148 species, 69 families, 27 groups, 4 classes.

Aquatic animal:

- Kelp: 20 kinds, 8 families, 3 branches
- Floating animal: 13 kinds
- Fish: 14 kinds
- Seabed animal: 11 kinds (clams, snails)

Land invertebrate animal:

- Insect: 150 kinds, 11 groups which are tremendous and various. Some are colorful, attracting tourists.
- According to the research of Ministry of Agriculture and Rural Development (in 2003), Phu Ninh area has many precious animals such as:
  - 11 kinds of mammal recorded in Red Book need to be protected: rhino, red monkey, yellow monkey, long tail monkey.
  - 7 reptiles: python, cobra, egretta garzetta.

Animal resources estimation:

- The land animal in this area has the significant value. Although there are not many kinds of animal, the zoology system in Phu Ninh Lake is various and valuable.
- Precious animals include 14 kinds (e.g.: red face monkey, wolf, bear, chamois, rhino, ground-dragon, snake, bird…) other animals: brocket, boar, vagrant, cock, snake…
- Ornamental animals: attractive shape, colorful, beautiful voice….. They can be supplied for tourism activities and sightseeing

Current land use

1. North Lake area:

- Dams: Chinh dam, Tu Yen dam, Long Son dam, and Duong Lam dam
- Management office, Security office: lake management team, forest protect station
- Power station
- Chap Tra mountain is existing natural mountain in the North of the lake with small area and some precious animals such as red face monkey which can be supplied for sightseeing.
- Agriculture land, fish pond and agricultural channel
- Mineral water and security station

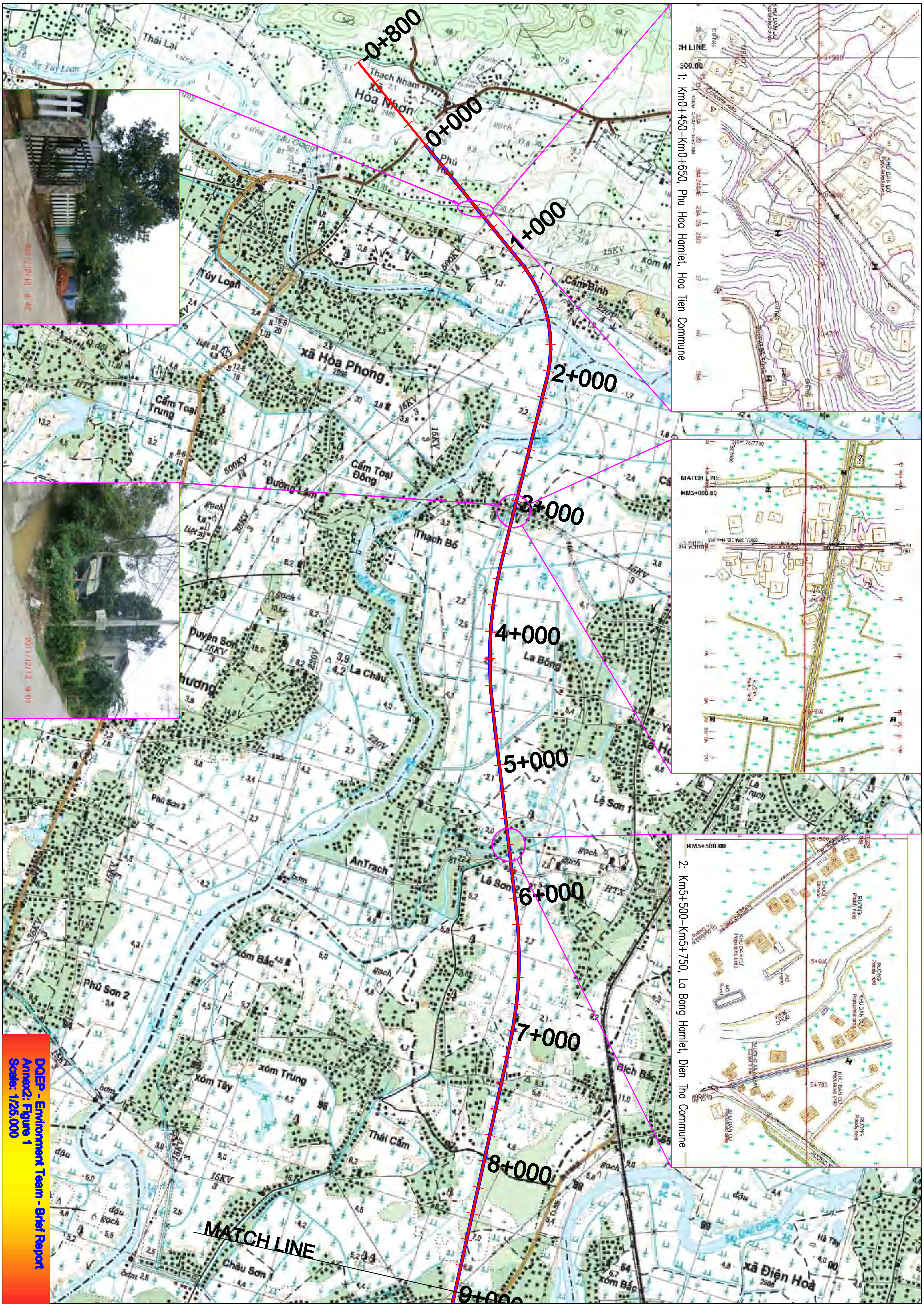
2. Island and peninsula:

- Phu Ninh Lake has 15 small and big islands. Small islands often flood in rainy season. North and East islands do not have natural forest any longer. New plantation area includes pine, eucalyptus… The zoology system is poor with a little kind of small animal, reptiles and birds.
- Rua Island: natural forest, small animals, especially two small kinds of monkey: long tail monkey and red face monkey.
- So Island: the biggest island of Phu Ninh Lake. Natural forest is being recovered. There are many animals, birds, reptiles. The quantity is low but with developing potentiality.
- 61st Island: there are two-floor old house of the management lake team. Because most forest in this island are planted, so the landscape and the zoology system are poor and need to be improved.
- The South and West Islands and peninsulas (belonging to Tam Son and Tam Lanh commune): many wild animals living such as deer, brocket, reptile, bird.

Mineral water

At the heart of the lake, near Chap Tra valley, there are many mineral water resources with useful elements for digestion and recovery treatment, health improvement.

The degree of Phu Ninh's mineral water is 90^0C underground, 60^0C-70^0C when flowing out; flowing speed is 0,5l/s. Mineral water company in Tam Ky commune uses it to make products (designed output: 15 million bottles/year) However, they have not use this mineral water for treatment yet.



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MATCH LINE
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Hòa Nhơn
Thạch Nham
Phú Hòa
Túy Loan
Cẩm Bình
xã Hòa Phong
Cẩm Toại Trung
Cẩm Toại Đông
Đường Lâm
Thạch Bồ
Duyên Sơn
La Châu
La Bông
Lệ Sơn 1
Lệ Trạch
Phú Sơn 3
AnTrạch
Lê Sơn 2
xóm Bắc
Phú Sơn 2
xóm Tây
xóm Trung
Thái Cẩm
Bích Bắc
Châu Sơn 1
xã Điện Hoà
Hà Tây
1: Km0+450–Km0+650, Phu Hoa Hamlet, Hoa Tien Commune
MATCH LINE
KM3+000.00
KM5+500.00
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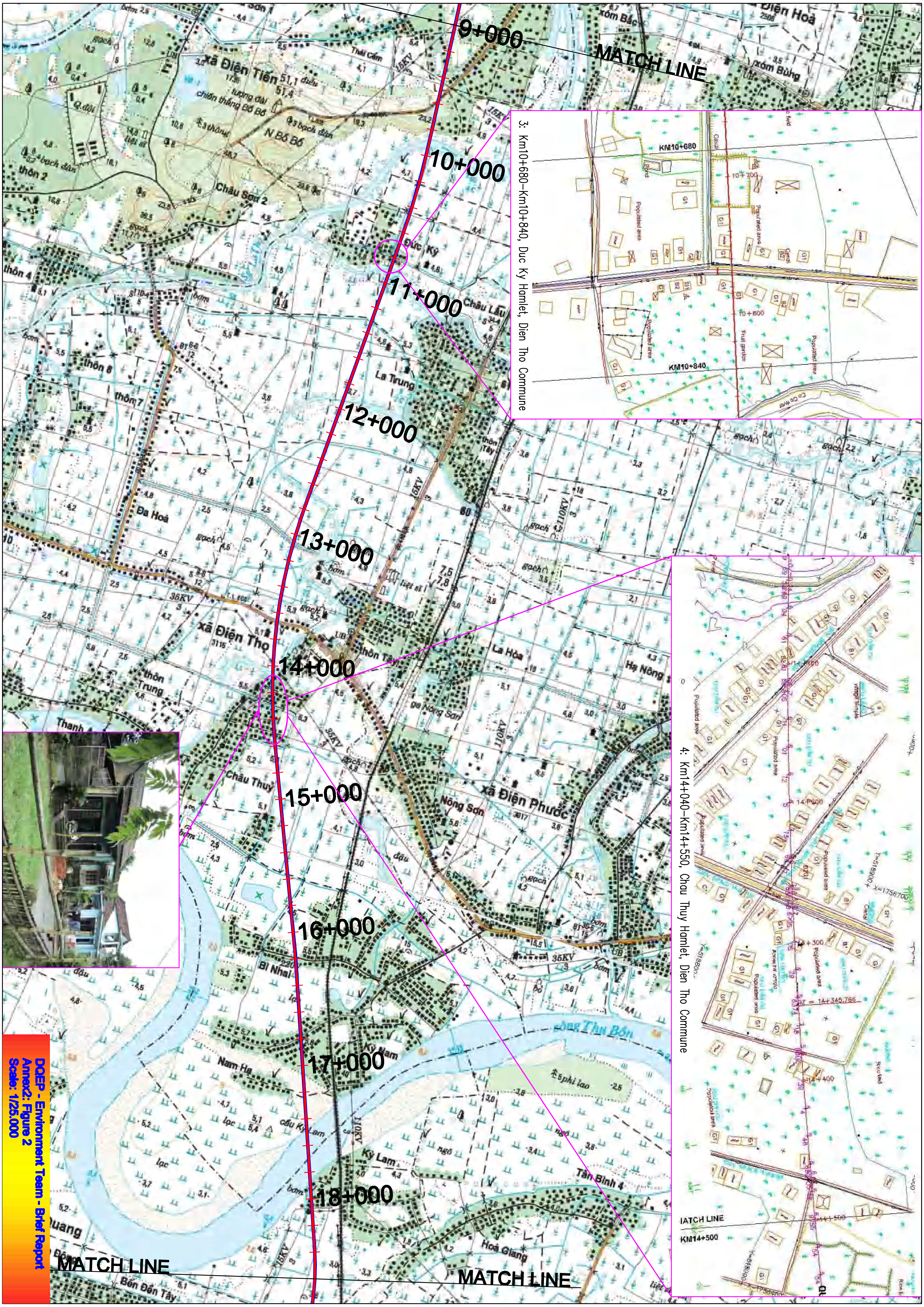
Annex2: Figure 1
Scale: 1/25,000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18+000
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MATCH LINE
3: Km10+680–Km10+840, Duc Ky Hamlet, Dien Tho Commune
KM10+680
KM10+840
4: Km14+040–Km14+550, Chau Thuy Hamlet, Dien Tho Commune
KM14+500
xã Điện Tiến
xã Điện Thọ
xã Điện Phước
Đức Kỳ
Châu Thuỷ
Kỳ Lam
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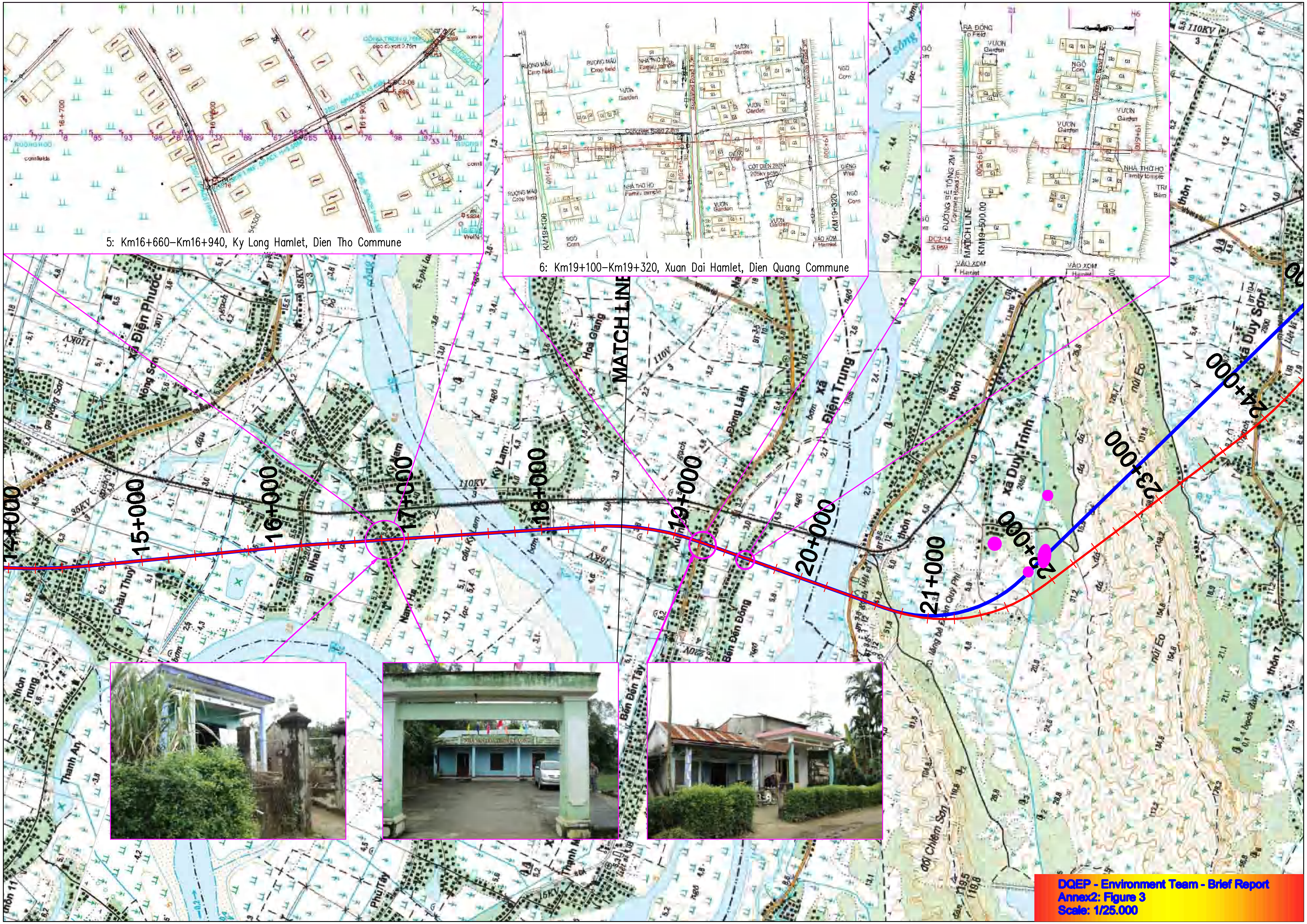
Annex2: Figure 2
Scale: 1/25.000



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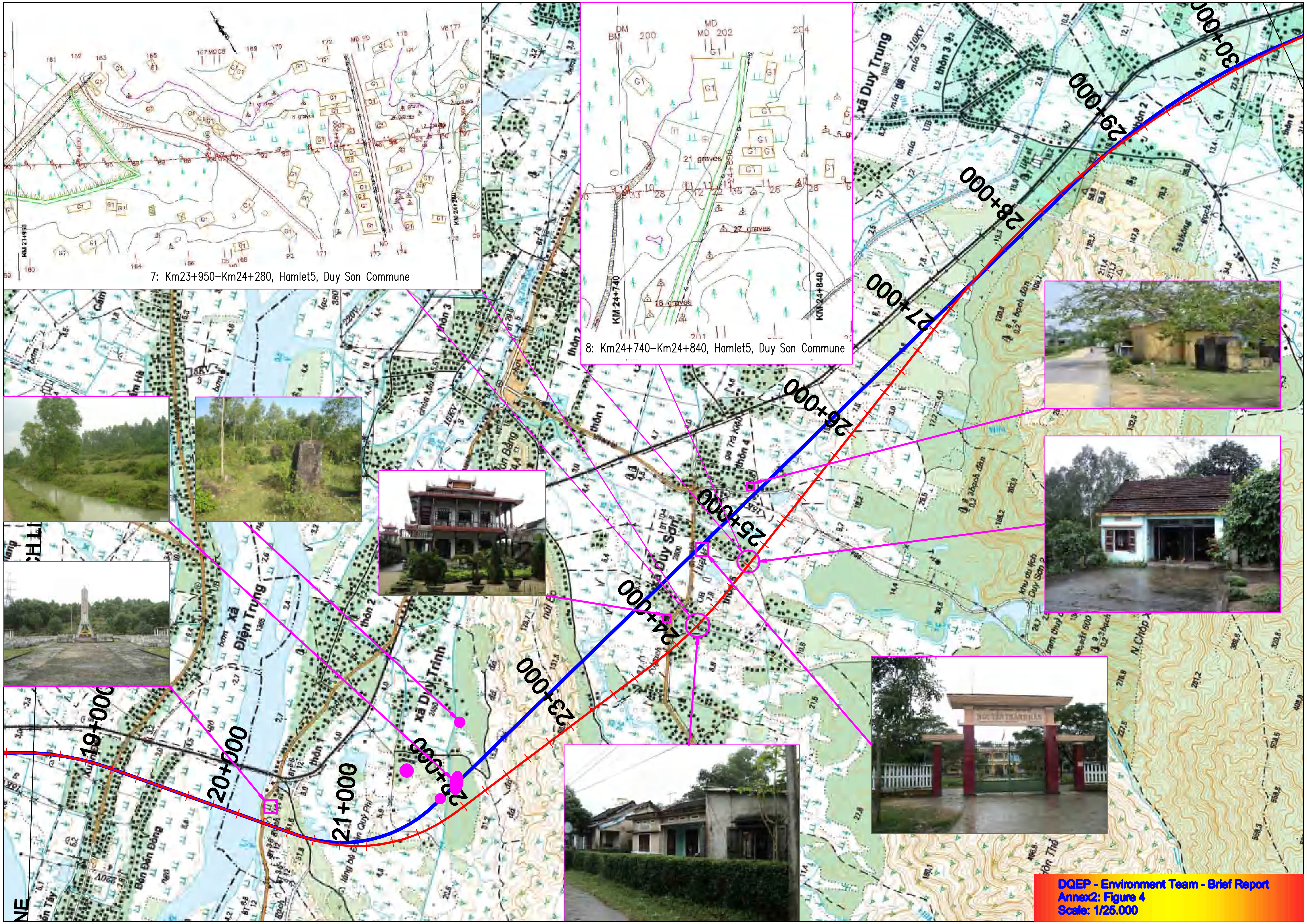

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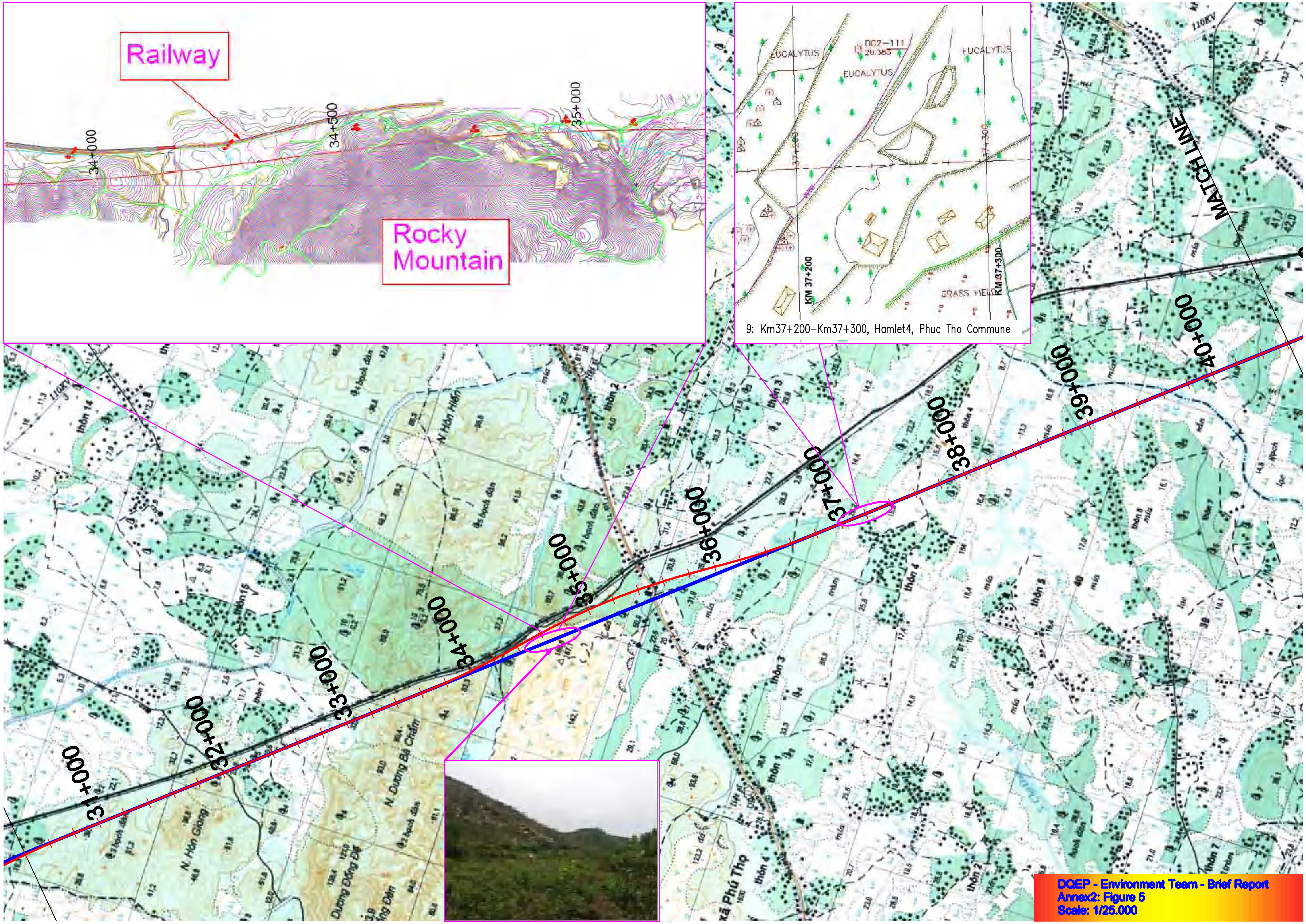
Scale: 1/25.000



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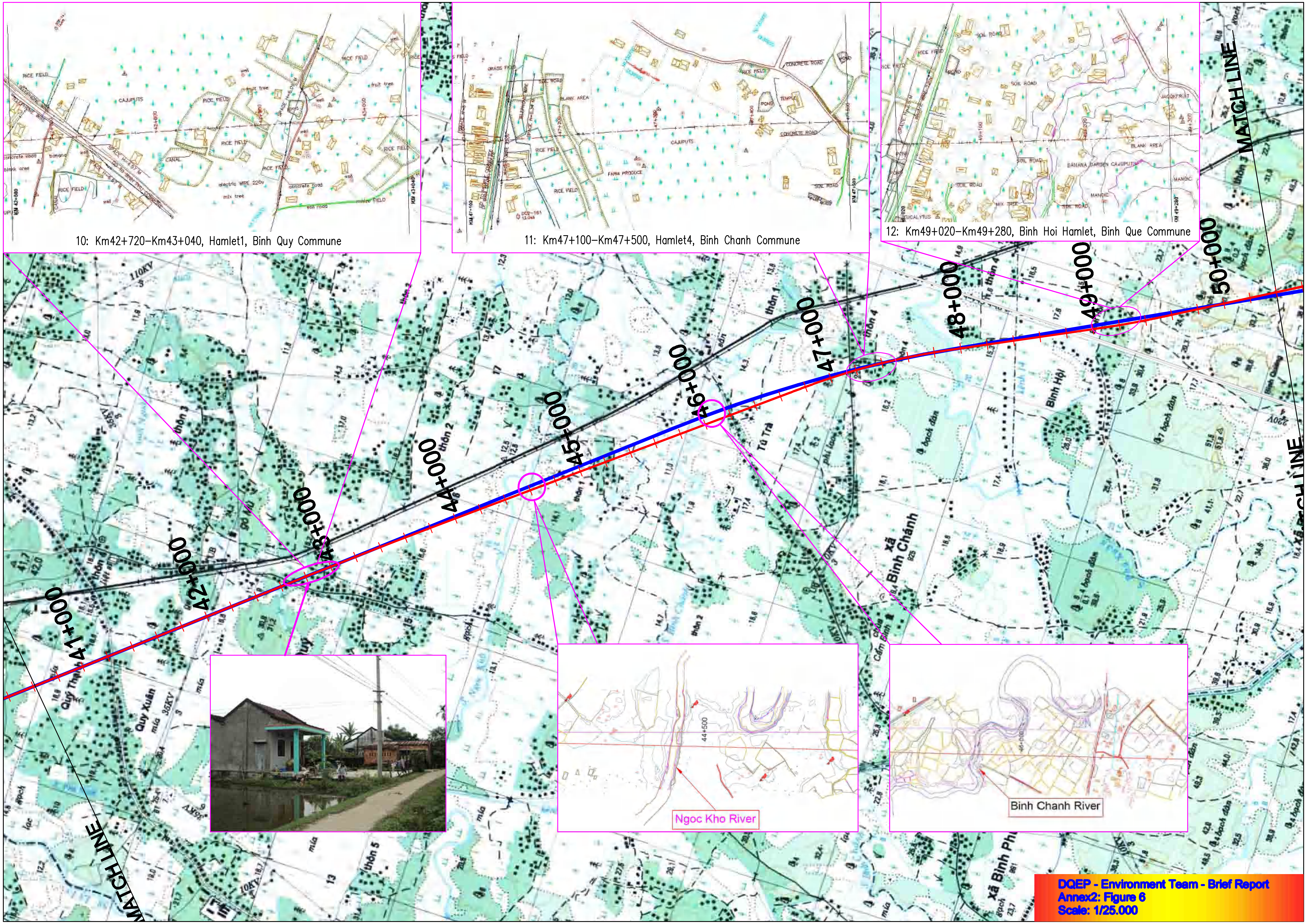

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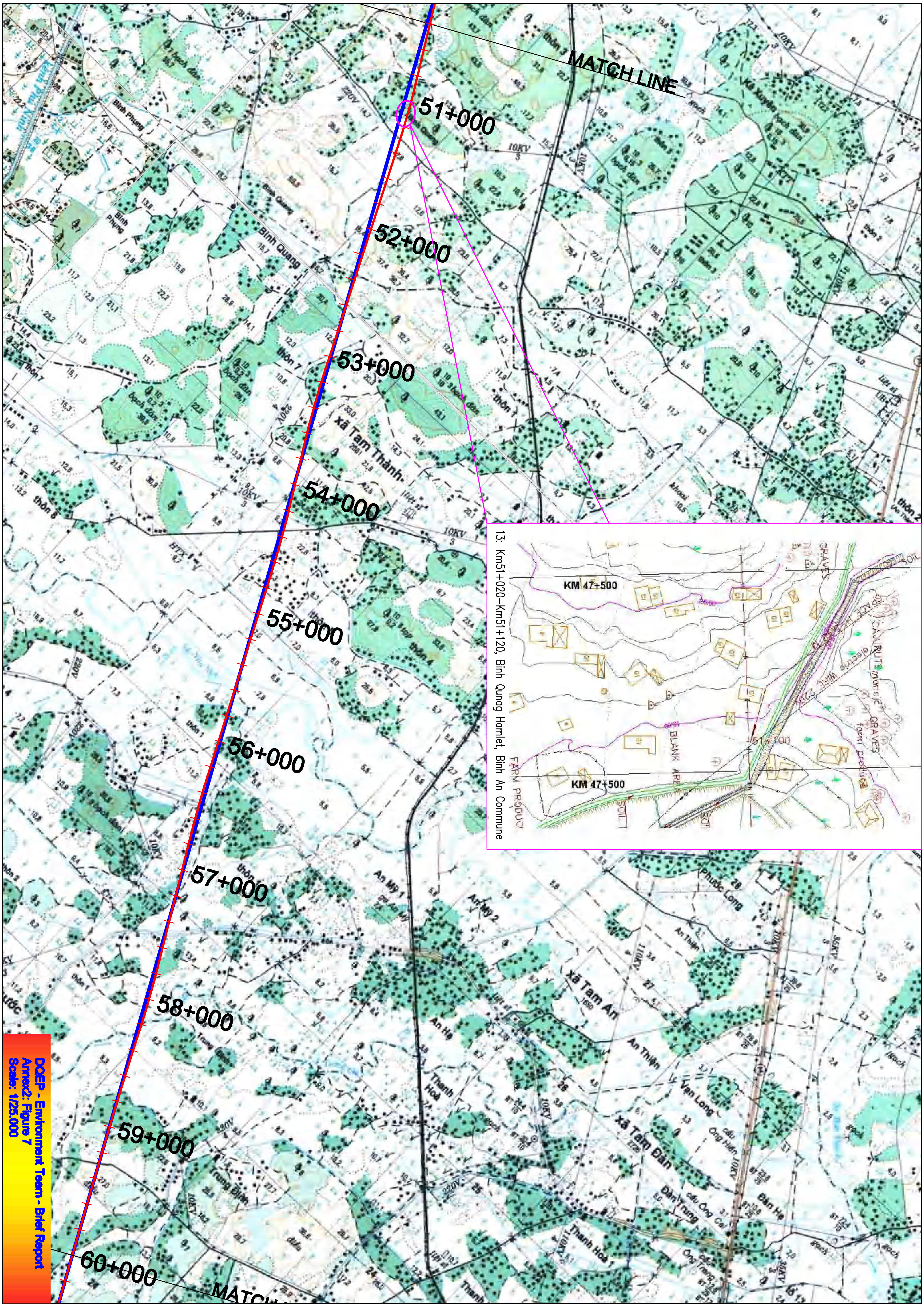
MATCH LINE
51+000
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57+000
58+000
59+000
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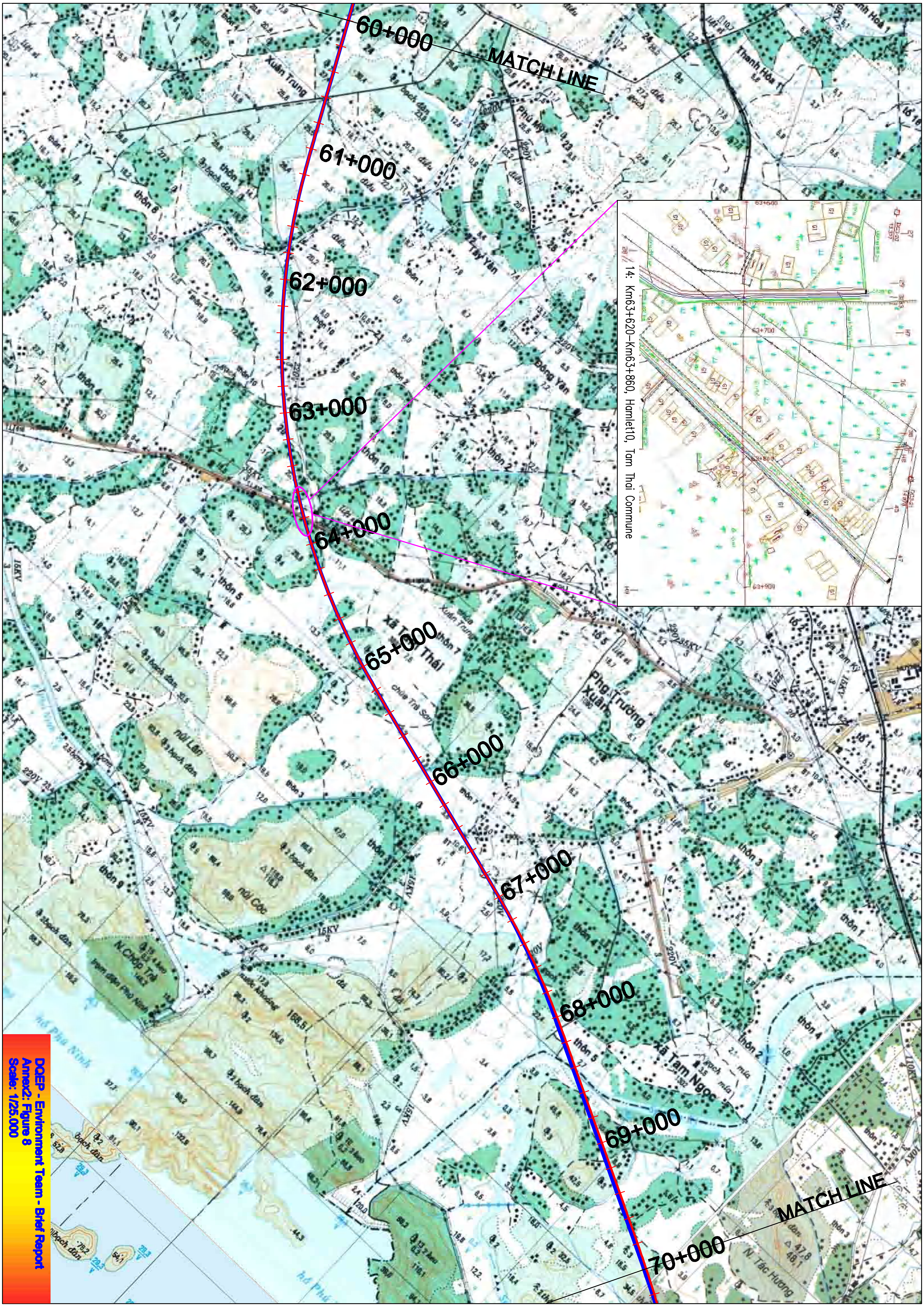
xã Tam Thành
xã Tam An
xã Tam Dân
13: Km51+020–Km51+120, Binh Qunag Hamlet, Binh An Commune
KM 47+500
KM 47+500
51+100
GRAVES
BLANK AREA
FARM PRODUCT
DQEP - Environment Team - Brief Report
Annex2: Figure 7
Scale: 1/25.000



DOEP - Environment Team - Brief Report
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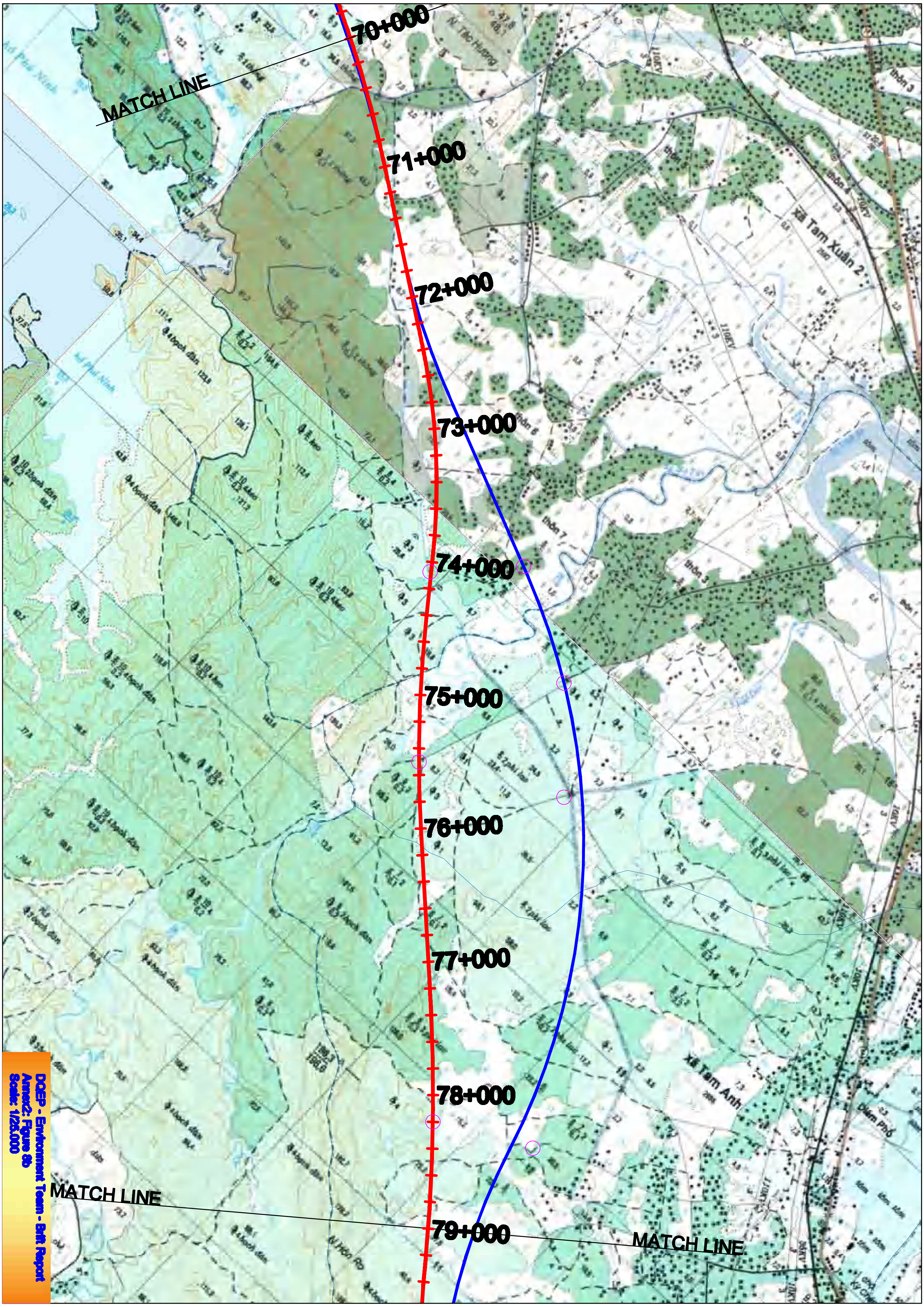
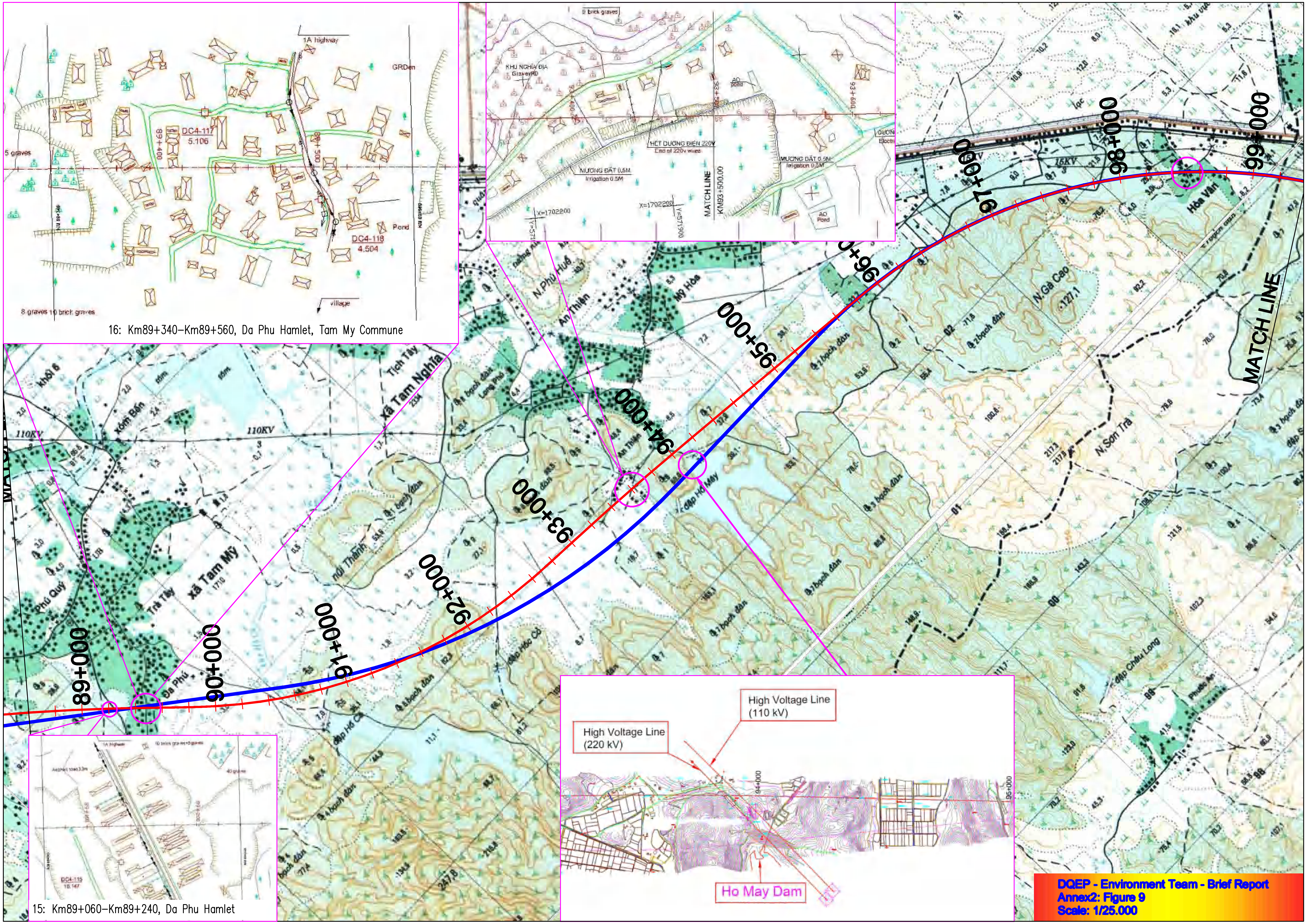
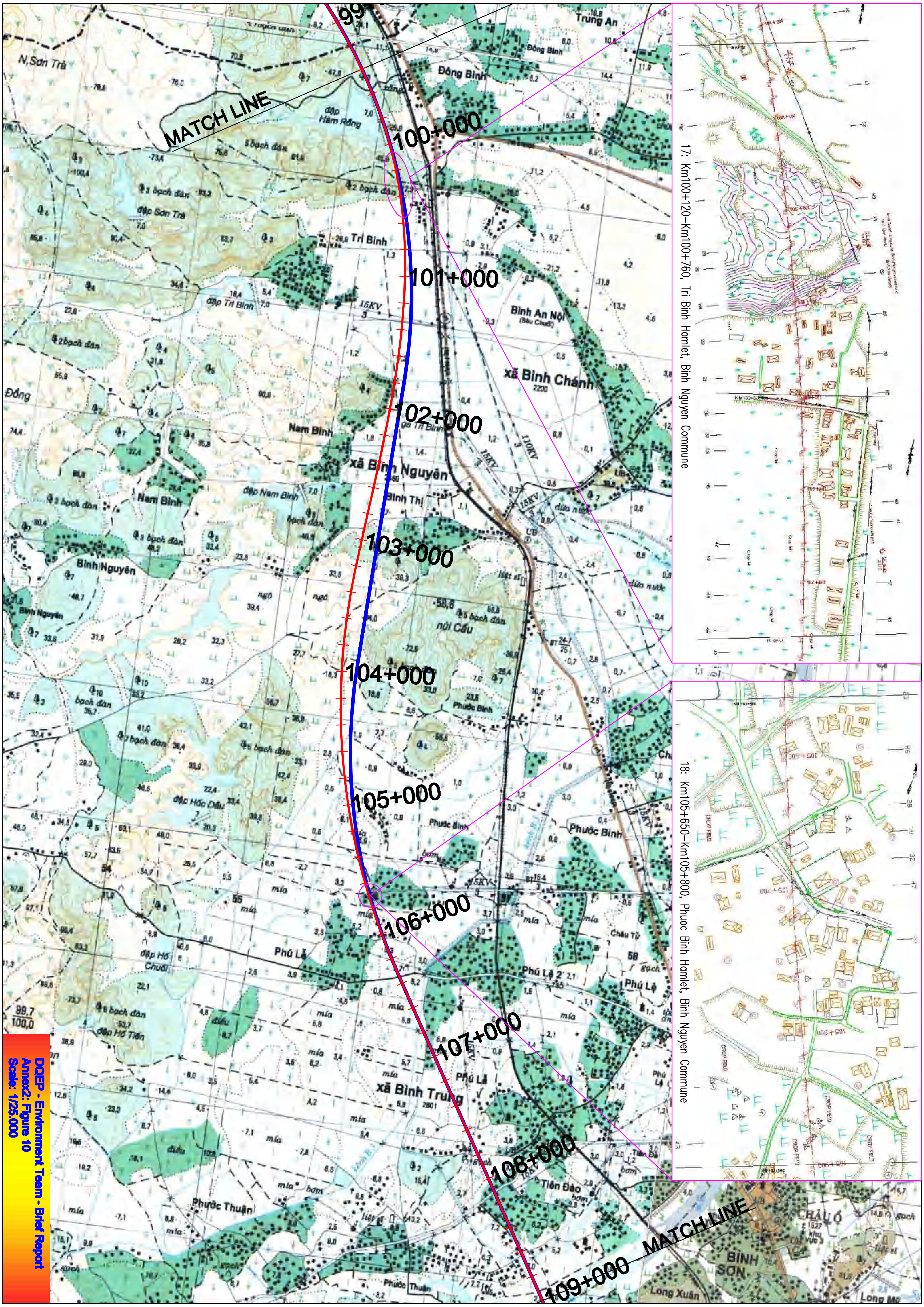

70+000
71+000
72+000
73+000
74+000
75+000
76+000
77+000
78+000
79+000
MATCH LINE
MATCH LINE
MATCH LINE
Xã Tam Xuân 2
Xã Tam Anh
DOEP - Environment Team - Brift Report
Annex2: Figure 8b
Scale: 1/25.000

DQEP - Environment Team - Brift Report
Annex2: Figure 8c
Scale: 1/25,000



DQEP - Environment Team - Brief Report
Annex2: Figure 9
Scale: 1/25.000



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MATCH LINE
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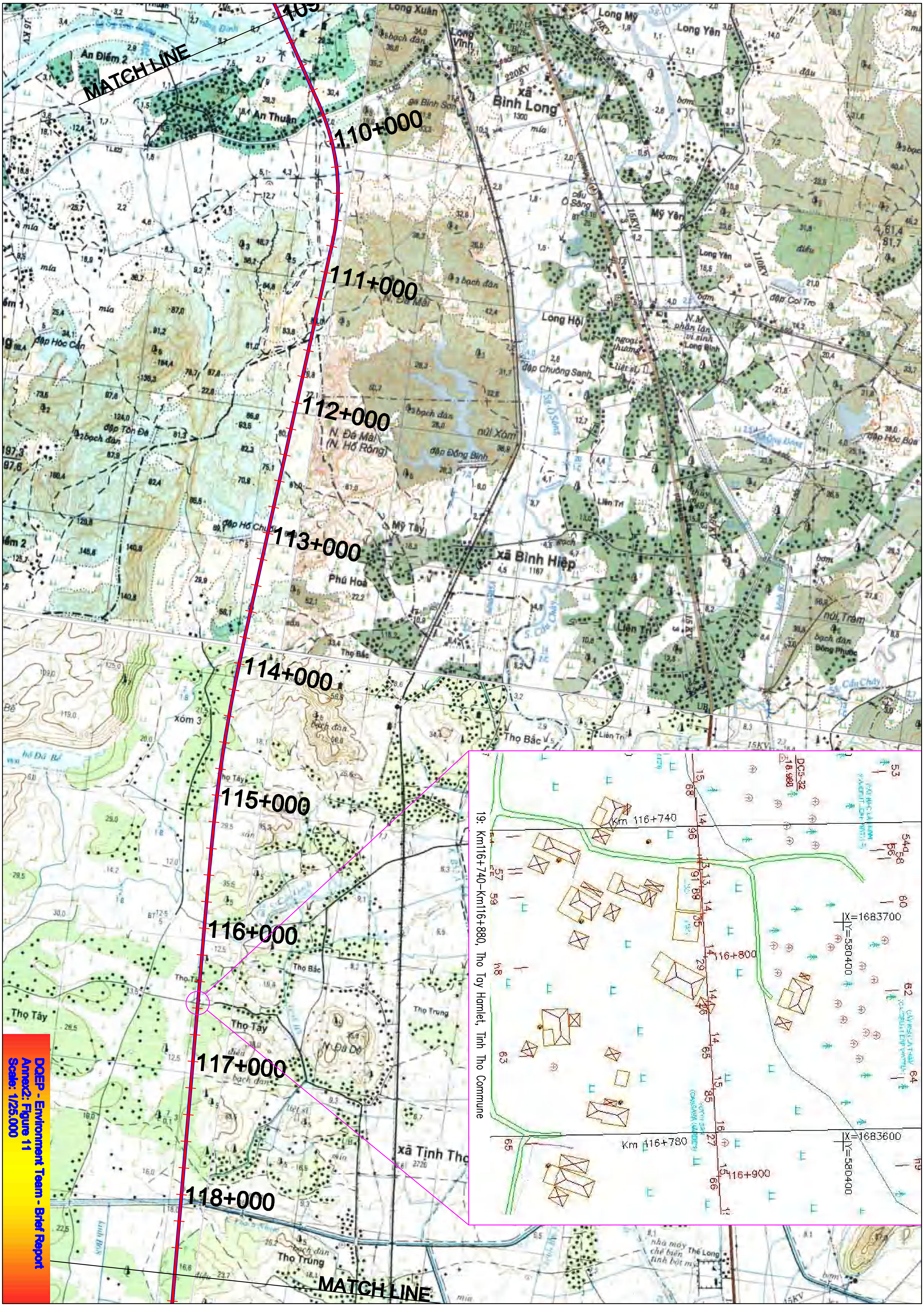
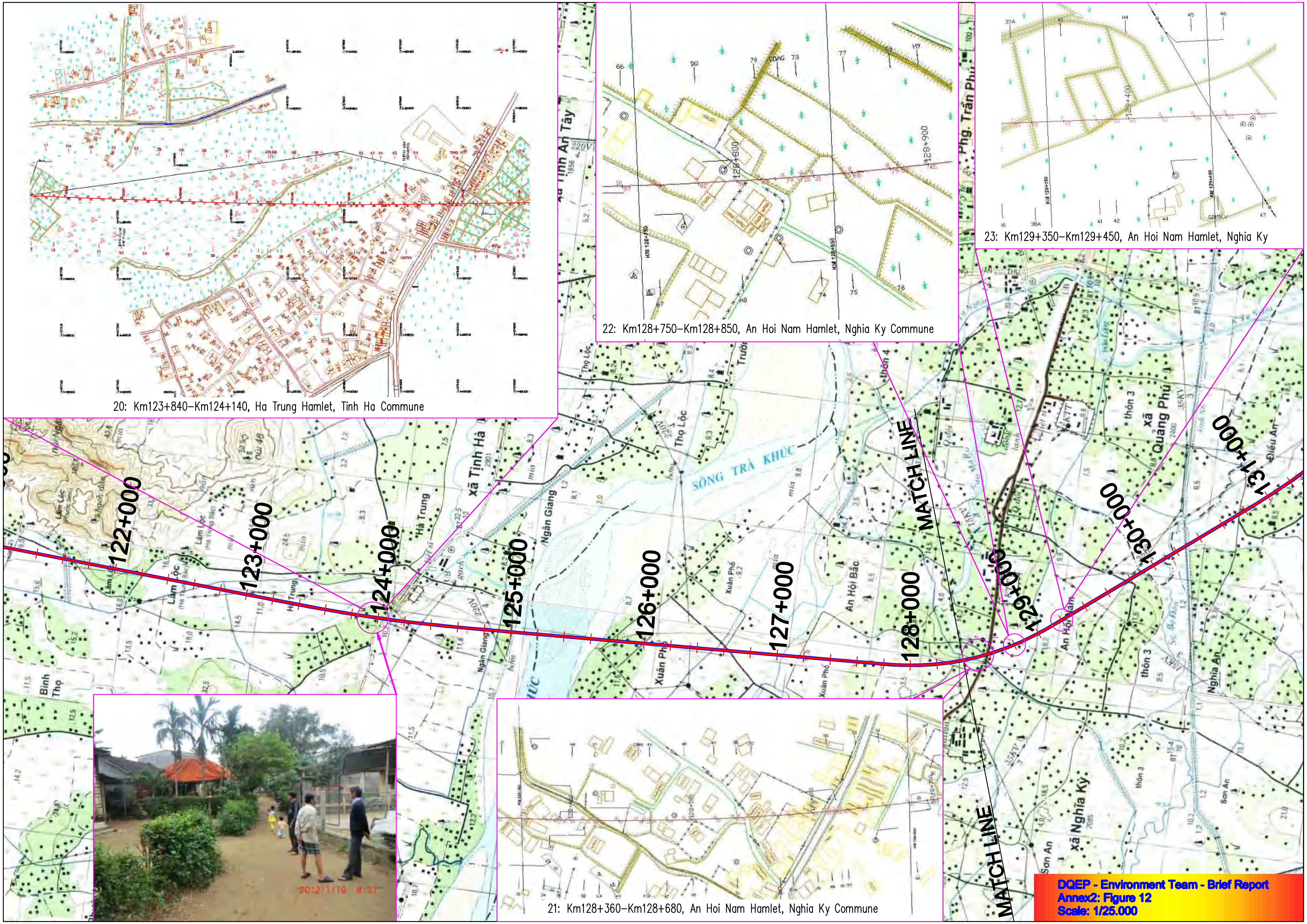
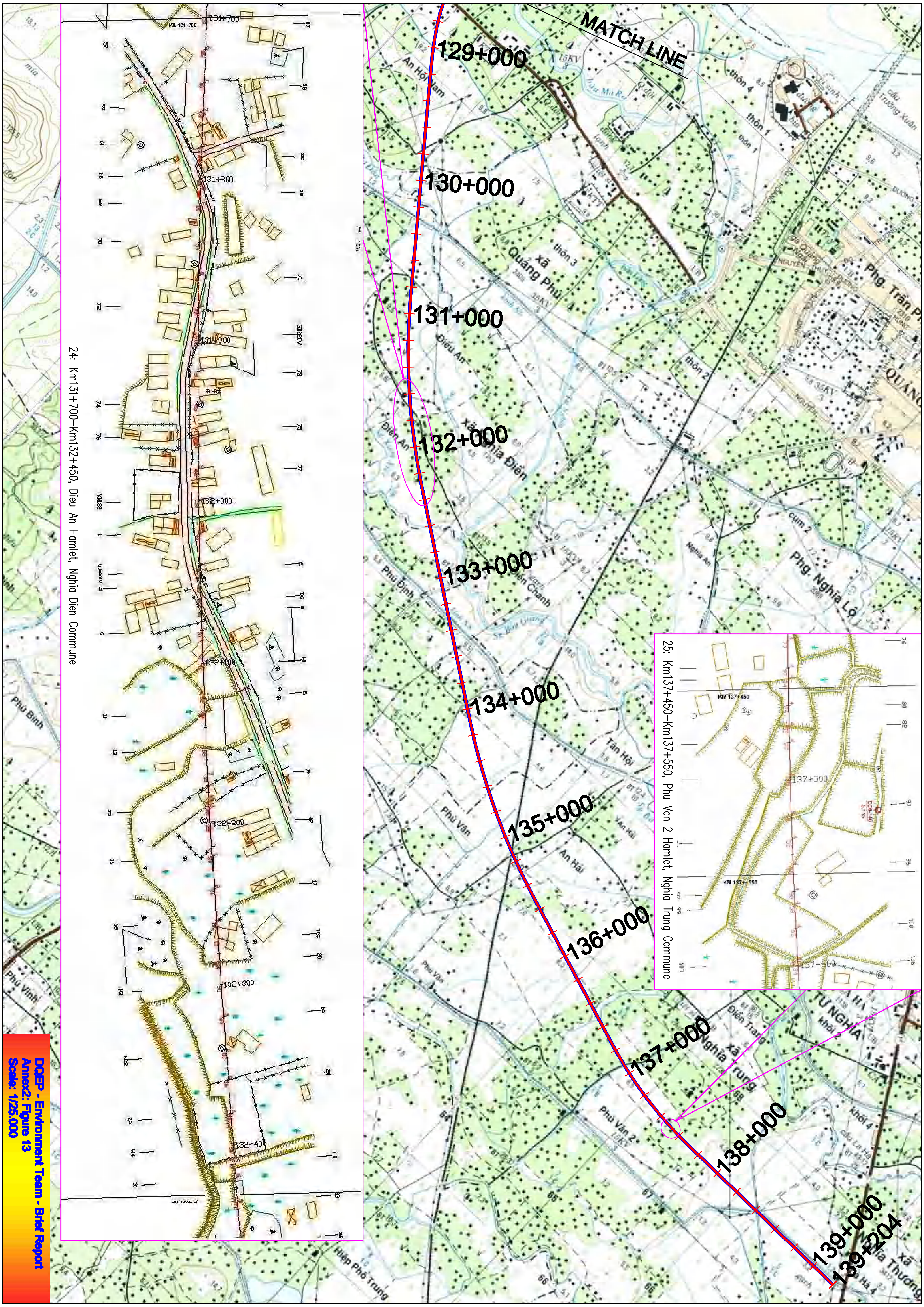
Đông Bình
đập Hàm Rồng
N.Sơn Trà
đập Sơn Trà
Trí Bình
đập Trí Bình
Bình An Nội
xã Bình Chánh
Nam Bình
xã Bình Nguyên
Bình Thì
Bình Nguyên
núi Cầu
Phước Bình
đập Hố Dầu
Phú Lễ
đập Hố Chuối
đập Hố Tiền
Phú Lễ 2
Châu Tử
xã Bình Trung
Phước Thuận
Tiên Đào
CHÂU Ổ
BÌNH SƠN
Long Xuân
Long Mỹ
17: Km100+120–Km100+760, Tri Binh Hamlet, Binh Nguyen Commune
18: Km105+650–Km105+800, Phuoc Binh Hamlet, Binh Nguyen Commune
DQEP - Environment Team - Brief Report
Annex2: Figure 10
Scale: 1/25.000



DQEP - Environment Team - Brief Report
Annex2: Figure 11
Scale: 1/25,000



DQEP - Environment Team - Brief Report
Annex2: Figure 12
Scale: 1/25.000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24: Km131+700–Km132+450, Dieu An Hamlet, Nghia Dien Commune
25: Km137+450–Km137+550, Phu Van 2 Hamlet, Nghia Trung Commune
131+800
131+900
132+000
132+100
132+200
132+300
132+400
137+500
137+600
xã Quảng Phú
xã Nghĩa Điền
xã Nghĩa Trung
Phg. Nghĩa Lộ
Phg. Trần Phú
Điều An
Phú Văn
Phú Văn 2
An Hải
Tân Hội
Phú Bình
Phú Vinh
Hiệp Phố Trung
Tư Nghĩa
An Hội Nam
thôn 1
thôn 2
thôn 3
thôn 4
DQEP - Environment Team - Brief Report
Annex2: Figure 13
Scale: 1/25.000

Appendix 3: List of environmentally-sensitive spots

Province	District	Package	No.	Location (D/D alignment)	Characteristic	Issues/ Impacts identified in F/S	Changes during D/D	Confirmation during D/D
								Findings / Results of field survey
ĐÀ NẴNG	Hòa Vang Km0+000 ~ Km7+965	PKG1 Km0 ~ Km8	1	Km000+000 - Km000+020	Cross intersection with provincial road no.14B	Impact on traffic and human life by wastes during construction stage	Not change	
			2	Km000+120 - Km000+300	Cut through the Phu Hoa hamlet, population density is low	Mostly are one-storey structure, Location in F/S is: Km0+000 - Km0+800	Not change	May be affected by land aquition, noise impact, etc.
			3	Km000+520 - Km000+610	Cut through the Phu Hoa hamlet, population density is medium	Mostly are one-storey structure, Location in F/S is: Km0+000 - Km0+800	Change	Mostly are one-or-two-storey structure. May be affected by land aquition, noise impact, etc.
			4	Km001+565 - Km001+630	Cross Tuy Loan river	Affect river flow & quality of the river water	Change	Location change
			5	Km002+428 - Km002+591	Cross Yen river	Affect river flow & quality of the river water	Change	Location change
			6	Km002+980 - Km003+100	Cut through the Thach Bo hamlet, population density is medium	Mostly are one-storey structure, Location in F/S is: Km3+100 - Km3+250	Change	Mostly are one-or-two-storey structure. May be affected by land aquition, noise impact, etc.
			7	Km005+500 - Km005+720	Cut through the Le Son 2 hamlet, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km5+400 - Km5+600	Change	Location change
			8	Km007+320 - Km007+620	Cut through the Thai Cam hamlet, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km7+100 - Km9+900	Not change	
			9	Km007+900 - Km007+980	Cut through the Thai Cam hamlet, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km7+100 - Km9+900	Not change	
	Điện Bàn Km7+965 ~ Km21+115	PKG2 Km8 ~ Km16+880	10	Km008+920 - Km009+060	Cut through the Thai Cam hamlet, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km7+100 - Km9+900	Change	There is Quynh temple located 50m from centre of alignment in left site
			11	Km009+580	Cross the provincial road 605	Increase noise level and air pollution	Change	Location change
			12	Km009+770 - Km009+930	Cross La Tho river	Affect river flow & quality of the river water	Change	Location change
			13	Km010+680 - Km010+840	Cut through the Duc Ky hamlet, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km10+800 - Km10+850	Change	Location change
			14	Km013+650 - Km013+800	Cross the provincial road 609 and Thon Tay hamlet, population density is medium	Have not been identified in F/S	-	Finding 2 temple at the right alignment Km13+750. May be affected by land aquition, noise impact, etc.
			15	Km013+900	-	Have not been identified in F/S	-	There is Ngo Quyen primary school located 200m from centre of alignment in left side.
			16	Km014+040 - Km014+550	Cut through the Chau Thuy hamlet, population density is medium	Mostly are one-storey structure, Location in F/S is: Km14+100 - Km15+250	Change	Location change and Mostly are one-or-two-storey structure
			17	Km016+100 - Km016+230	Cut through the Bi Nhai hamlet, population density is low	Mostly are one-storey structure, Location in F/S is: Km16+100 - Km16+350	Change	Location change, There are 2 temples located near by the from centre of alignment in left
			18	Km016+660 - Km016+940	Cut through the Ky Long hamlet, population density is medium	Have not been identified in F/S	-	There is 1 hamlet culture house located near by the from centre of alignment in left side
		PKG3A Km16+880 ~ Km18+100	19	Km017+662	Cross Thu Bon river	Affect river flow & quality of the river water	Change	Location change
			20	Km017+850 - Km018+050	Cut through the Ky Lam hamlet, population density is low	Mostly are one-storey structure, Location in F/S is: Km17+800 - Km18+050	Change	Location change
			21	Km018+700 - Km018+750	Through field o Ky Lam hamlet	Have not been identified in F/S	-	There is Sir Hoang Dieu tomb located 50m from centre of alignment in right side

Province	District	Package	No.	Location (D/D alignment)	Characteristic	Issues/ Impacts identified in F/S	Changes during D/D	Confirmation during D/D Findings / Results of field survey
QUẢNG NAM		PKG3B Km18+100 ~ Km21+500	22	Km019+180 - Km019+300	Cut through the Xuan Dai hamlet, population density is medium	Mostly are one-storey structure, Location in F/S is: Km18+950 - Km19+000	Change	Location change and Mostly are one-or-two-storey structure
			23	Km019+560 - Km019+600	Cut through the Ben Den Dong hamlet, population density is medium	Mostly are one-or-two-storey structure, Location in F/S is: Km19+450 - Km19+550	Change	Location change
			24	Km020+203	Cross Ba Ren river	Affect river flow & quality of the river water	Change	Location change
			25	Km020+710	Cross the provincial road 610	Increase noise level and air pollution	Change	Location change
	Duy Xuyên Km21+115 ~ Km29+465	PKG4 Km21+500 ~ Km32+600	26	Km022+500 - Km023+000	Tunel pass the rocky mountain	Air and noise polution	Change	Change alignment
			27	Km023+950 - Km024+280	Cut through Hamlet 5, Duy Son commune, population density is medium	Mostly are one-or-two-storey structure, Location in F/S is: Km24+000 - Km24+100	Change	Location change
			28	Km024+760 - Km024+820	Cut through Hamlet 5, Duy Son commune, population density is medium	Mostly are one-or-two-storey structure, Location in F/S is: Km24+000 - Km24+100	Change	Location change
			29	Km028+860 - Km029+100	Cut through Hamlet 2, Duy Trinh commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km28+700 - Km29+000	Change	Location change
	Quế Sơn Km29+465 ~ Km39+650		30	Km032+150 - Km032+200	Cut through Hamlet 7, Que Xuan commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km32+000 - Km32+050	Change	Location change
		PKG5 Km32+600 ~ Km42	31	Km035+460 - Km035+520	Cut through Hamlet 3 - Phu Tho commune and provincial road 611, population density is low	Mostly are one-storey structure, Increase noise level and air pollution	Change	Location change
			32	Km037+230 - Km037+280	Cut through Hamlet 4, Phu Tho commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km37+000 - Km37+600	Change	Location change
	Thăng Bình Km39+650 ~ Km52+350		33	Km039+780 - Km039+940	Through Quy Thanh Hamlet , Binh Quy commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km40+900 - Km41+100	Change	Location change. There is Nguyen temple located 70m from centre of alignment in right
			34	Km041+200 - Km041+320	Cut through Quy Xuan Hamlet - Binh Quy commune and National road 14E, population	Mostly are one-or-two-storey structure, Location in F/S is: Km40+300 - Km41+600	Change	Location change
			35	Km041+600 - Km041+740	Cut through Quy Xuan Hamlet - Binh Quy commune population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km40+300 - Km41+600	Change	Location change
		PKG6 Km42 ~ Km52	36	Km042+720 - Km043+040	Cut through Hamlet 1 - Binh Quy commune population density is medium	Mostly are one-storey structure, Location in F/S is: Km42+750 - Km43+500	Change	Location change and Mostly are one-or-two-storey structure
			37	Km045+060 - Km45+300	Cut through Hamlet 1 - Binh Chanh commune population density is low	Mostly are one-storey structure, Location in F/S is: Km45+000 - Km45+050	Change	Location change
			38	Km045+889	Cross Stream	Affect stream flow & quality of the stream water	Change	Location change
			39	Km046+180 - Km046+300	Cut throughTu Tra Hamlet - Binh Chanh commune population density is low	Mostly are one-storey structure, Location in F/S is: Km46+050 - Km46+070	Change	Location change
			40	Km047+100 - Km047+500	Cut through Hamlet 4 - Binh Chanh commune population density is very low	Mostly are one-or-two-storey structure, Location in F/S is: Km47+250 - Km47+350	Change	Location change
			41	Km048+160 - Km048+240	Cut through Hamlet 4 - Binh Chanh commune population density is very low	-	-	Mostly are one-storey structure, population density is low. May be affected by land aquition, noise impact, etc.
			42	Km048+680 - Km048+780	Cut through Binh Hoi Hamlet- Binh Que commune population density is very low	Mostly are one-storey structure, Location in F/S is: Km48+900 - Km49+050	Change	Location change, population density is low. May be affected by land aquition, noise impact, etc.
			43	Km049+040 - Km049+280	Cut through Binh Hoi Hamlet- Binh Que commune population density is low	Mostly are one-storey structure, Location in F/S is: Km48+900 - Km49+050	Change	Location change, population density is medium. May be affected by land aquition, noise impact, etc.

Province	District	Package	No.	Location (D/D alignment)	Characteristic	Issues/ Impacts identified in F/S	Changes during D/D	Confirmation during D/D
								Findings / Results of field survey
			44	Km050+200 - Km050+360	Cut through Binh Quang Hamlet- Binh An commune population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km50+800 - Km51+000	Change	Location change, population density is low.
			45	Km050+480 - Km050+600	Cut through Binh Quang Hamlet- Binh An commune population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km50+800 - Km51+000	Change	Location change
			46	Km051+020 - Km051+120	Cut through Binh Quang Hamlet- Binh An commune population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km50+800 - Km51+000	Change	Location change
	Phú Ninh Km52+350 ~ Km66+480	PKG7 Km52 ~ Km65	47	Km053+180 - Km053+280	Cut through Hamlet 7 - Tam Thanh commune population density is very low	Mostly are one-or-two-storey structure, Location in F/S is: Km53+500 - Km53+600	Change	Location change
			48	Km054+060 - Km054+160	Cut through Hamlet 7 - Tam Thanh commune population density is very low	-	-	
			49	Km054+760 - Km054+800	Cut through Hamlet 4 - Tam Thanh commune and cross concrete canal, population density is very low	Mostly are one-or-two-storey structure	Change	Location change
			50	Km055+760 - Km055+870	Cut through Hamlet 1 - Tam Phuoc commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km55+650 - Km57+450	Change	Location change
			51	Km055+980 - Km056+080	Cut through Hamlet 1 - Tam Phuoc commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km55+650 - Km57+450	Change	Location change
			52	Km056+500 - Km056+540	Cut through Hamlet 1 - Tam Phuoc commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km55+650 - Km57+450	Change	Location change
			53	Km056+700 - Km057+200	Cut through Hamlet 2 - Tam Phuoc commune, population density is very low	Mostly are one-or-two-storey structure, Location in F/S is: Km57+700 - Km557+750	Change	Location change
			54	Km057+476 - Km057+516	Cross canal and provincial road 616	Have not been identified in F/S		
			55	Km058+850 - Km058 +950	Cut through Trung Dinh Hamlet - Tam Dan commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km58+850 - Km59+500	Change	Location change
			56	Km059+640 - Km059+820	Cut through Xuan Trung Hamlet - Tam Dan commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km59+950 - Km60+150	Change	Location change
			57	Km059+900 - Km060+300	Cut through Xuan Trung Hamlet - Tam Dan commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km59+950 - Km60+150	Change	Location change
			58	Km061+720 - Km061+960	Cut through Hamlet 1 - Tam Thai commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km61+450 - Km62+500	Change	Location change
			59	Km063+620 - Km063+860	Cut through Hamlet 10 - Tam Thai commune, population density is medium	Mostly are one-or-two-storey structure, Location in F/S is: Km62+950 - Km63+600	Change	Location change
		PKGA1 Km65 ~ Km81+150	60	Km065+000 - Km065+140	Cut through Hamlet 3 - Tam Thai commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km65+500 - Km66+850	Change	Location change
	Tam Kỳ Km66+480 ~ Km68+42		61	Km067+800 - Km067+980	Cut through Hamlet 4 - Tam Ngoc commune, population density is very low	Mostly are one-storey structure, Location in F/S is: Km67+700 - Km67+900	Change	Location change
			62	Km068+420	Cross the Tam Ky river	Affect river flow & quality of the river water	Change	Location change
			63	Km068+600 - Km068+980	Cut through Hamlet 4 - Tam Xuan 1 commune, population density is very low	Have not been identified in F/S	Change	Location change
			64	Km071+020 - Km71+280	Cut through Hamlet 6 - Tam Xuan 2 commune, population density is very low	Mostly are one-or-two-storey structure, Location in F/S is: Km72+500 - Km72+850	Change	Location change
			65	Km072+620 - Km072+760	Cut through Hamlet 6 - Tam Xuan 2 commune, population density is very low	Mostly are one-or-two-storey structure, Location in F/S is: Km72+500 - Km72+850	Change	Location change
			66	Km075+185	Cross the Ba Tuc river	Affect river flow & quality of the river water	Change	Change alignment

List of Environmentally – Sensitive Spots/Structures

Province	District	Package	No.	Location (D/D alignment)	Characteristic	Issues/ Impacts identified in F/S	Changes during D/D	Confirmation during D/D
								Findings / Results of field survey
	Núi Thành Km68+425 ~ Km99+200	PKGA2 Km81+150 ~ Km99+500	67	Km082+400	Cross the Trau river	Affect river flow & quality of the river water	Change	Location change
			68	Km083+180 - Km083+220	Cut through Thai Xuan Hamlet - Tam Hiep commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km83+500 - Km83+550	Change	Location change
			69	Km085+733	Cross the provincial road 617	Increase noise level and air pollution	Change	Location change
			70	Km086+720 - Km087+020	Cut through Hamlet 6 - Tam Hiep commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km86+900 - Km87+500	Change	Location change
			71	Km089+360 - Km089+540	Cut through Da Phu Hamlet - Tam My commune, population density is medium	Mostly are one-storey structure, Location in F/S is: Km89+500 - Km89+700	Change	Location change
			72	Km093+360 - Km093+480	Cut through An Thien Hamlet - Tam Nghia commune, population density is medium	-	-	-
			73	Km096+900 - Km098+200	Cut through rock pits: Hung Vuong, Ky Ha, Hung Long		Change	Location change
			74	Km098+420 - Km098+600	Cut through Hoa Van Hamlet - Tam Nghia commune, population density is medium	Mostly are one-or-two-storey structure, Location in F/S is: Km98+980 - Km99+010	Change	Location change
	Bình Sơn Km99+200 ~ Km111+512	PKGA3 Km99+500 ~ Km110+100	75	Km099+700 - Km100+000	200m to right of alignment, Ham Rong dam			
			76	Km101+800 - Km102+000	Cut through Tri Binh Hamlet - Binh Nguyen commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km102+400 - Km102+500	Change	Location change
			77	Km105+650 - Km105+800	Cut through Phuoc Binh Hamlet - Binh Nguyen commune, population density is medium	Mostly are one-storey structure	Change	Location change
			78	Km105+900 - Km105+940	Cut through Phu Le Hamlet - Binh Trung commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km106+000 - Km106+500	Change	Location change
			79	Km107+780 - Km107+800	Cut through Phu Le Hamlet - Binh Trung commune, population density is low	-	Change	Location change
			80	Km108+080 - Km108+440	Cut through Tien Dao Hamlet - Binh Trung commune, population density is medium	Mostly are one-storey structure	Change	Location change
			81	Km108+560 - Km108+640	Cut through Phuoc Thuan Hamlet - Binh Trung commune, population density is low	Mostly are one-storey structure	Change	Location change
			82	Km109+100	Cross the Tra Bong river	Affect river flow & quality of the river water	Change	Location change
			83	Km109+760 - Km109+840	Cut through Long Xuan Hamlet - Binh Long commune, population density is low	Mostly are one-storey structure	Change	Location change
			84	Km110+100	Cross the provincial road 622	Increase noise level and air pollution	Change	Location change

List of Environmentally – Sensitive Spots/Structures

Province	District	Package	No.	Location (D/D alignment)	Characteristic	Issues/ Impacts identified in F/S	Changes during D/D	Confirmation during D/D Findings / Results of field survey
QUẢNG NGÃI	Sơn Tịnh Km111+512 ~ Km125+200	PKGA4 Km110+100 ~ Km124+700	85	Km114+580 - Km114+680	Cut through Hamlet 3 - Tinh Tho commune, population density is very low	Mostly are one-or-two-storey structure	Change	Location change
			86	Km116+460 - Km116+600	Cut through Tho Tay Hamlet - Tinh Tho commune, population density is very low	Mostly are one-or-two-storey structure	Change	Location change
			87	Km118+050	Cross the Thach Nham irrigation canal			
			88	Km119+200	Cross the provincial road 622C	Increase noise level and air pollution	Change	Location change
			89	Km119+920 - Km120+040	Cut through Van Hoa Hamlet - Tinh Tho commune, population density is low	Have not been identified in F/S	Change	Location change
			90	Km121+120 - Km121+180	Cut through Tho Nam Hamlet - Tinh Ha commune, population density is low	Have not been identified in F/S	Change	Location change
			91	Km121+580 - Km121+720	Cut through Lam Loc Hamlet - Tinh Ha commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km122+100 - Km124+400	Change	Location change
			92	Km123+840 - Km124+140	Cut through Ha Trung Hamlet - Tinh Ha commune, population density is medium	Have not been identified in F/S	Change	Location change
			93	Km124+070	Cross the provincial road 623	Increase noise level and air pollution	Change	Location change

List of Environmentally – Sensitive Spots/Structures

Province	District	Package	No.	Location (D/D alignment)	Characteristic	Issues/ Impacts identified in F/S	Changes during D/D	Confirmation during D/D Findings / Results of field survey
		PKGA5 Km124+700 ~ Km131+500	94	Km124+900 - Km125+000	Cut through Ngan Giang Hamlet - Tinh Ha commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km124+700 - Km125+400	Change	Location change
	Tư Nghĩa Km125+200 ~Km129+905		95	Km125+400	Cross the Tra Khuc river	Affect river flow & quality of the river water	Change	Location change
			96	Km125+780 - Km126+040	Cut through Xuan Pho Hamlet - Nghia Ky commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km125+900 - Km126+700	Change	Location change
			97	Km128+000 - Km128+240	Cut through An Hoi Hamlet - Nghia Ky commune, population density is low	Mostly are one-storey structure, Location in F/S is: Km127+800 - Km129+100	Change	Location change
			98	Km128+360 - Km128+600	Cut through An Hoi Hamlet - Nghia Ky commune, population density is medium	-	-	-
			99	Km128+620	Cross the provincial road 623B	-	-	-
			100	Km129+100	To the east 120m, Duc Long pagoda		Change	Location change
	Tư Nghĩa Km130+175 ~ Km132+600		101	Km130+660 - Km130+800	Cut through Dieu An Hamlet - Nghia Dien commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km131+300 - Km131+600	Change	Location change
		PKGA5 Km131+500 ~ Km139+263	102	Km131+700 - Km132+300	Cut through Dien An Hamlet - Nghia Dien commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km132+500 - Km133+000	Change	Location change
			103	Km131+900	To the south 100m, Nghia Dien 2 Primary school		Change	Location change
	Nghĩa Ha nh Km132+600 - Km134+640		104	Km133+050	Cross the provincial road 624	-	-	-
			105	Km133+700 - Km134+000	Cut through Phu Dinh Hamlet - Hanh Thuan commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km134+400 - Km134+500	Change	Location change
	Tư Nghĩa Km134+640 ~ Km139+263		106	Km134+950	Cross the North - South rain way			
			107	Km135+50 - Km135+200	Cut through An Hai Hamlet - Nghia Trung commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km136+700 - Km137+000	Change	Location change
			108	Km137+180	To the North 140m, Nghia Trung secondary school		Change	Location change
			109	Km137+700 - Km137+820	Cut through Phu Van 2 Hamlet - Nghia Trung commune, population density is low	Mostly are one-or-two-storey structure, Location in F/S is: Km138+000 - Km138+500	Change	Location change
			110	Km139+204	Cross the No.1A National Road			

DN-QN EXPRESSWAY PROJECT	**SOCIALIST REPUBLIC OF VIETNAM**
Stage: Detail Design	**Independence – Freedom – Happiness**
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Duy Xuyen, 26 September 2012

MINUTES OF MEETING

DANANG-QUANG NGAI EXPRESSWAY PROJECT

Stage: Detail Design

TIME AND VENUE:

1. **Time:** 8h30 – 11h30, 26 Sep 2012;
2. **Venue:** Office of Culture – Sport – Tourism, Duy Xuyen District.

PARTICIPANTS:

1. **Employer - PMU85**
   - 1.1. Ms Huynh Thi Ngoc Hoa – Deputy Director
2. **Representatives of Department of Culture and Communication, Quang Nam Province**
   - 2.1. Mr. Ho Xuan Tinh – Deputy Director
   - 2.2. Mr. Ho Xuan Rinh – Head of Specialized Department - Relics Management Center
3. **Duy Xuyen District**
   - 3.1. Ms. Luu Thi Hien Phuong – Head of Division of Culture – Sport – Tourism;
   - 3.2. Mr. Nguyen Truong Son – Party Secretary of Duy Trinh PC;
   - 3.3. Mr. Luu Cong Nam – Vice Chairman of Duy Trinh PC;
   - 3.4. Mr. Ngo Mai – Expert on land administrative, Duy Trinh commune;
   - 3.5. Ms. Nguyen Thi Tuyet – Expert of Division of Culture – Sport – Tourism;
   - 3.6. Ms. Ngo Thi Lan - Expert of Division of Culture – Sport – Tourism;
   - 3.7. Mr. Pham Hung - Expert of Division of Culture – Sport – Tourism;
4. **Representatives of D/D Consultant**
   - 4.1. Mr. Minami Yasuhira – Environmental Specialist;
   - 4.2. Mr Ngo The Hung – Environmental Specialist;
   - 4.3. Mr. Pham The Giang - Environmental Specialist.

RESULTS :

After checking site and studying the related documents, participants of the meeting agreed that:

- The Expressway alignment does avoid to encroach the designated conservation area of Trien Tranh Ruin;
- The distance from the designated conservation area of Trien Tranh Ruin to the demarcation line of land acquisition (ROW line) is about 70m.

PROPOSALS:

- Mr. Ho Xuan Tinh, Vice Director: agrees that the Project's alignment will run through the location as planned. However, the test excavation is required within the Project's ROW (at the concerned road section). Department of Culture and Communication (of Quang Nam Province) may take responsibility in overseeing the test excavation. The test excavation may take about one month. The test excavation shall be carried out as soon as possible to ensure that there will be sufficient time to undertake necessary actions in case of artifacts/remains are detected.
- Ms. Luu Thi Hien Phuong – Head of Division of Culture – Sport – Tourism of Duy Xuyen District: the Trien Tranh relic is being buried underground. The scope of the relic has not been clearly defined yet. Therefore, the test excavation is required.
- Mr. Nguyen Truong Son – Party Secretary of Duy Trinh Commune: This is a relic designated by the province. Demarcation of the protection area was made based on a limited number of artifacts found on the ground. Therefore, the test excavation is very necessary. Besides, during construction, the Project Owner is requested to strictly supervise the construction works, and apply the (proper) procedure if any remain/artifact is discovered.
- Ms. Huynh Thi Ngoc Hoa – PMU85: PMU would like to receive all comments raised by the local authorities and will report to competent agencies for proper solutions.

The Minutes are prepared in 5 copies with same legal value, one for each related party.

PMU85

(with signature)

Ms. Huynh Thi Ngoc Hoa

Department of Culture and Communication, Quang Nam Province

(with signature)

Mr. Ho Xuan Tinh

Division of Culture – Sport – Tourism, Duy Xuyen District

(with signature)

Ms. Luu Thi Hien Phuong

D/D Consultant

(with signature)

Mr. Yasuhira Minami

Duy Trinh Commune PC

(with signature)

Luu Cong Nam

DỰ ÁN ĐƯỜNG CAO TỐC ĐN-QN	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Giai đoạn: Thiết kế kỹ thuật	**Độc lập – Tự do – Hạnh Phúc**
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Duy Xuyên, ngày 26 tháng 9 năm 2012

BIÊN BẢN HỌP

DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG - QUẢNG NGÃI

Giai đoạn: Thiết kế kỹ thuật

THỜI GIAN, ĐỊA ĐIỂM:

1. **Thời gian họp:** 8h30 – , ngày 26/9/2012;
2. **Địa điểm họp:** Phòng Văn hóa – Thể thao – Du lịch huyện Duy Xuyên.

THÀNH PHẦN THAM DỰ:

1. **Đại diện Chủ đầu tư – Ban QLDA 85**

   1.1. Bà: Huỳnh Thị Ngọc Hoa – Phó Giám đốc Ban điều hành.

2. **Đại diện sở Văn hóa – Thể thao – Du lịch tỉnh Quảng Nam**

   2.1. Ông: Hồ Xuân Tịnh – Phó Giám đốc Sở.

   2.2. Ông: Hồ Xuân Rinh – Trưởng phòng nghiệp vụ - Trung tâm quản lý di tích

3. **Huyện Duy Xuyên**

   3.1. Bà: Lưu Thị Hiền Phương – Trưởng phòng VHTTDL;

   3.2. Ông: Nguyễn Trường Sơn – Bí thư đảng ủy xã Duy Trinh;

   3.3. Ông: Lưu Công Nam – Phó Chủ tịch UBND xã Duy Trinh;

   3.4. Ông: Ngô Mại – Chuyên viện địa chính xã Duy Trinh;

   3.5. Bà: Nguyễn Thị Tuyết – Chuyên viên văn hóa phòng VHTTDL;

   3.6. Bà: Ngô Thị Lan - Chuyên viên văn hóa phòng VHTTDL;

   3.7. Ông: Phạm Hùng - Chuyên viên văn hóa phòng VHTTDL.

4. **Đại diện Tư vấn thiết kế**

   4.1. Ông: Minami Yasuhira – Chuyên gia môi trường;

   4.2. Ông: Ngô Thế Hùng – Chuyên gia môi trường;

   4.3. Ông: Phạm Thế Giang - Chuyên gia môi trường.

KẾT QUẢ THỐNG NHẤT:

Sau khi đi kiểm tra hiện trường và nghiên cứu các tài tiệu có liên quan, các thành viên dự họp thống nhất một số nội dung như sau:

- Hướng tuyến đường cao tốc đã tránh được phạm vi bảo tồn đã được công nhận của di tích Triền Tranh.

– Khoảng cách từ khu bảo tồn di tích tới mốc GPMB của Dự án là khoảng 70m.

KIẾN NGHỊ CỦA CÁC BÊN:

- Ông Hồ Xuân Tịnh – PGĐ Sở: Nhất trí về mặt chủ trương việc hướng tuyến đi qua vị trí đã xác định, tuy nhiên cần phải tiến hành đào thám sát trong phạm vi GPMB của Dự án. Chủ trì đào thám sát sẽ do Sở Văn hóa, Thể thao và Du lịch đảm nhiệm. Công tác thám sát có thể triển khai dọc theo phạm vi GPMB, thời gian thực hiện kéo dài khoảng 1 tháng. Việc đào thám sát cần được tiến hành sớm để trong trường hợp phát lộ di tích còn có đủ thời gian để sử lý.
- Bà Lưu Thị Hiền Phương – Trưởng phòng VHTTDL huyện Duy Xuyên. Di tích Triền Tranh nằm trong lòng đất, chưa thể xác định được phạm vi cụ thể nên việc đào thám sát là hết sức cần thiết.
- Ông Nguyễn Trường Sơn – Bí thư đảng ủy xã Duy Trinh. Di tích cấp tỉnh đã được công nhận. Phạm vi bảo tồn đã được khoanh vùng mới chỉ trên cơ sở một số phát lộ trên mặt đất, do vậy công tác thám sát là hết sức cần thiết. Ngoài ra, trong quá trình thi công Chủ đầu tư cần có các qui định chặt chẽ về việc quản lý thi công và có quy trình sử lý trong trường hợp phát lộ.
- Bà Huỳnh Thị Ngọc Hoa – PMU85. Ban quản lý dự án ghi nhận toàn bộ các ý kiến đề xuất của địa phương và sẽ trình vấn đề này tới các cơ quan quản lý có thẩm quyền để giải quyết.

Biên bản được lập thành 5 bản có giá trị pháp lý như nhau. Mỗi bên liên quan giữ 01 bản.

Đại diện Ban QLDA 85	**Đại diện sở Văn hóa, Thể thao, Du lịch**
	Hồ Xuân Tịnh
Đại diện phòng VHTTDL Duy Xuyên	**Đại diện Tư vấn thiết kế**
TRƯỞNG PHÒNG	
PHÒNG VĂN HOÁ VÀ THÔNG TIN	
Lưu Thị Hiền Phương	Yasuhira Minami
Đại diện UBND xã Duy Trinh	

UỶ BAN NHÂN DÂN TỈNH QUẢNG NAM	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM **Độc lập - Tự do - Hạnh phúc**
Số: 754 /QĐ-UBND	*Tam Kỳ, ngày 13 tháng 3 năm 2006*

QUYẾT ĐỊNH
Về việc xếp hạng di tích cấp tỉnh

CHỦ TỊCH UỶ BAN NHÂN DÂN TỈNH QUẢNG NAM

Căn cứ Luật Tổ chức HĐND và UBND ngày 26 tháng 11 năm 2003;

Căn cứ Luật Di sản Văn hóa đã được Quốc hội nước Cộng hòa xã hội chủ nghĩa Việt Nam khóa X, kỳ họp thứ 9 thông qua ngày 29/6/2001 và Nghị định số 92/2002/NĐ-CP ngày 11/11/2002 của Chính phủ quy định chi tiết thi hành một số Điều của Luật Di sản Văn hóa;

Theo đề nghị của Giám đốc Sở Văn hóa - Thông tin tại Tờ trình số 54/TTr-VHTT ngày 09 tháng 3 năm 2006,

QUYẾT ĐỊNH:

Điều 1. Xếp hạng di tích cấp tỉnh cho các di tích sau đây của huyện Duy Xuyên:

1. Di tích lịch sử: **Nơi thành lập chi bộ Đảng đầu tiên huyện Duy Xuyên,** thôn Phước Mỹ, thị trấn Nam Phước, huyện Duy Xuyên, tỉnh Quảng Nam.

2. Di tích lịch sử: **Đồn Hòn Bằng** - Thôn 1, xã Duy Sơn, huyện Duy Xuyên, tỉnh Quảng Nam.

3. Di tích lịch sử: **Chùa Thanh Lương** - Thôn 1, xã Duy Hải, huyện Duy Xuyên, tỉnh Quảng Nam.

4. Di tích lịch sử: **Văn miếu huyện Duy Xuyên** - Khối phố Long Xuyên I, thị trấn Nam Phước, huyện Duy Xuyên, tỉnh Quảng Nam.

5. Di tích lịch sử: **Mộ Lê Quý Công (mộ tiền hiền Mỹ Xuyên)** - Thôn Xuyên Đông, thị trấn Nam Phước, huyện Duy Xuyên, tỉnh Quảng Nam.

6. Di tích lịch sử: **Chiến thắng đường 104 (610)** - thị trấn Nam Phước, huyện Duy Xuyên, tỉnh Quảng Nam.

7. Di tích lịch sử: **Chiến thắng Đức Dục - An Hoà** - Thôn Phú Đa 2, xã Duy Thu, huyện Duy Xuyên, tỉnh Quảng Nam.

8. Di tích khảo cổ: **Khu tháp Gò Lồi** - Thôn 1 (Chiêm Sơn), xã Duy Trinh, huyện Duy Xuyên, tỉnh Quảng Nam.

9. Di tích khảo cổ: **Gò Gạch** - Thôn 1 (Chiêm Sơn), xã Duy Trinh, huyện Duy Xuyên, tỉnh Quảng Nam.

10. Di tích khảo cổ: **Triền Tranh** - Thôn 1 (Chiêm Sơn), xã Duy Trinh, huyện Duy Xuyên, tỉnh Quảng Nam.

11. Di tích khảo cổ: **Chùa Vua** - Thôn 1 (Chiêm Sơn), xã Duy Trinh, huyện Duy Xuyên, tỉnh Quảng Nam.

12. Di tích khảo cổ: **Cảng Trung Phường** - Thôn 1 và thôn 5, xã Duy Hải, huyện Duy Xuyên, tỉnh Quảng Nam.

Điều 2. Ủy ban nhân dân các cấp nơi có di tích được xếp hạng tại Điều 1 quyết định này trong phạm vi nhiệm vụ và quyền hạn của mình thực hiện việc quản lý Nhà nước đối với các di tích trên theo luật định.

Điều 3. Chánh Văn phòng UBND tỉnh, Giám đốc Sở Văn hóa Thông tin, Chủ tịch UBND huyện Duy Xuyên, Thủ trưởng các cơ quan, đơn vị và các tổ chức, cá nhân có liên quan chịu trách nhiệm thi hành Quyết định này.

Quyết định này có hiệu lực kể từ ngày ký.

CHỦ TỊCH

Nguyễn Xuân Phúc

Nơi nhận:
- Như Điều 3;
- TT HĐND, UBND tỉnh
- Lưu VT, VX (Viện).

FILES-SERVERS VAN XA Vanxa Vien Quyet dinh Nam 2006 QD-XHDT-DX 10-3-26.doc

LÝ LỊCH DI TÍCH

1-Tên gọi Di Tích :

Nền tháp Triền Tranh

2-Địa chỉ, vị trí, đường đi đến

Di tích nền tháp Triền Tranh là di tích khảo cô học nằm trong nhóm phế tích Champa ở thung lũng Chiêm Sơn tây , thuộc thôn 1 xã Duy Trinh , nay là thôn Chiêm Sơn xã Duy trinh , huyện Duy Xuyện tỉnh Quảng Nam

Từ ngã ba Nam Phước thẳng hướng tây theo đường ĐT 610 khoảng 10 km đến chợ Giỏ xã Duy Trinh , Rẽ trái theo đường bê tông khoảng 2km là đến di tích .

3-Sự kiện Di tích :

Nằm ở phía Tây kinh đô Trà Kiệu , nhóm phế tích Chăm ở thung lũng Chiêm Sơn tây đã bị sụp đổ hoàn toàn , nay chỉ còn lại phần móng , gạch đổ và rất nhiều hiện vật đá điêu khắc , có kích thước lớn, đặc biệt là bệ đá cố chạm voi 4 mặt rất tinh xảo và độc đáo ...

Căn cứ vào những đồ trang trí kiến trúc còn lại , các nhà nghiên cứu cho rằng nhóm kiến trúc ở thung lũng chiêm sơn tây có niên đại từ cuối thế kỷ X đến đầu thế kỷ XI, dường như chúng có liên quan đến khu kinh thành Trà Kiệu.

4-Khảo tả Di tích :

Di tích nền tháp Triền Tranh nằm sát chân núi Úc Đạp về phía Động nam của thung lũng Chiêm sơn tây .Kiến trúc này bị sụp đổ từ lâu , tạo thành một gò cao khoảng 8m, đường kính khoảng 70m cho thấy, đây là một công trình kiến trúc lớn, được xây dựng trên một gò đất .Tại đây người ta đã phát hiện được nhiều hiện vật trang trí kiến trúc bằng đá sa thạch , đặc biệt đã phát hiện được 1 chiếc bệ đá kích thước lớn có trang trí hình voi 4 mặt và rất nhiều gạch Chăm .Hiện đang được lưu giữ tại Phòng VHTT-TT huyện Duy Xuyên

5-Loại hình Di Tích :

Khu nền tháp Triền Tranh là Di tích Khảo cổ học .

6-Trạng thái bảo quản:

Nền tháp Triền Tranh đã được các cấp chính quyền địa phương khoanh vùng bảo vệ ,nghiêm cấm mọi hành vi xâm phạm Di tích .

7-Cơ sở pháp lý :

Di tích khảo cổ học nền tháp Triền Tranh đã được UBND Tỉnh Quảng Nam ra Quyết định đăng ký bảo vệ theo quyết định số 1549/QĐ-UB ngày 15/8/1997.

8-Phương án bảo vệ ;

Di tích khảo cổ học nền tháp triền Tranh là Di Tích khảo cổ học có ý nghĩa quan trọng , và có mối liên quan đến khu kinh thành Trà Kiệu .Bộ phận chuyên môn và các cấp chính quyền địa phương tiếp tục bảo vệ nhằm phục vụ cho công tác nghiên cứu lâu dài.

Người lập hồ sơ

Ngô Thị Lan

TRƯỞNG PHÒNG VHTT-TT DUY XUYÊN

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
PHÒNG VĂN HÓA THÔNG TIN THỂ THAO
H. DUY XUYÊN T. QUẢNG NAM

Trịnh Sơn Hải

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập- Tự do- Hạnh Phúc

BIÊN BẢN KHOANH VÙNG BẢO VỆ .

Di tích : KCH Gò Triên Tranh
Địa điểm : Chấn 1 Xã Duy Trinh
Huyện Duy Xuyên

- Căn cứ Luật Di sản văn hoá được Quốc hội nước Cộng hoà xã hội chủ nghĩa Việt Nam khoá X , kỳ họp thứ 9 thông qua ngày 29/6/2001.

-Thi hành lệnh số 09/ 2001/ LCTN, ngày 12/ 7/ 2001 lệnh của Chủ Tịch nước về việc công bố Luật Di sản Văn hoá .

-Thực hiện Nghị định số 92/2002/NĐ-CP ngày 11/11/2002 của Chính phủ qui định chi tiết thi hành 1 số điều của Luật Di sản văn hoá.

Hôm nay, vào lúc 9 giờ, ngày 23 tháng 12 năm 2005
Tại: UBND Xã Duy Trinh
Chúng tôi gồm có :
1) Ông Thái Viết Cường - Giám Đốc Sở VHTT Quảng Nam
2) Ông Hồ Xuân Tịnh - Giám Đốc Bảo Tàng Quảng Nam
3) Ông Nguyễn Văn Khương - Phó Chủ Tịch UBND huyện
4) Ông Trịnh Sơn Hải - Trưởng Phòng VHTT huyện
5) Ông Hầu Công Cả - Chủ Tịch UBND Xã Duy Trinh
6) Ông Đặng Cang - Cán bộ địa Chính xã

Tiến hành xét chọn ,khảo sát khoanh vùng bảo vệ di tích nói trên .
Sau khi xem xét những điều kiện hội đủ của Di tích, chúng tôi cùng đi đến thống nhất .

1-Giá trị lịch sử khoa học của Di tích
Gò Triên Tranh nằm trong nhóm phế tích Chămpa ở Thung lũng Chiêm Sơn Tây. Có niên đại khoảng cuối thế kỷ X đến đầu Thế kỷ XI và có liên quan đến khu kinh đô Trà Kiệu. Đây là Di Tích Khảo cổ học quan trọng phục vụ cho công tác nghiên cứu lâu dài.

2-Qui định khu vực bảo vệ Di tích :

Với giá trị lịch sử như đã nêu ở phần trên ,di tích cần được bảo vệ được mất ta khoanh vùng bảo vệ , ngăn chặn mọi sự xâm phạm đối với di tích.

Khu vực bảo vệ là khu vực được (thống nhất) tô màu đỏ trên bản đồ khoanh vùng. Khu vực này nghiêm cấm mọi sự xây dựng hoặc vi phạm . Không mọi tổ chức hay cá nhân nào được tự ý xây dựng hay phá vỡ cảnh quan vốn có của di tích .

Diện tích khoanh vùng bảo vệ di tích là: 5000 m2

(Viết chữ: Năm ngàn m2)

-Đông giáp: Vườn Dưỡng

-Tây giáp : DT còn lại thửa 832a

-Nam giáp : DT còn lại thửa 832a thuộc Vườn Dưỡng

-Bắc giáp : DT còn lại thửa 832a

Biên bản này lập thành 03 bản, có giá trị như nhau, 01 bản để làm hồ sơ đề nghị cấp bằng di tích cấp tỉnh, 01 bản lưu tại hồ sơ Bảo tàng huyện, 01 bản giao cho địa phương.

Các bên thống nhất cùng ký tên.

UBND HUYỆN DUY XUYÊN
KT. CHỦ TỊCH
PHÓ CHỦ TỊCH

NGUYỄN VĂN KHƯƠNG

PHÒNG VHTT-TT

UBND XÃ........
CHỦ TỊCH

Lưu Công

SỞ VHTT TỈNH QUẢNG NAM
GIÁM ĐỐC
Thái Viết Tường

BẢO TÀNG QUẢNG NAM
GIÁM ĐỐC

HỒ XUÂN TỊNH

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

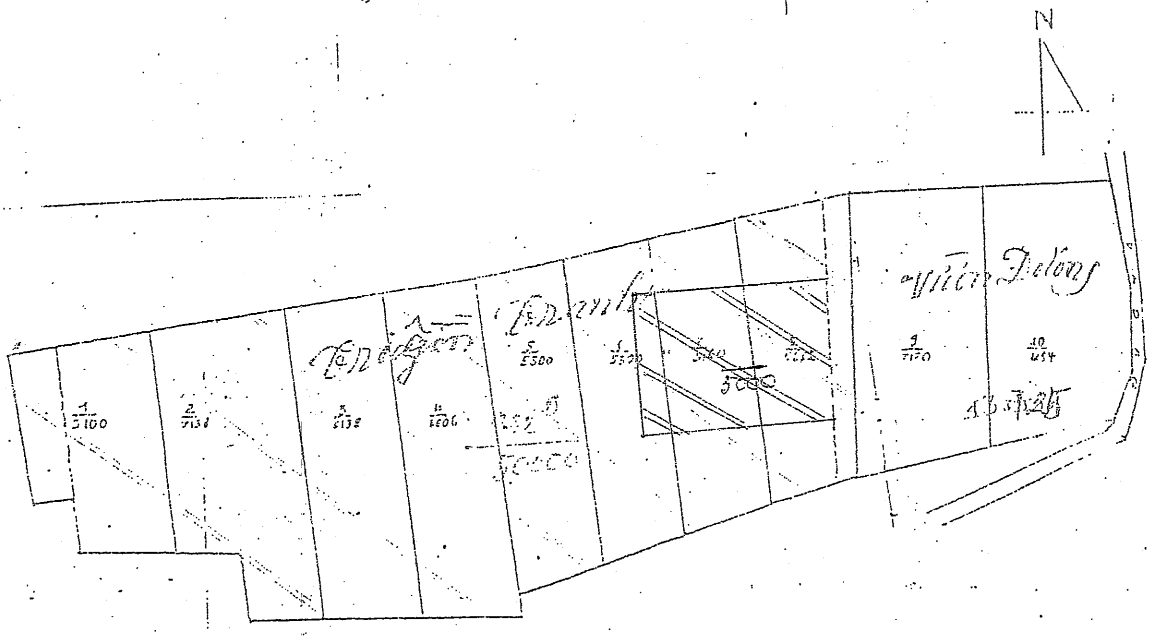
Độc lập-Tự do-Hạnh phúc

BẢN ĐỒ TRÍCH ĐO

(Kèm theo hồ sơ: Biên bản khoanh vùng bảo vệ di tích gò Chiêm Đành

Số: 400 /TNMT

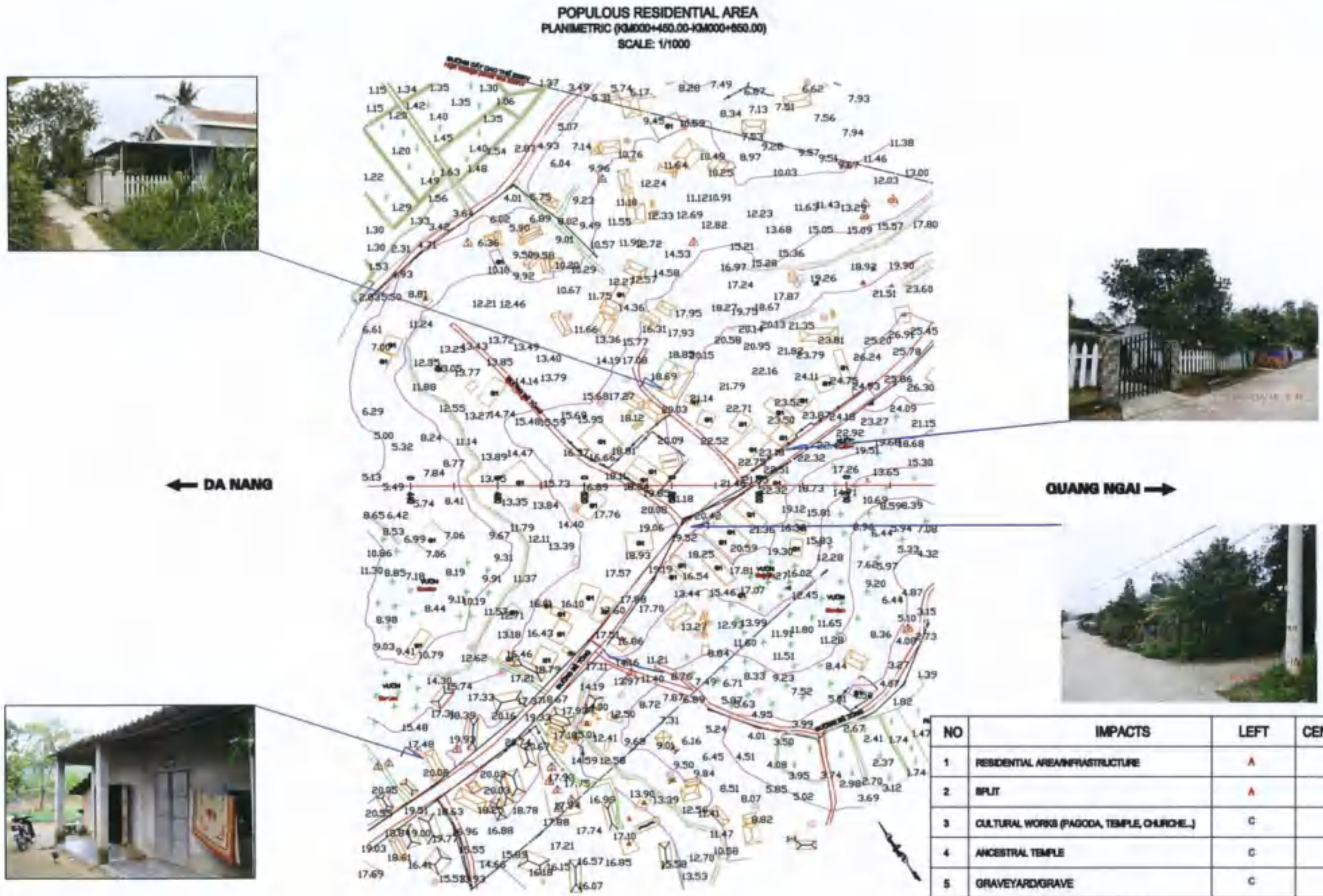
- Họ và tên chủ gia đình, cá nhân xin trích lục: ....
- Địa chỉ: Thôn Chiêm Sơn Tây
- Tờ bản đồ số: 11 Thửa số: 832 Diện tích: 5.0000 m²
- Thuộc xã, thị trấn: Duy Trinh Duy Xuyên



- Khoảng cách từ thửa đất vào đến đường chính..................m (tên đường..........................)
- Loại đường..Vị trí..........................
- Vị trí khu đất: ▨

Tỉ lệ: 1/1000

Người đo vẽ (Ký, ghi rõ họ tên)	UBND xã, thị trấn (Ký tên, đóng dấu)	PHÒNG TN-MT&KH-CN DUY XUYÊN Người kiểm tra (Ký, ghi rõ họ tên)	Trưởng phòng (Ký tên, đóng dấu)
Ngày / /	CHỦ TỊCH	Ngày 17 / / 2006	Ngày 17 / / 2006
Đặng Cang	Lưu Công Cả	Lê Văn Thái	



NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	C	C	C
5	GRAVEYARD/GRAVE	C	C	B
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
7	HEALTH WORKS (HOSPITAL, CLINIC,...)	C	C	C

A: SERIOUS NEGATIVE IMPACTS IS EXPECTED; B: NEGATIVE IMPACTS IS EXPECTED TO SOME EXTENT
C: LIMITED IMPACT/NEGLIGIBLE IMPACT

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	B	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	C	C	C
5	GRAVEYARD/GRAVE	C	C	C
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
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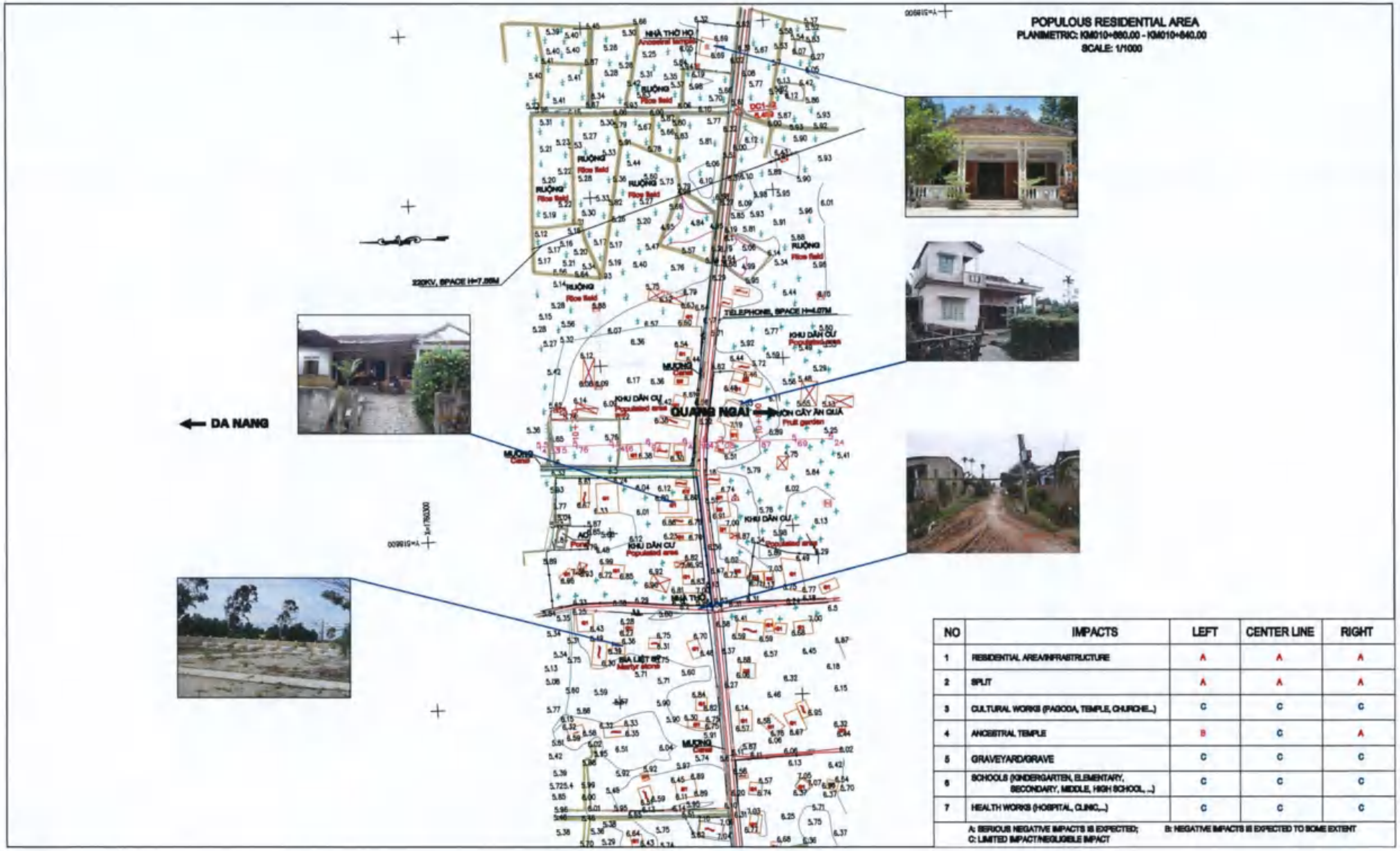

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	B	C	A
5	GRAVEYARD/GRAVE	C	C	C
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
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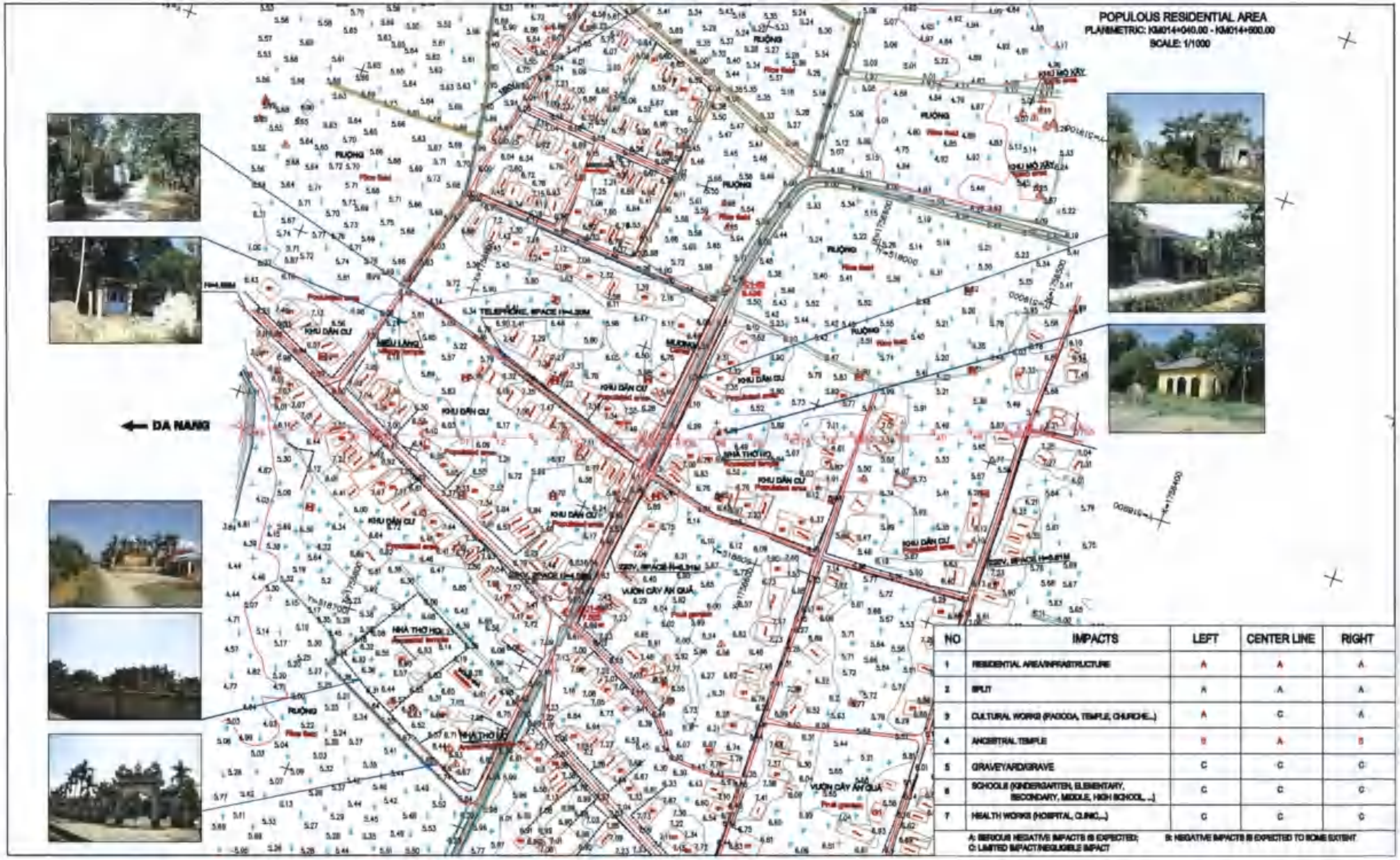

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	A	C	A
4	ANCESTRAL TEMPLE	B	A	B
5	GRAVEYARD/GRAVE	C	C	C
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
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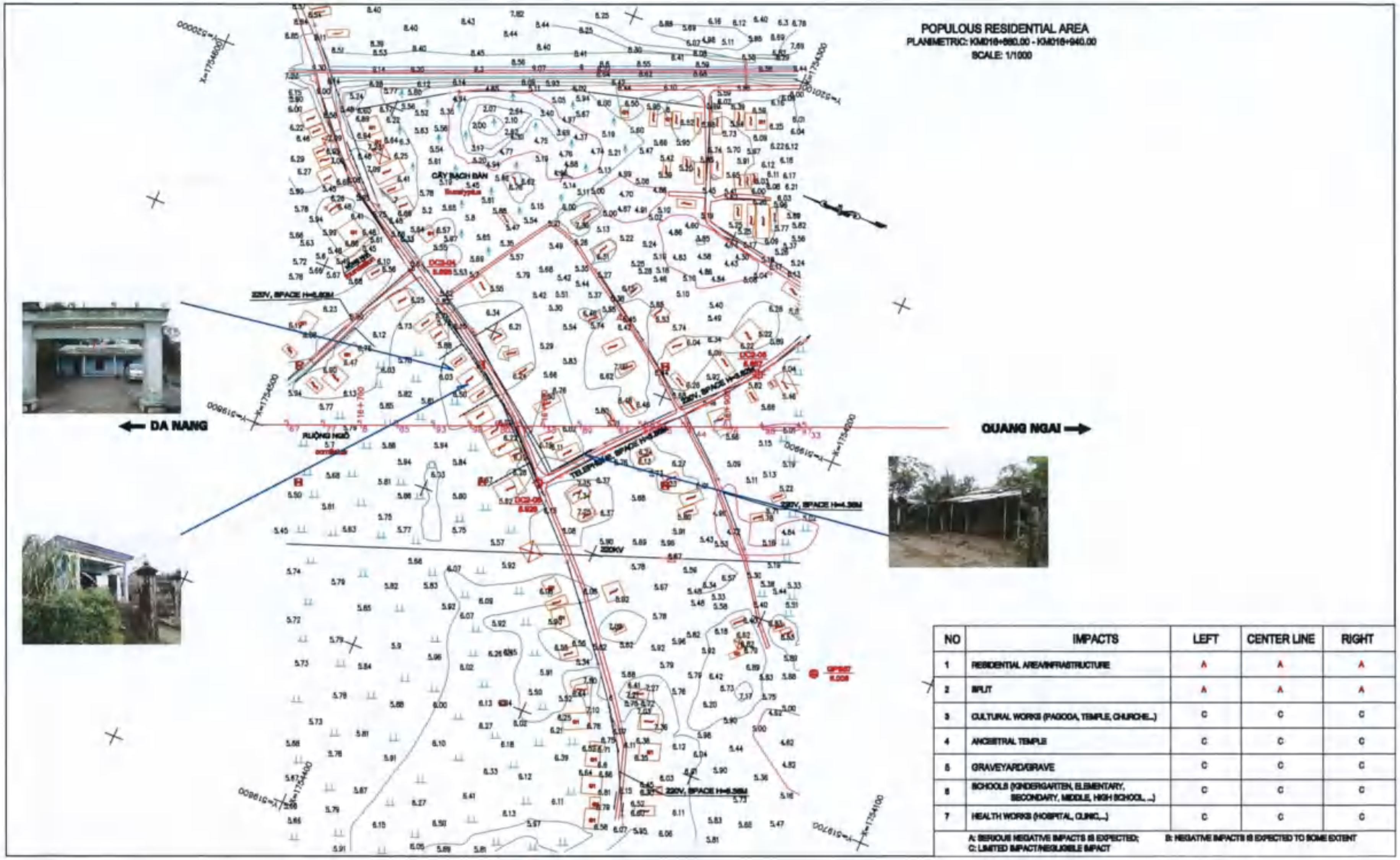

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
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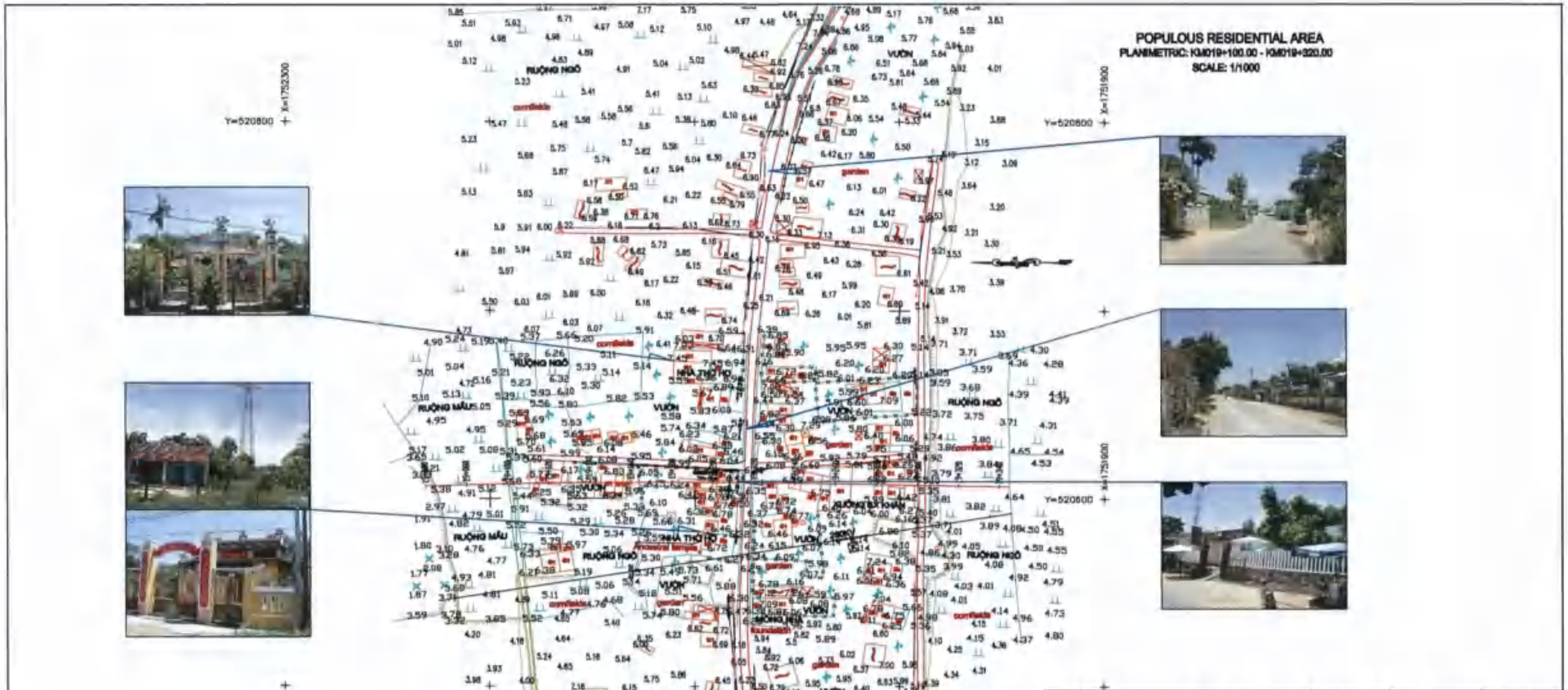

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
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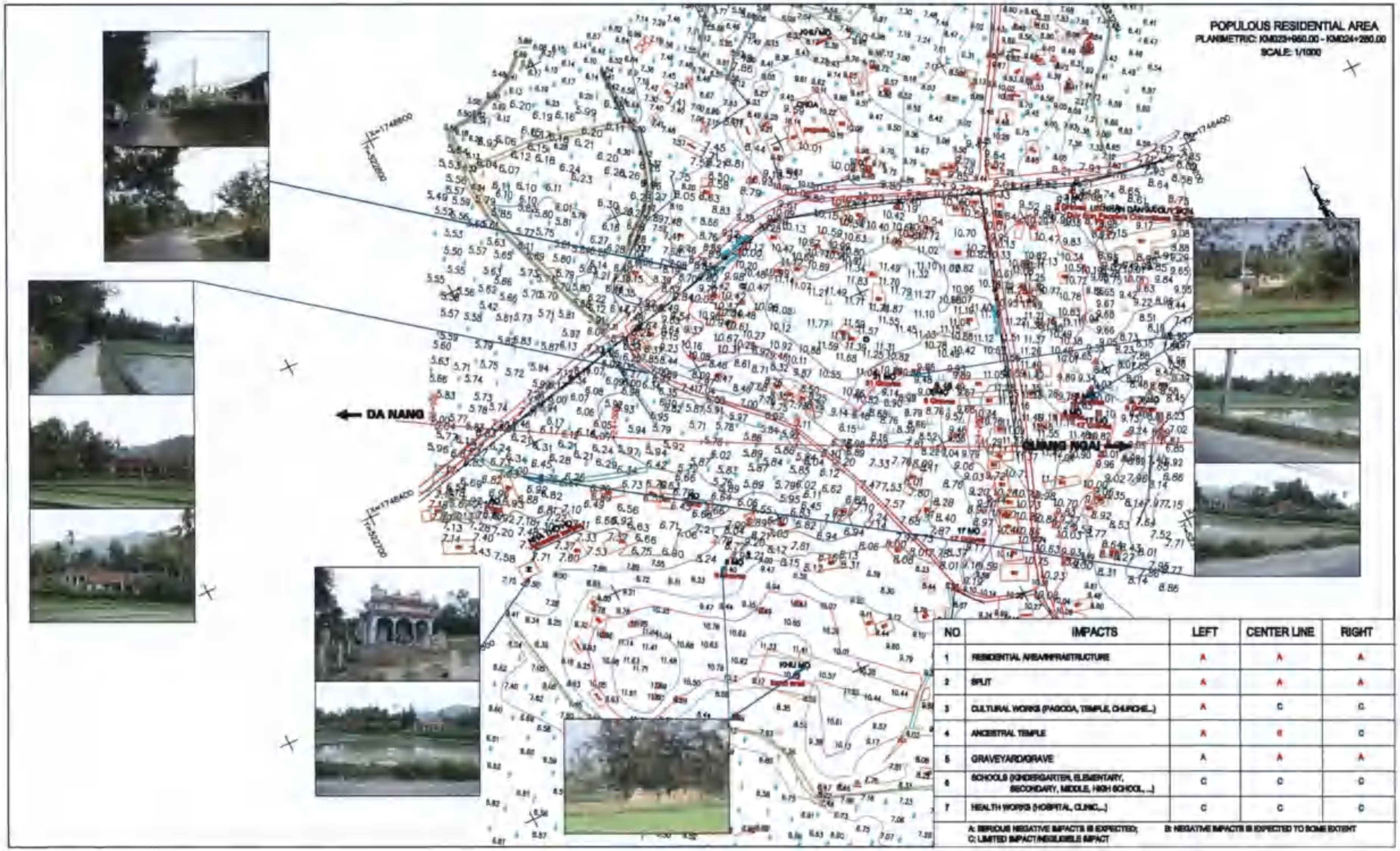

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	A	C	C
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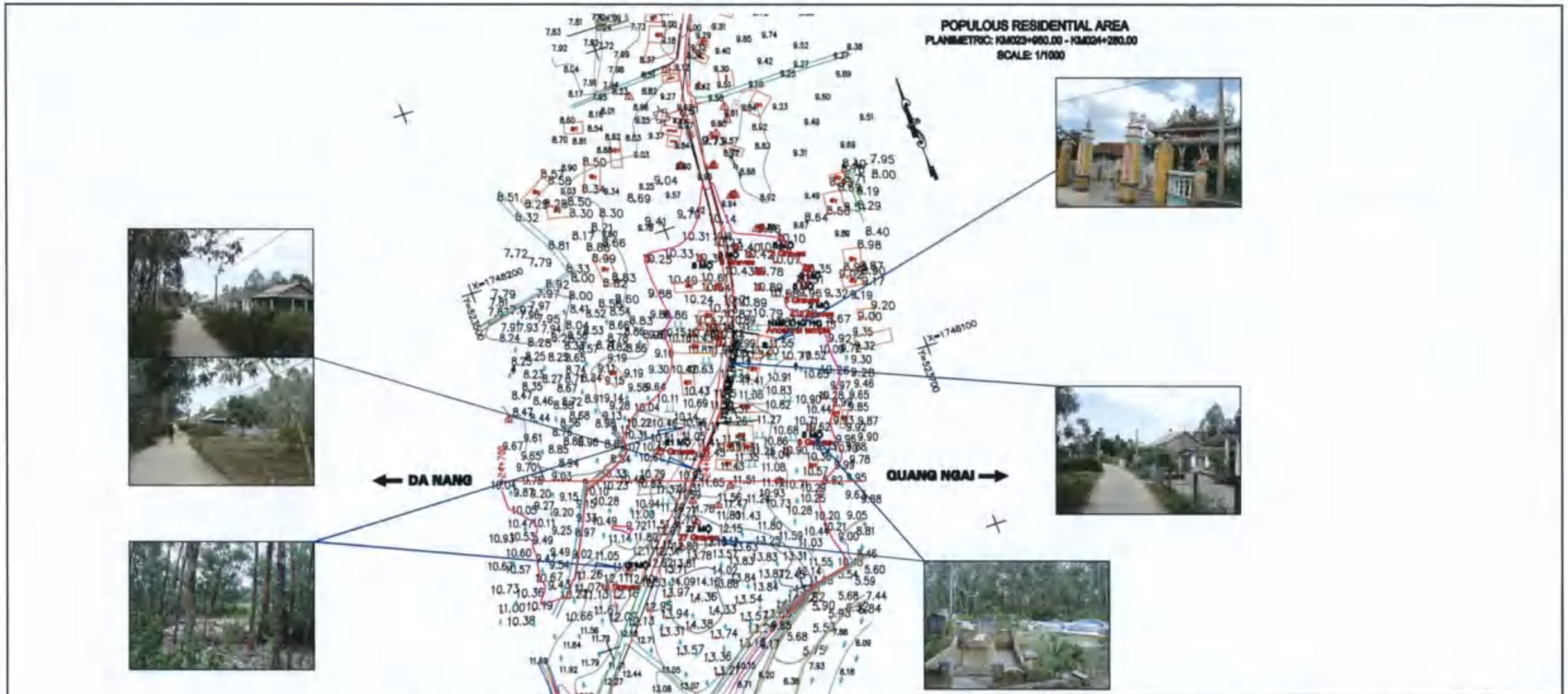

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	B	C
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	A	C	C
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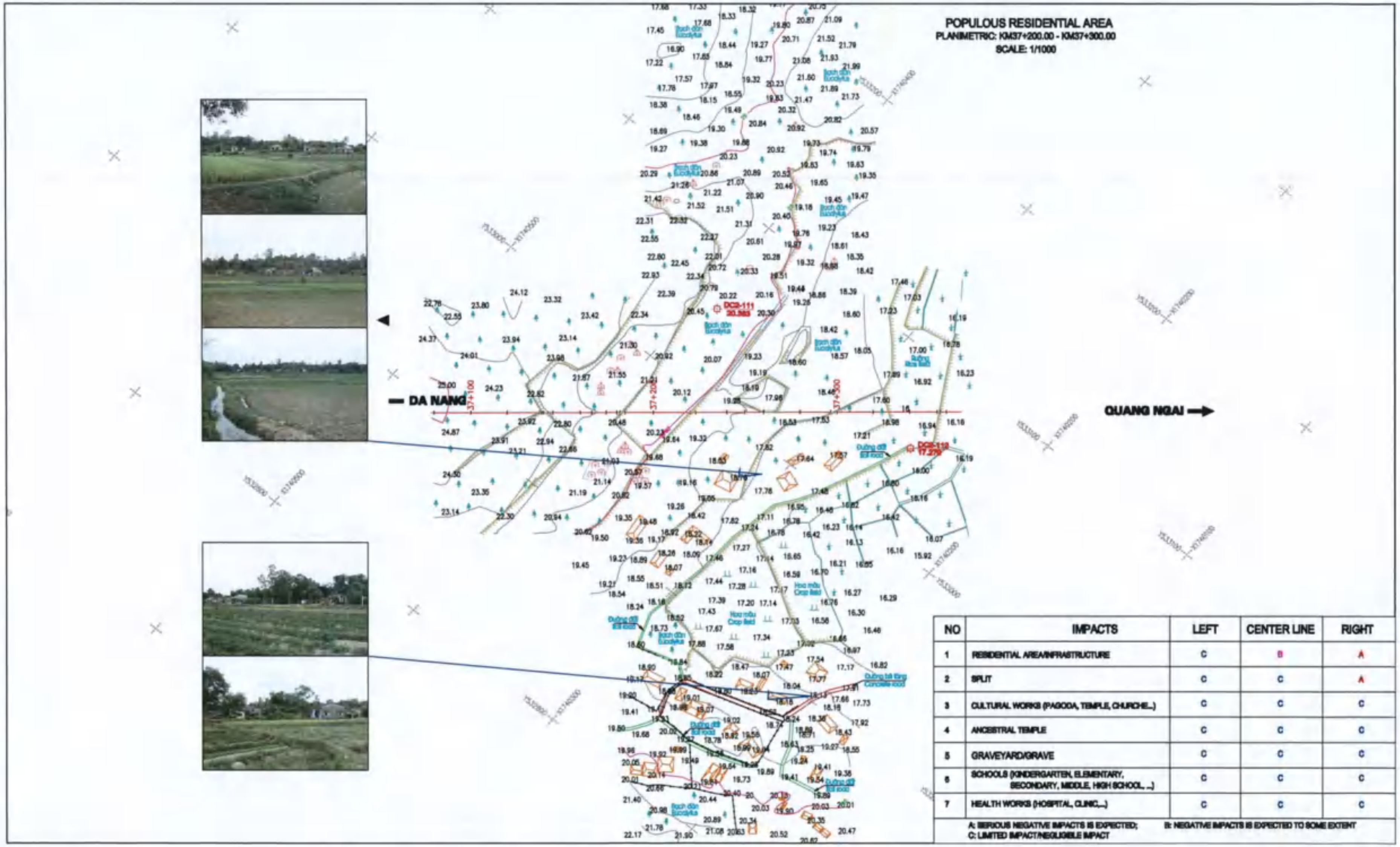

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1	RESIDENTIAL AREA/INFRASTRUCTURE	C	B	A
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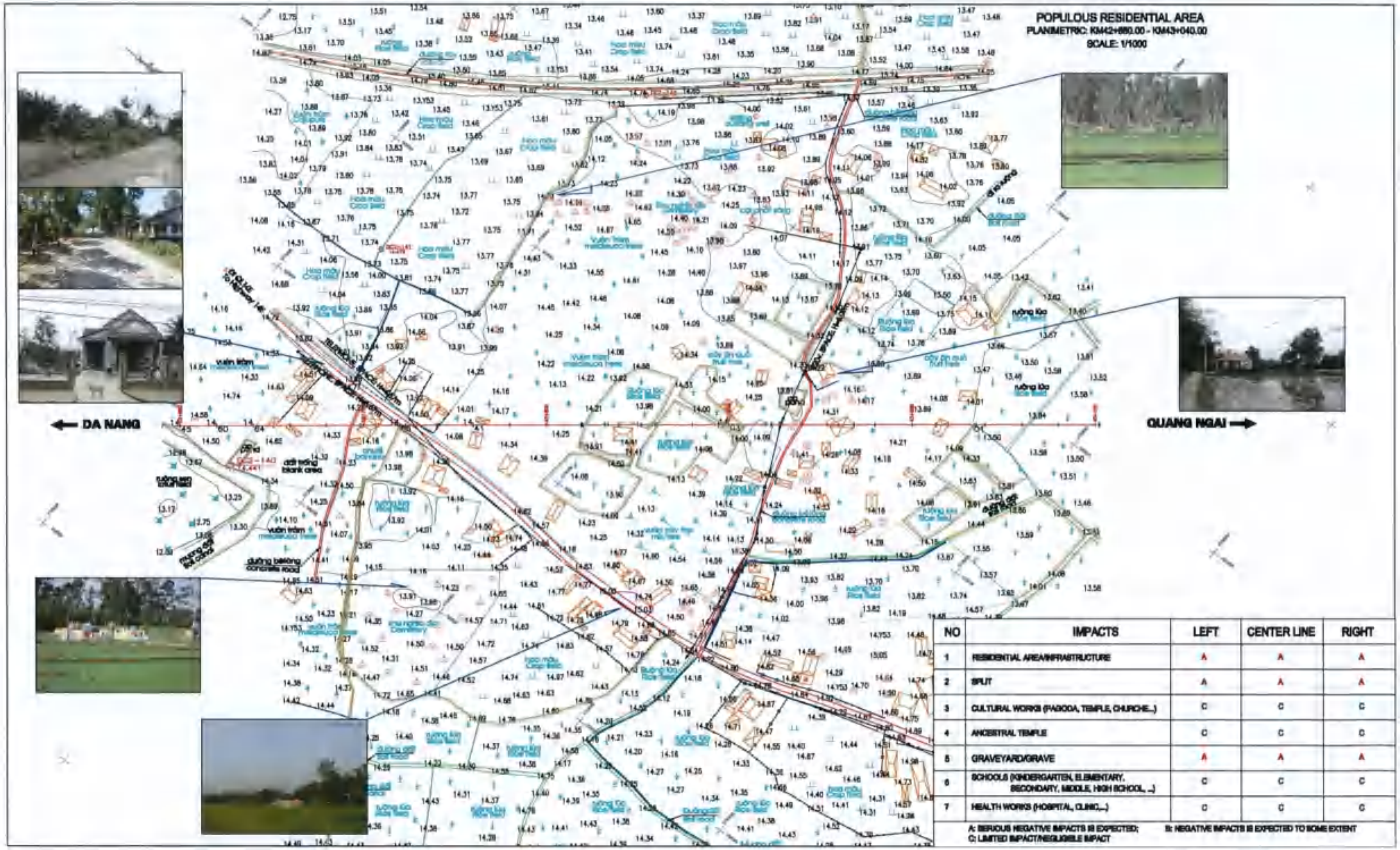

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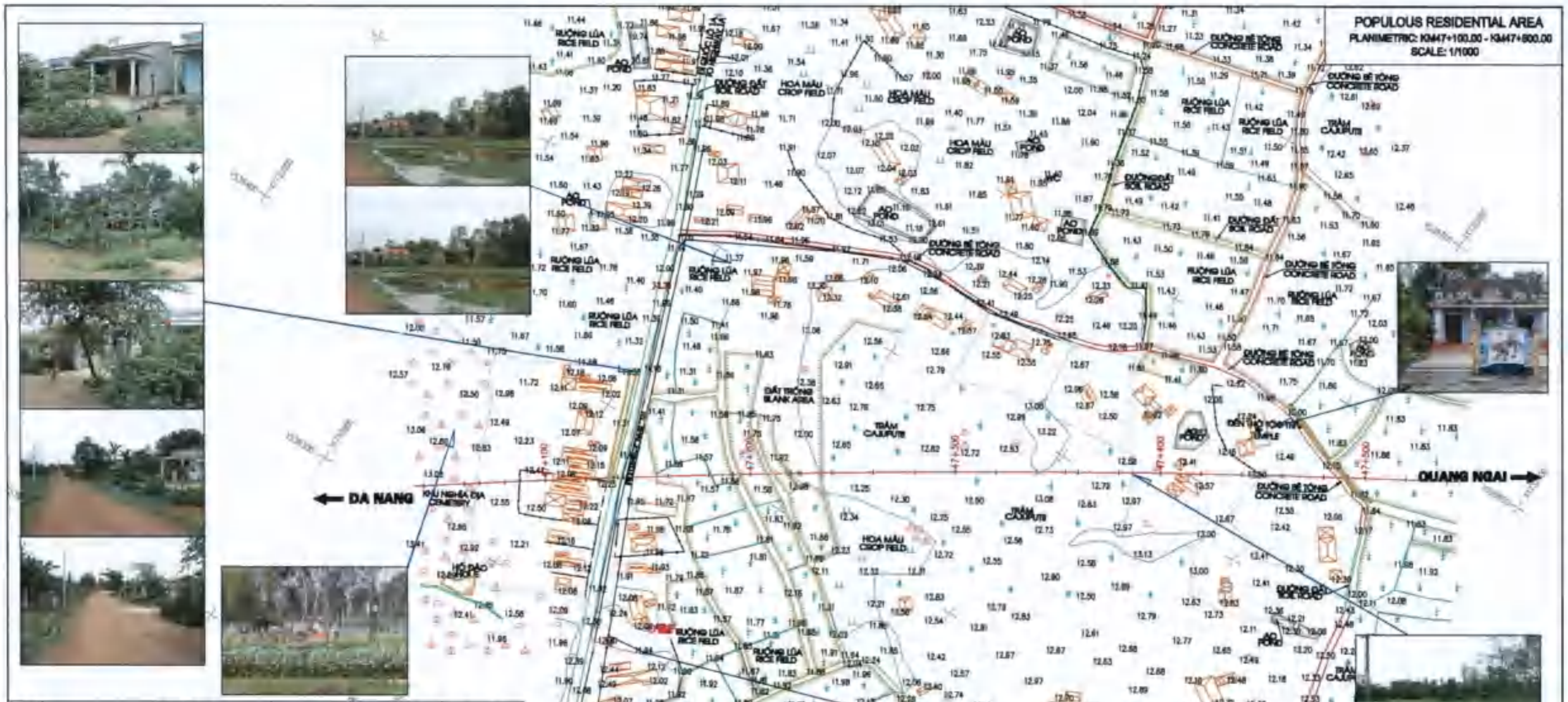

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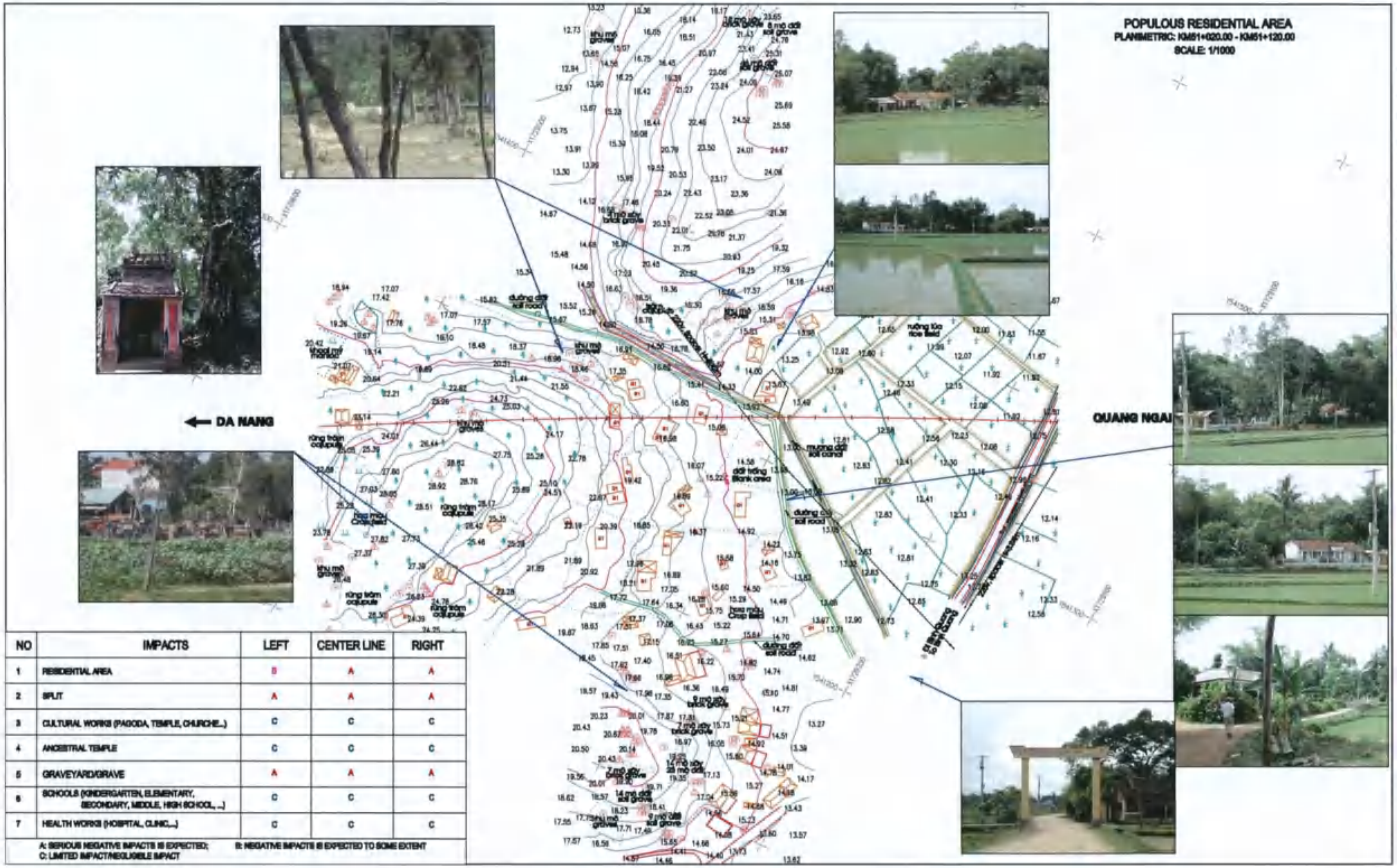

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA	B	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
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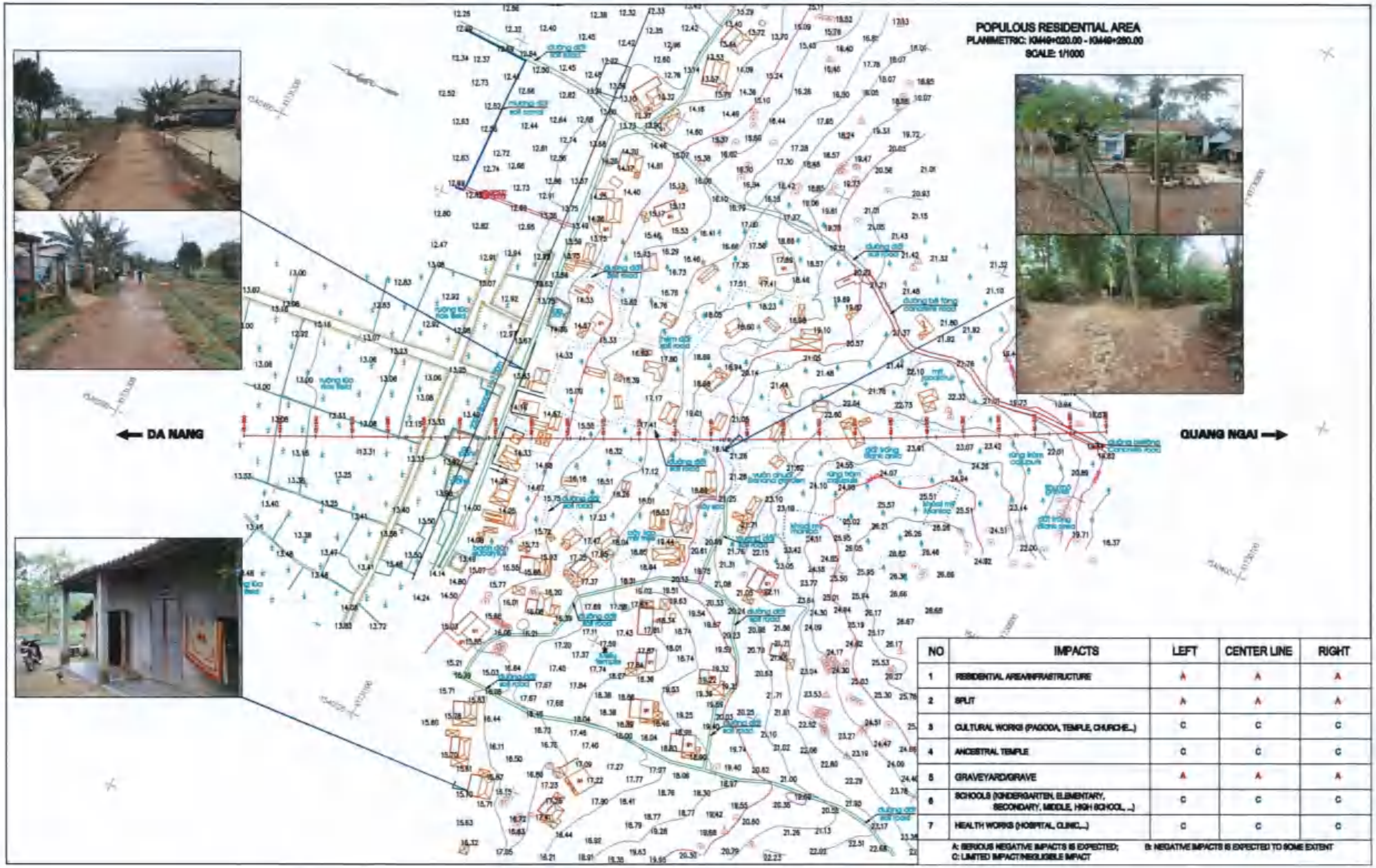
Appendix 5 Populous residential areas affected by the Expressway



NO	IMPACTS	LEFT	CENTER LINE	RIGHT
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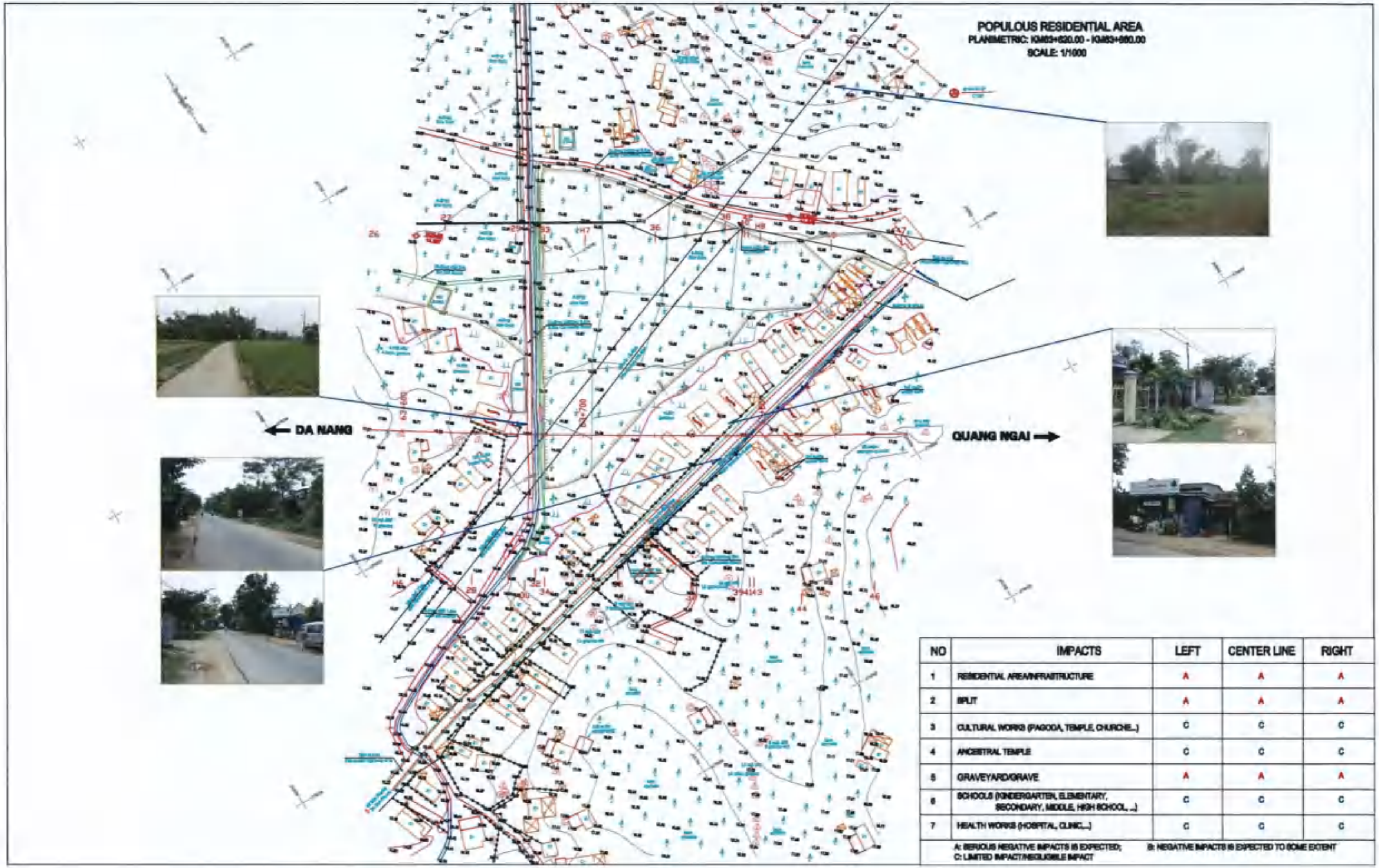

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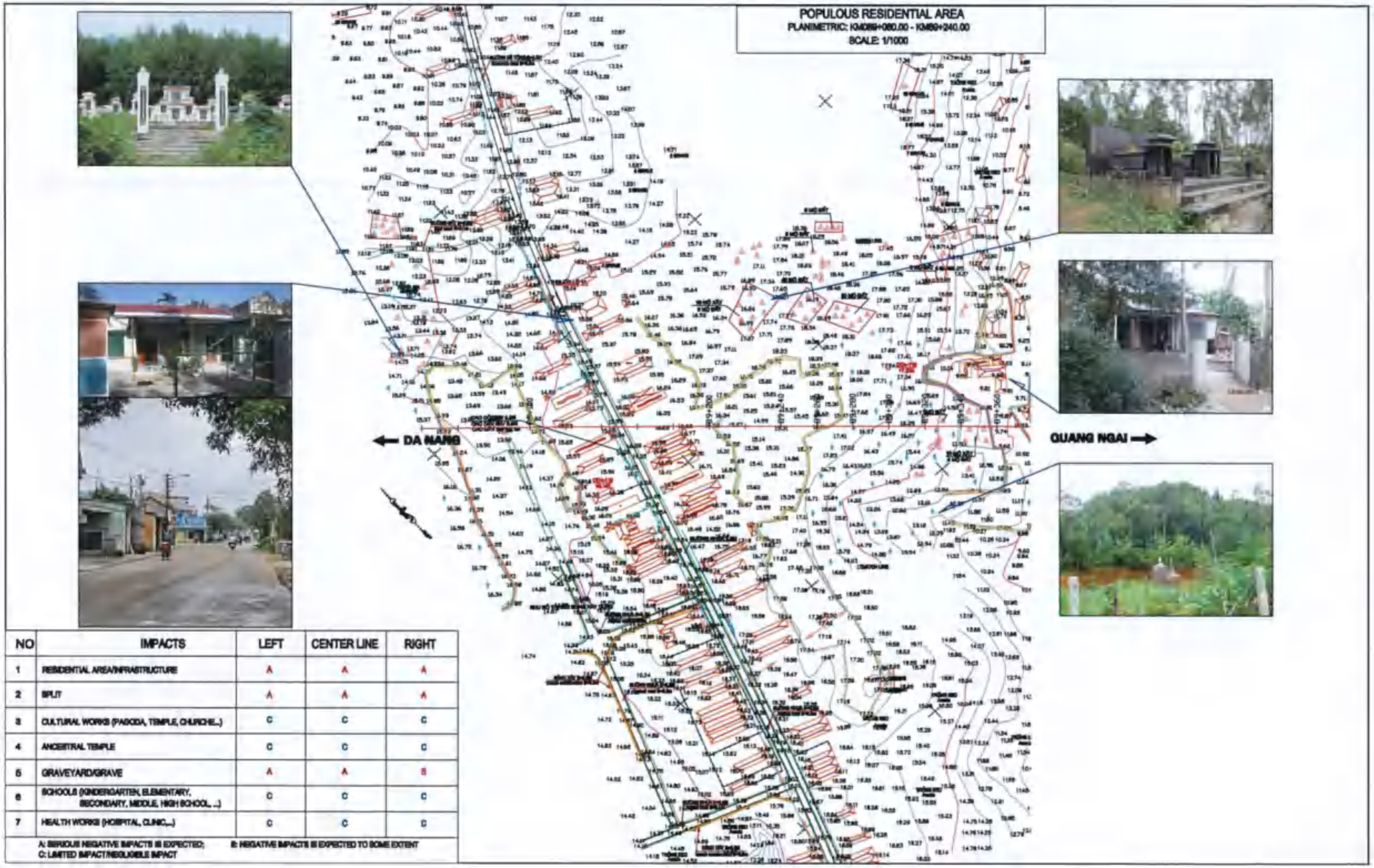

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2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	C	C	C
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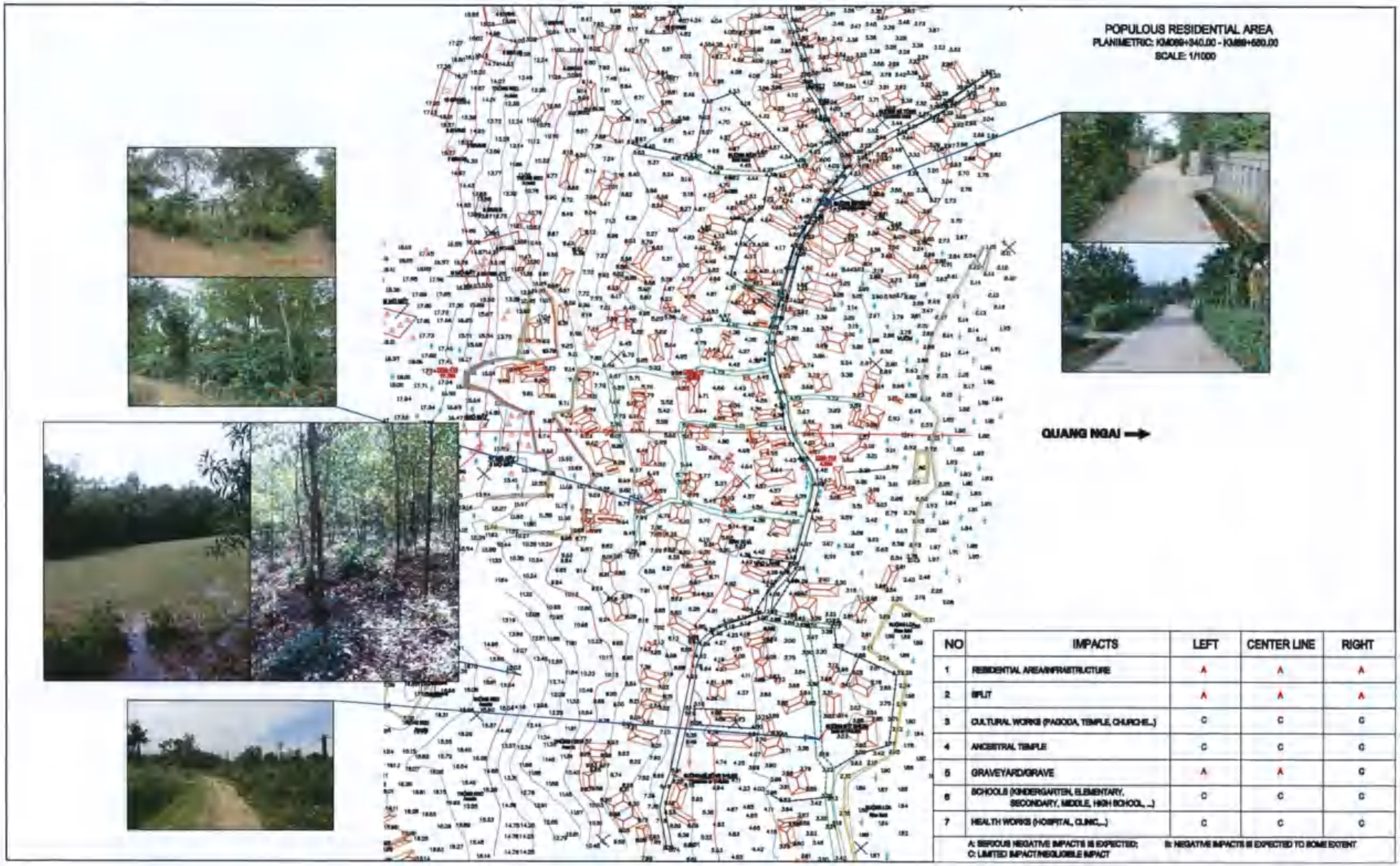

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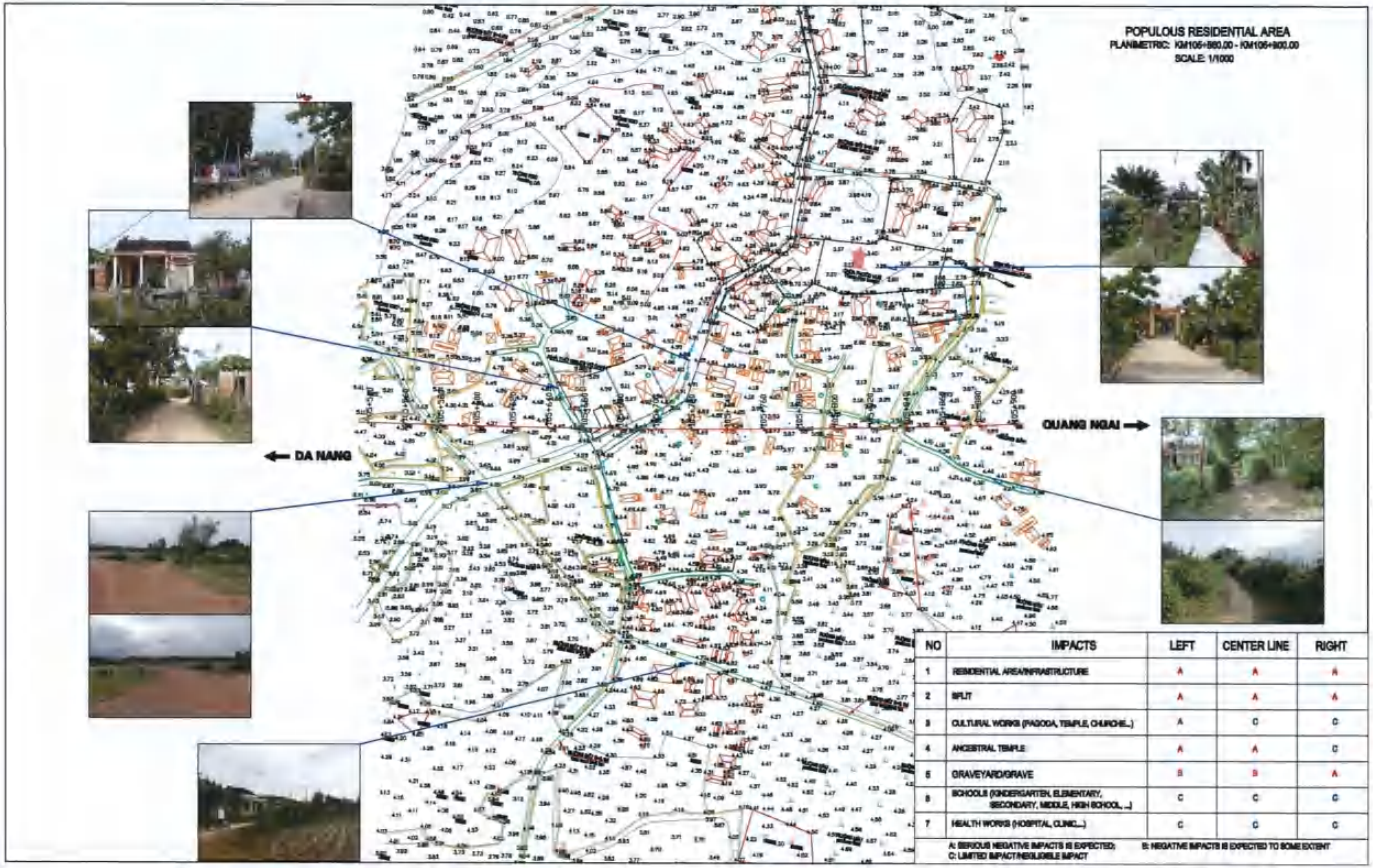
Appendix 5 Populous residential areas affected by the Expressway



NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	A	C	C
4	ANCESTRAL TEMPLE	A	A	C
5	GRAVEYARD/GRAVE	B	B	A
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
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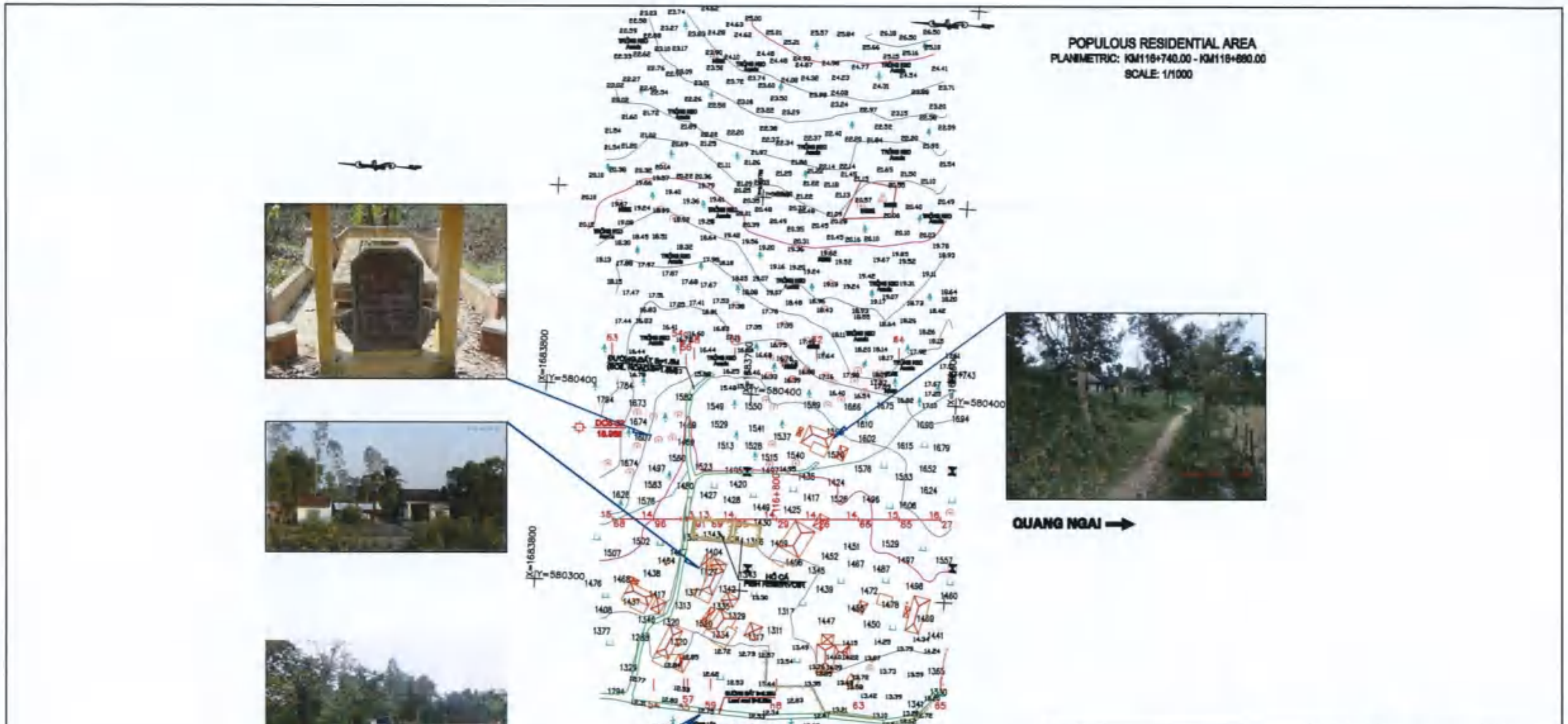
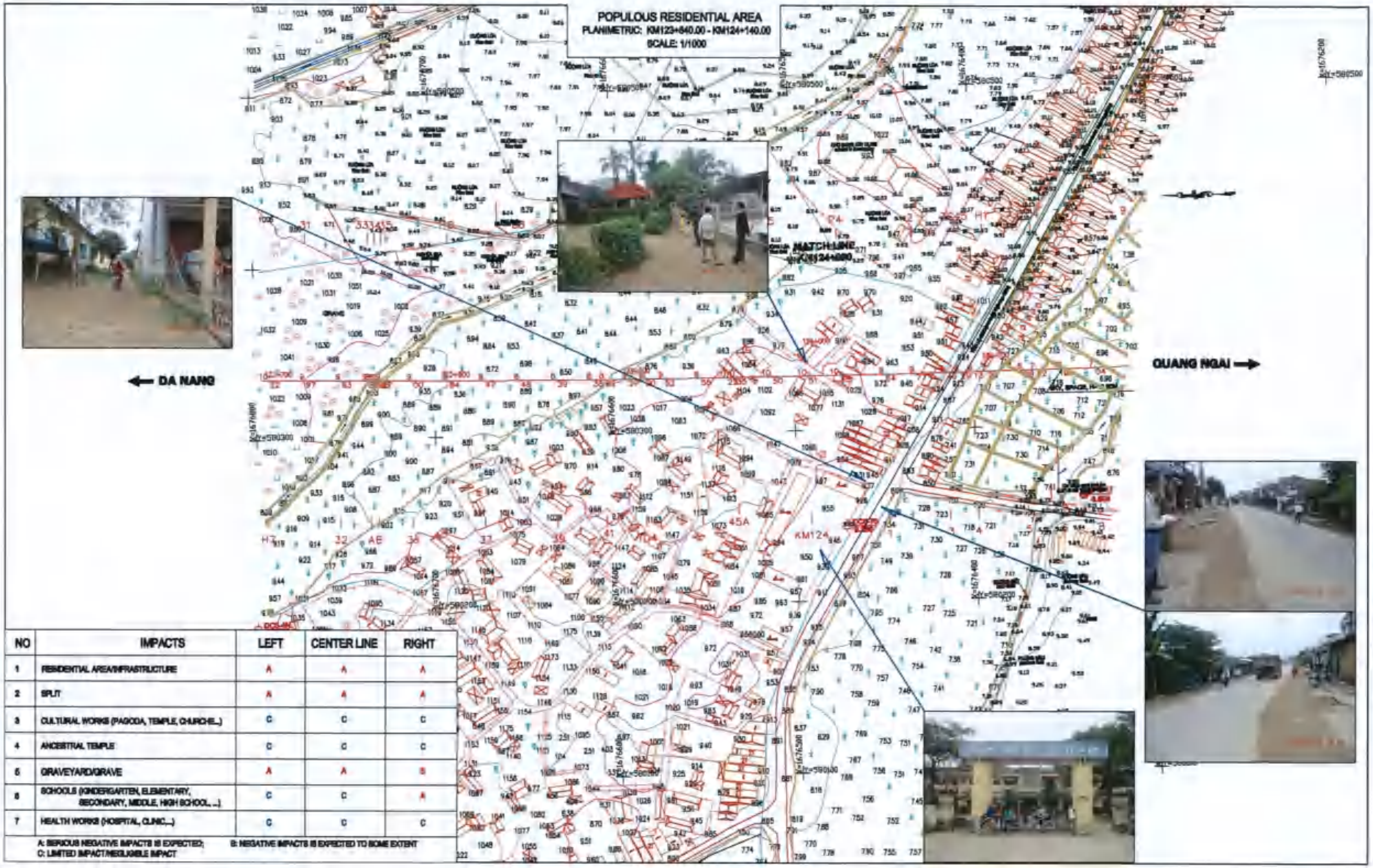
Appendix 5 Populous residential areas affected by the Expressway



NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	B	A	A
2	SPLIT	B	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	A
4	ANCESTRAL TEMPLE	C	C	C
5	GRAVEYARD/GRAVE	A	B	C
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
7	HEALTH WORKS (HOSPITAL, CLINIC,...)	C	C	C
	A: SERIOUS NEGATIVE IMPACTS IS EXPECTED; B: NEGATIVE IMPACTS IS EXPECTED TO SOME EXTENT C: LIMITED IMPACT/NEGLIGIBLE IMPACT			



NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
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5	GRAVEYARD/GRAVE	A	A	B
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A: SERIOUS NEGATIVE IMPACTS IS EXPECTED; B: NEGATIVE IMPACTS IS EXPECTED TO SOME EXTENT
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POPULOUS RESIDENTIAL AREA

PLANIMETRIC: KM128+750.00 - KM128+850.00

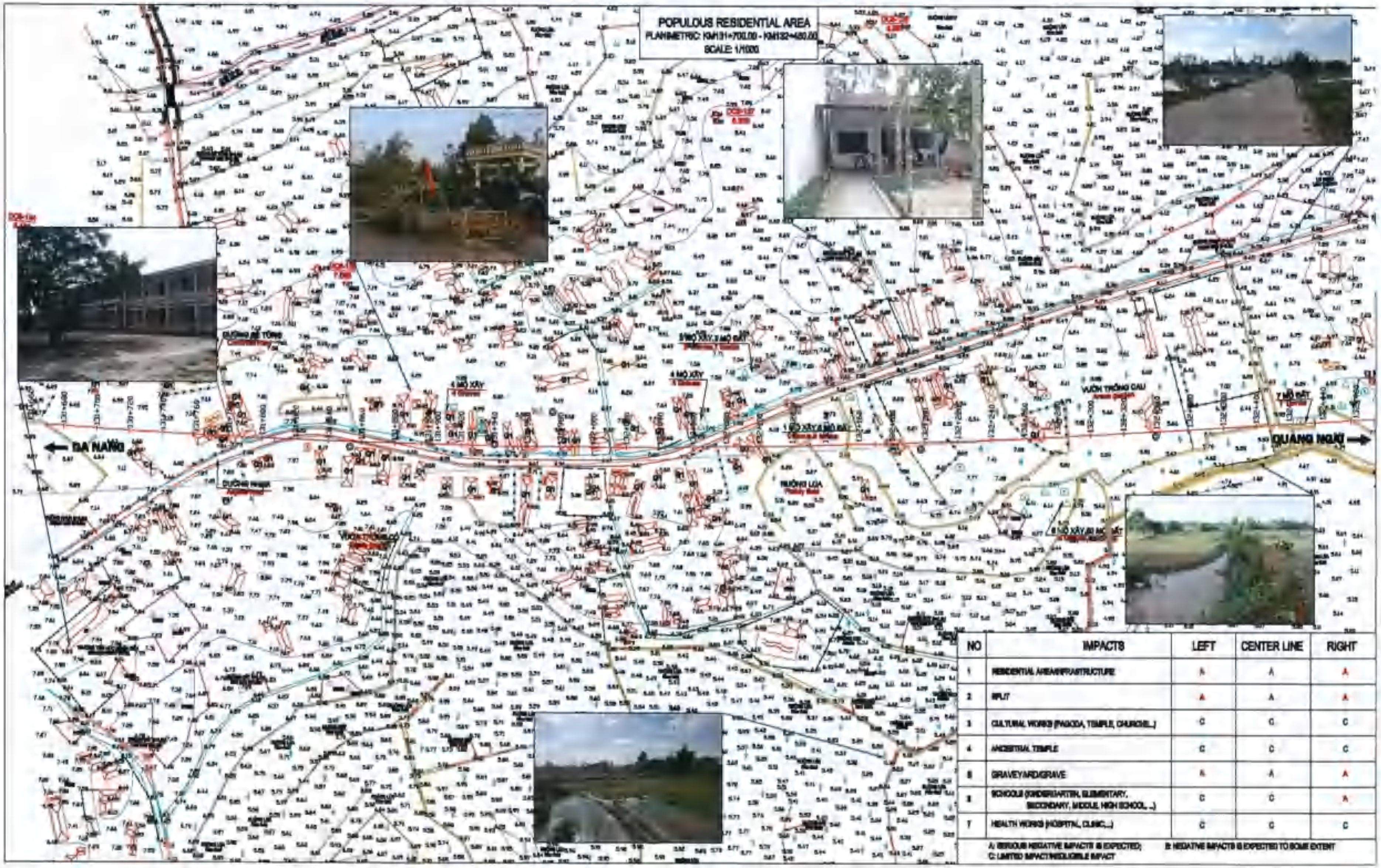
SCALE: 1/1000

← DA NANG

QUANG NGAI →

NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	C	B	A
5	GRAVEYARD/GRAVE	A	A	B
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	C
7	HEALTH WORKS (HOSPITAL, CLINIC,...)	C	C	C

A: SERIOUS NEGATIVE IMPACTS IS EXPECTED; B: NEGATIVE IMPACTS IS EXPECTED TO SOME EXTENT
C: LIMITED IMPACT/NEGLIGIBLE IMPACT



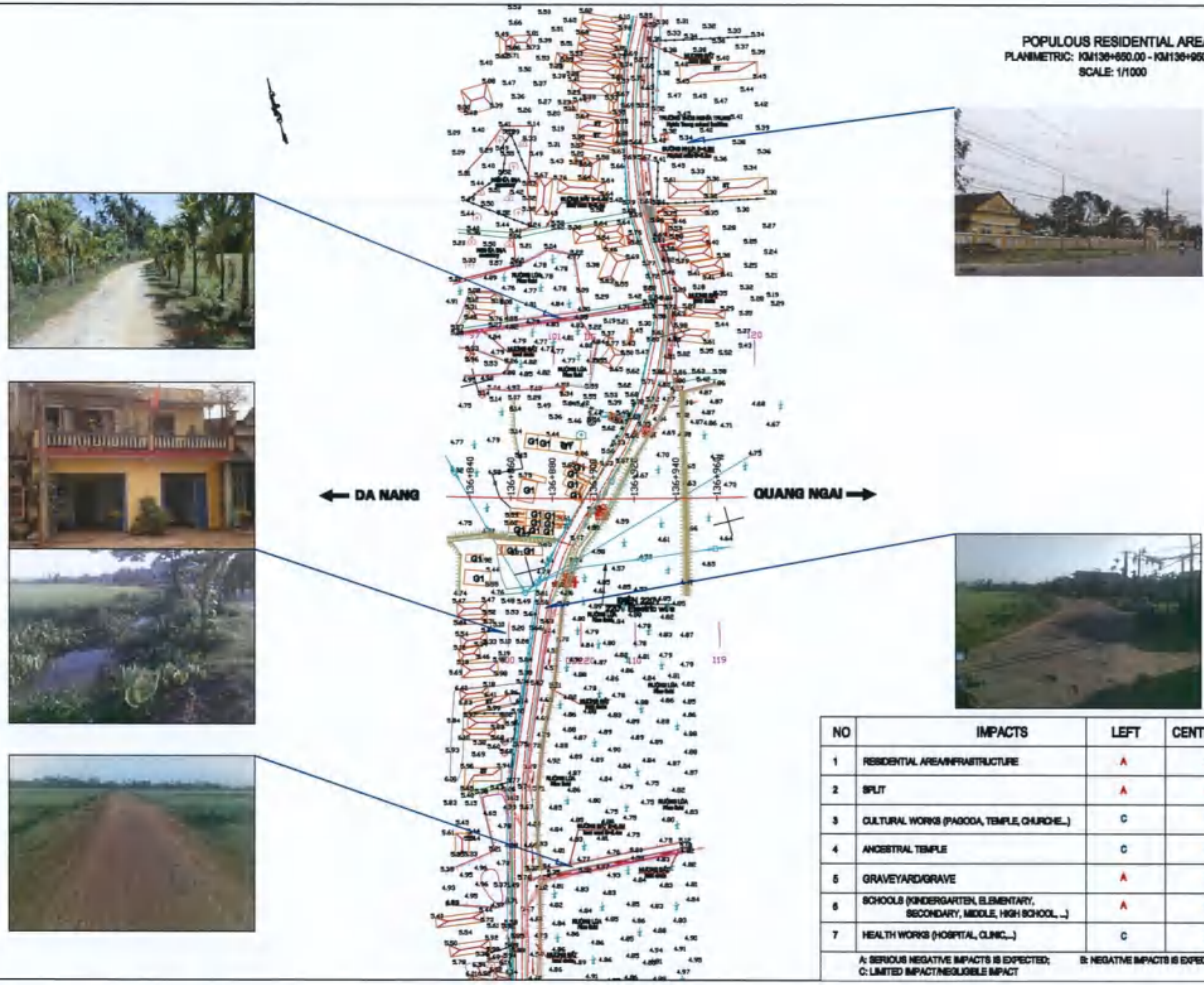
NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCH...)	C	C	C
4	ANCESTRAL TEMPLE	C	C	C
5	GRAVEYARD/GRAVE	A	A	A
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	C	C	A
7	HEALTH WORKS (HOSPITAL, CLINIC,...)	C	C	C

A: SERIOUS NEGATIVE IMPACTS IS EXPECTED; B: NEGATIVE IMPACTS IS EXPECTED TO SOME EXTENT
C: LIMITED IMPACT/NEGLIGIBLE IMPACT

POPULOUS RESIDENTIAL AREA

PLANIMETRIC: KM136+650.00 - KM136+950.00

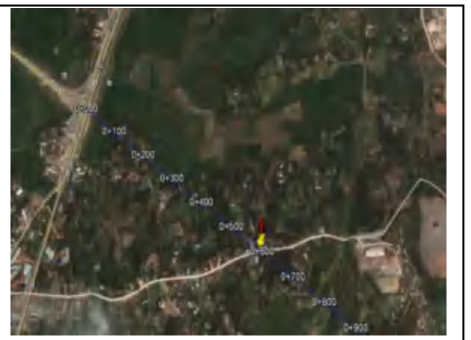
SCALE: 1/1000

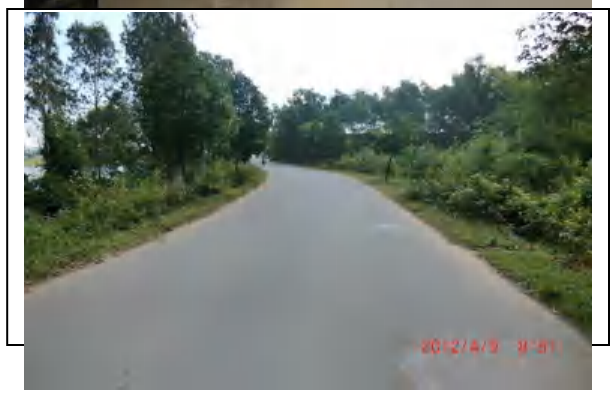


NO	IMPACTS	LEFT	CENTER LINE	RIGHT
1	RESIDENTIAL AREA/INFRASTRUCTURE	A	A	A
2	SPLIT	A	A	A
3	CULTURAL WORKS (PAGODA, TEMPLE, CHURCHE...)	C	C	C
4	ANCESTRAL TEMPLE	C	C	C
5	GRAVEYARD/GRAVE	A	C	C
6	SCHOOLS (KINDERGARTEN, ELEMENTARY, SECONDARY, MIDDLE, HIGH SCHOOL, ...)	A	C	C
7	HEALTH WORKS (HOSPITAL, CLINIC,...)	C	C	C

A: SERIOUS NEGATIVE IMPACTS IS EXPECTED; B: NEGATIVE IMPACTS IS EXPECTED TO SOME EXTENT
C: LIMITED IMPACT/NEGLIGIBLE IMPACT

Appendix 6 Site-Specific Environmental Mitigation Measures for the Da Nang – Quang Ngai Expressway

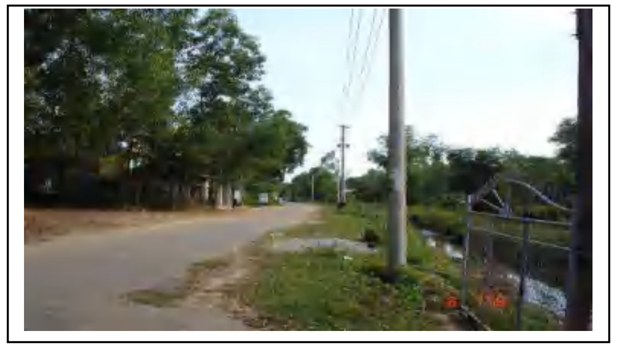
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
I	**The alignment cross the road and railway**						
1	PKG1	Km0+000 (The flyover bridge at Tuy Loan interchange)	 	- The alignment cross the NH No.14B at Km0+000. - The flyover bridge near the households along the NH No. 14B and rice field	- Affect traffic on PR14B during construction phase - Increase noise level and air pollution on the routes during construction and operation.	- Tuy Loan interchange	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on National Highway No. 14B and install fence as appropriate at bridge Km0+000. - Build temporary dyke to prevent wastewater and bentonite from running into agricultural land at flyover bridge Km0+000. - Direct traffic flow when required for flyover bridge Km0+000. - Pile driving late at night and early morning is not allowed at flyover bridges Km0+000 and Km0+573
2		Km0+580 - Km0+620	 	- Cross the exiting residential road at Km0+600	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design flyover bridge at Km0+573 with 6.5m width and access road linking to exiting concrete road	
3	PKG2	Km 9+620		- Cross provincial road No. 605 - The flyover bridge located next to households along the PR No. 605	- Disturb transportation on province road No. 605 during construction. - Increase noise level and air pollution on the routes during construction and operation.	Design flyover bridge	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on province road No. 605, PR No. 609 and install fence as appropriate at bridge Km9+620, Km13+540 - Direct traffic flow when required for flyover bridge Km9+620, Km13+540 - Pile driving late at night and early morning is not allowed at bridges: Km9+620, Km13+540.
4		Km13+647		- Cross provincial road No. 609 - The flyover bridge located next to households along the PR No. 609	- Disturb transportation on province road No. 605 during construction. - Increase noise level and air pollution on the routes during construction and operation.	Design bridge with 22m length	

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
5	PKG3A	Km16+801		- Cut though the residential road of Ky Long hamlet	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design the culvert box with 5.0m width and 3.5m hight	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Pile driving late at night and early morning is not allowed
6	PKG3B	Km19+220		- Cross provincial road No. 610B (left dyke of Ba Ren river) - Cut though the residential area and agriculture land	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation. - Affecting soil quality.	Design the bridge Km19+040 with 653m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Build temporary dyke to prevent wastewater and bentonite from running into agricultural land - Place warning signs and signboards on province road No. 610B, PR No. 610 and install fence as appropriate at bridge Km19+040 and Km20+203 - Direct traffic flow when required - Pile driving late at night and early morning is not allowed at bridge Km19+040
7		Km20+400		- Cross provincial road No. 610B (right dyke of Ba Ren river)	- Affecting the local traffic. - Traffic safety issue	Design the bridge Km20+203 with 446m length	
8	PKG4	Km24+229		- Cross communal road in Duy Xuyen commune	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design flyover bridge at Km24+229	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate at bridge Km24+229 - Pile driving late at night and early morning is not allowed at bridge Km24+229, Km28+909

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
9		Km28+900		- Cross communal road in Duy Trung commune	- Affecting the local traffic. - Traffic safety issue. - Increase noise level and air pollution on the routes during construction and operation.	Design bridge at Km28+909	
10	PKG5	Km35+497		Cross province road No. 611	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km35+488 with 19m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate
11		Km41+254		Cross National Highway No. 14E	- Affecting the local traffic. - Traffic safety issue.	Design Ha Lam interchange, including the bridge Km41+235 with 24.0m length	
12	PKG6	Km16+180		Cross communal road of Binh Chanh commune	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km46+170 with 19m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
13	PKG7	Km57+476-Km57+516		Crossing Province Road No. 615 and irrigation ditch	- Affecting the local traffic. - Traffic safety issue.	- Design bridge Km57+496 with 40.0m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge at bridge Km57+496 - Pile driving late at night and early morning is not allowed at bridge Km63+787
14		Km59+290–Km59+303		Cross local road of Trung Dinh hamlet	- Affecting the local traffic. - Traffic safety issue.	Design bridge Km59+297 with 18.0m length	
15		Km60+500		Cross Tran Phu road at Xuan Trung hamlets of Tam Dan Commune	- Affecting the local traffic. - Traffic safety issue.	- Design underpass bridge at Km60+032 with 9.0m length	
16		Km63+770-Km63+803		Cross Province Road No. 616	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction and operation.	- Design bridge Km63+787 with 33.0m length	

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
17	PKGA1	Km66+300		- Cross asphalt road to Phu Ninh reservoir.	- Affecting the local traffic. - Traffic safety issue.	Design flyover bridge Km66+463	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge - Install of signage at construction sites near the school at culvert Km69+308. - Install fence to separate the school from construction area at culvert Km69+308.
		Km69+308	 	- Cross concrete road linking Tam Ky city to Phu Ninh reservoir. - Ly Tu Trong primary school, Tam Ngoc commune, Tam Ky city is 50m from the alignment	- Affecting the local traffic. - Traffic safety issue. - Safety for students during construction. - Noise level increases at school. - Obstruct access to school of students.	Design culvert box with 5.0m width and 3.5m height	
18		Km72+035		- Cut though the access road of the existing borrow pit in Bich Son hamlet, Tam Xuan commune	Disturb traffic in and out the borrow pit. Traffic safety issue.	Design culvert box at Km72+027 with 3.0m width, 3.0m length	
19		Km75+440		Cross small road of Duc Bo 2 hamlet, Tam Anh Bac Commune	- Affecting the local traffic. - Traffic safety issue.	- Design underpass bridge Km75+189	

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
20	PKG A2	Km 81+367		Cross communal road and irrigation ditch of Xuan Ngoc hamlet 2, Tam Anh Bac Commune	- Affecting the local traffic. - Traffic safety issue. - Affect water quality in the irrigation ditch	- Design underpass the Bridge Km81+360 with 40m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge at bridge Km81+360
21		Km 82+900 - Km83+300		Cross small road of Thai Xuan hamlet	- Affecting the local traffic. - Traffic safety issue.	- Design underpass culvert box with 5m width, 3.5m length and access road	
22		Km85+727 - Km85+746		- Cross Province Road No. 617. - No households nearby.	- Affecting the local traffic. - Traffic safety issue.	Design underpass bridge Km85+735 with 27.0m length	
23		Km 87+615		Cross residential road of Thai Xuan village	- Affecting the local traffic. - Traffic safety issue.	- Design underpass culvert box Km87+615	

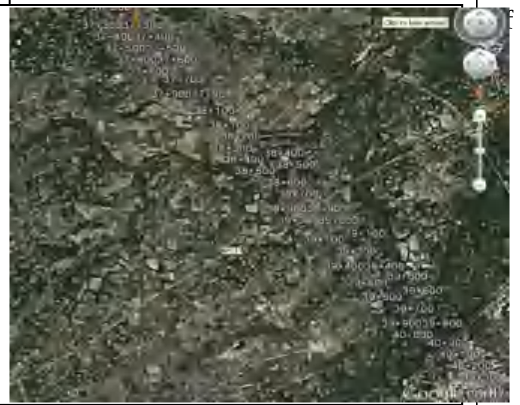
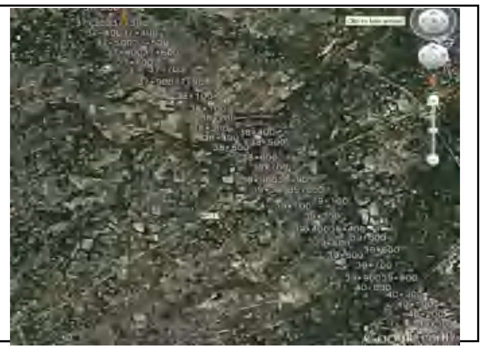
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
24		Km89+150		Cross communal road. No resettlement required	- Affecting the local traffic. - Traffic safety issue.	- Design flyover bridge Km89+180	- ditto -
25	PKG A3	Km106+695		- Cross communal roads. - Households nearby	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction.	Design underpass culvert box with 5.0m width, 3.5m high	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Collect and treat construction wastewater before discharge at bridge Km109+450 - Arrange transportation and storage of materials in ways that do not affect dike safety at bridge Km109+450. - Do not let construction machines, trucks run on the dike at bridge Km109+450.
26		Km109+450		Cross road of left Tra Bong dyke	- Affecting the local traffic. - Traffic safety issue. - Safety of dike.	- Design poles at locations in accordance with dyke safety requirements.	
27	PKG A4	Km110+200		- Cross Province Road No. 622. - No households nearby.	- Affecting the local traffic. - Traffic safety issue. - Safety of dike.	Design underpass bridge	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Arrange transportation and storage of materials in ways that do not affect dike safety at bridge Km110+200. - Do not let construction machines, trucks run on the dike

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
28		Km119+170		Cross province roads No. 622C	- Affecting the local traffic. - Traffic safety issue.	Design flyover bridge Km119+170	at bridge Km110+200. - Pile driving late at night and early morning is not allowed at bridge Km124+120
29		Km124+120	 	Cross province roads No. 623 The Households and primary school Son Tinh No. 1 nearby	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dust pollution on the route during construction.		
30	PKG A5	Km128+615		- Cross PR No.623B asphalts road. - Households nearby	- Affect traffic during construction and operation. - Traffic safety issue. - Increase levels of noise and dusts during construction and operation.	Design underpass bridge Km128+615 with 21.0m length	- Optimize construction schedule to shorten construction time. - Plan construction activities to minimize impacts on traffic. - Spraying water periodically during the construction period. - Place warning signs and signboards on commune road and install fence as appropriate - Pile driving late at night and early morning is not allowed at bridge Km124+120 - Inform construction schedule to local railway management unit for bridge Km134+970 - Connect the signal line to cut railway, road at bridge Km134+970
31		Km134+970		Cross North – South railway	- Affect the operation of the railway during construction. - Safe on railway during construction phase of the expressway.	- Design underpass bridge Km134+970 with 460m length	

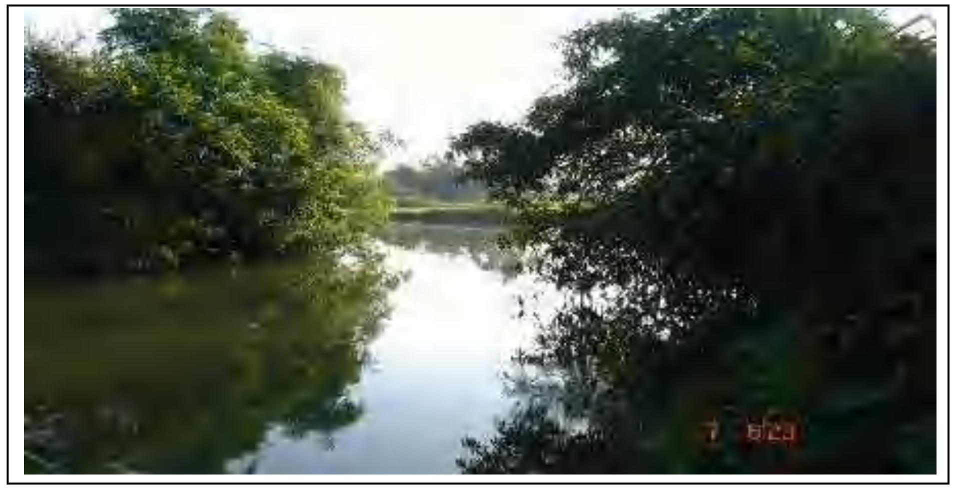
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
32		Km139+480		Cross National Highway No. 1A	- Affect traffic on National Highway No. 1A . - Traffic safety issue.	- Optimise design to minimize land acquisition	
II	**The alignment cross rivers, streams**						
1	PKG1	Km 1+615	 	- Cross Tuy Loan river	- Modification of river's wet cross section that may cause localized erosion, sedimentation and/or affect flood discharge capacity of the river. - Affect waterway transportation. - Water pollution caused by construction.	- Design bridge with: 188.3m length, span arrangement 4x40m. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into agriculture land and water body of river. - Store fuel at least 200 m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction for bridges: Tuy Loan (Km1+615), Yen (Km2+510). - Place and maintain warning sign, signboards and lights at construction are on the river for bridges: Tuy Loan (Km1+615), Yen (Km2+510).
2		Km 2+510	 	- Cross Yen river	- Modification of river's wet cross section that may cause localized erosion, sedimentation and/or affect flood discharge capacity of the river. - Affect waterway transportation. - Water pollution caused by construction.	- Design bridge with: 249.8m length, span arrangement 7x33m. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	

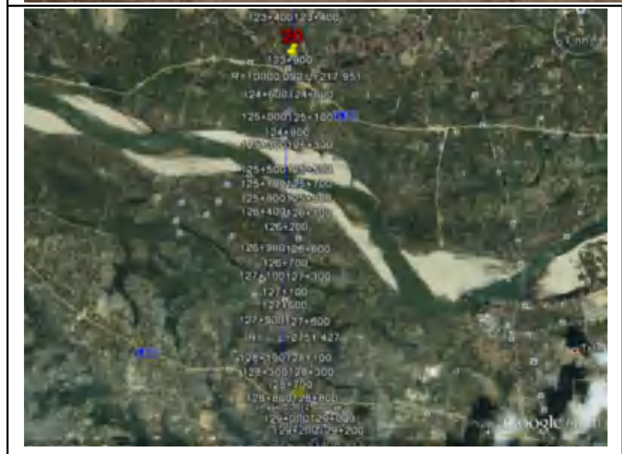
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
3	PKG2	Km 9+852	 	Cross La Tho river	- Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction.	- Design bridge with: 176m length, span arrangement 5x33m. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into agriculture land and water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction - Place and maintain warning sign, signboards and lights at construction are on the river - Washing of construction materials directly in rivers is forbidden
		Km10+882		n of La Tho river	- Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction.	- Design bridge with: 134m length, span arrangement 3x40m. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	
	PKG 3A	Km 17+503	 	Cross Thu Bon river, located between Dien Tho and Dien Quang Communes	- Affect waterway transport increase erosion potentials affect river flood discharge capacity. - Affect water quality during construction. - Environmental hazard during the operation such as oil trucks turn over on the bridge during operation phase	- Design bridge with: 1,004m length. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase + Strong handrails, barriers to prevent vehicles from falling into the river	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction - Place and maintain warning sign, signboards and lights at construction are on the river - Washing of construction materials directly in rivers is forbidden

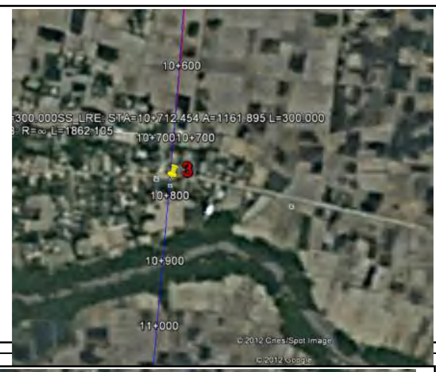
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 3B	Km 19+980 -Km20+426		Cross Ba Ren river (Chiem Son bridge)	- Affect waterway transport, increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. Environmental hazard during the operation such as oil trucks turn over on the bridge during operation phase	- Design bridge with: 444m length. + Adequate vertical clearance for boat crossing + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase + Strong handrails, barriers to prevent vehicles from falling into the river	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction - Place and maintain warning sign, signboards and lights at construction are on the river - Washing of construction materials directly in rivers is forbidden
	PKG 4	Km29+555		Cross Dao Lao river	- Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction.	- Design bridge with: 88.9m length, span arrangement 3x27m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 5	Km38+347	 	Cross the North branch of Ly Ly river	- Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction.	- Design bridge with: 170m length, span arrangement 4x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden
		Km39+645	 	Cross the South branch of Ly Ly river	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction.	- Design bridge with: 330m length, span arrangement 7x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	
	PKG 6	Km44+435	 	Cross the Cat river	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 88.4m length, span arrangement 3x27m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden
		Km47+920	 	Cross the Phu Xuan river	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 164m length, span arrangement 5x30m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	

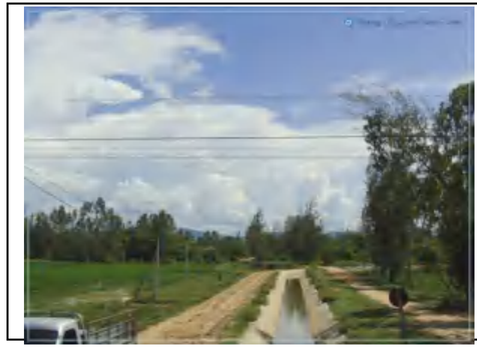
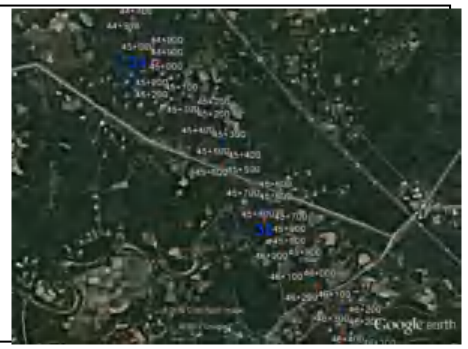
	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 7	Km55+615	 	Cross Nha Ngo river	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 191m length, span arrangement 5x33m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden
		Km58+255	 	Cross the stream at Km58+255	-Increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 160m length, span arrangement 5x30m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	
		Km62+477		Cross a small stream of Tam Thái Commune.	- Affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 33m length, span arrangement 1x24m	
	PKG A1	Km68+420	 	Cross Tam Ky River	- Affect stability of river bed and river bank May affect flood drainage capacity. - Quality of water as source of drinking water for Tam Ky town may be affected during construction and operation	- Design bridge with: 372m length, span arrangement 9x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase + Wastewater collection system to prevent pollution of drinking water source in case of accident	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
		Km 75+185	 	Cross a river of Tam Xuan 2 and Tam Anh Bac Communes	- Affect water quality during construction. - Affect river capacity to drain flood water.	- Design bridge with: 88.6m length, span arrangement 2x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	danger warning signs. - Washing of construction materials directly in rivers is forbidden
	PKG A2	Km87+996		Cross stream	- Affect river flood discharge flow. - Affect water quality during construction	- Design bridge with: 170m length, span arrangement 5x33m	- Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Washing of construction materials directly in rivers is forbidden
	PKG A3	Km109+660-Km109+770	 	Cross Tra Bong river at Tien Dao hamlet, Binh Trung Commune	- Affect waterway transport, increase erosion potentials and affect river flood discharge flow. - Affect water quality during construction. Environmental hazard during the operation such as oil trucks turn over on the bridge during operation phase	- Design bridge with: 445m length, span arrangement 11x40m + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards. - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
							- Washing of construction materials directly in rivers is forbidden.
	PKG A5	Km124+900-Km125+700 and Km126+530 – Km127+210	 	Cross Tra Khuc river -	Affect river bank stability and draining of flood flow. Affect water quality as source of drinking water source for Quang Ngai town during construction. Affect water quality for the town of Chau O. Environmental accidents during the operation.	- Design bridge with: 800m length from Km124+900 – Km125+700 and bridge with 680m length from Km126+530 – KM127+210 + Ensure adequate river cross-section for flood discharge + Include measures to protect the locations where erosion potentials increase	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Collect and treat wastewater before discharge. - Collect and prevent bentonite running into water body of river and agriculture land. - Store fuel at least 200m from river, in roofed area and on impermeable ground. Place sign boards to restrict access and danger warning signs. - Restrict access to construction sites by fences and signboards. - Coordinate with project owner, local authority and waterway management authority to divert waterway transport means during construction. - Place and maintain warning sign, signboards and lights at construction are on the river. - Washing of construction materials directly in rivers is forbidden.
III	**The alignment cross irrigation canals and ditch**						
	PKG 1	Km2+951 , Km3+515, Km4+930	 	Cross irrigation canal at Km2+951, Km3+515 and Km4+930	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2.0x2.0m at Km2+951 ; 2(2.0x1.5)m at Km3+515 and 2(1.5x1.5)m at Km4+930	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 2	Km8+741	 	Cross irrigation canal at Km8+741	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 5.0x4.0m at Km8+741	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km10+773	 	Cross irrigation canal at Km10+773	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 5.0x4.0m at Km8+741	
		Km11+280	 	Cross irrigation canal at Km11+280	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 5.0x4.0m at Km11+280	
	PKG 4	Km21+847	 	Cross Vinh Trinh irrigation canal at Km2+847	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km2+847 with 28m length.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 5	Km34+149	 	Cross irrigation canal at Km34+149	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km34+150 with 33m.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km40+110	 	Cross Phu Ninh irrigation canal at Km40+110	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km40+111 with 33m.	
	PKG 6	Km42+189	 	Cross N20 irrigation canal at Km42+189	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km42+189 with 24m.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction. .
		Km43+656	 	Cross N18 irrigation canal at Km43+656	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km43+656 with 24m.	

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
		Km45+540	 	Cross N16 irrigation canal at Km45+540	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km45+540 with 24m.	
	PKG 7	Km54+114	 	Cross irrigation canal at Km54+114	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2(2.0x2.0)m.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km63+670		Cross irrigation canal at Km63+670	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box	
	PKG A1	Km70+374	 	Cross irrigation canal at Km70+374	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the culvert box with 2(2.0x2.0)m.	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
		Km71+014 – Km71+265	 	Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km71+160 with 24.0m length and bypass canal	
		Km74+264	 	Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	Design the bridge Km74+264 with 43.0m length and span arrangement 1x24m	
	PKG A2	Km82+148 and Km82+495	 	Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box at Km82+148 and Km82+495 with 2(3.0x2.0)m and 3(3.0x2.5)m	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
	PKG A3	Km106+611		Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design bridge with 50.0m length, span arrangement 1x35m	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
		Km108+685		Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box with 2(2.0x2.0)m	agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
	PKG A4	Km110+253		Cross irrigation canal	Irrigation ditches will be filled in to affect irrigation service during construction period. Water quality is affected by oil, dirt during construction and operation	- Design culvert box with 1(3.0x1.5)m	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.
		Km118+050	 	Cross Thach Nham irrigation canal	Interrupt water supply for irrigation during construction and operation. Affect water quality due to pollution from construction activities.	- Design bridge Km118+050 with 43.0m length, span arrangement 1x35m	
	PKG A5	Km133+380	 	Cross irrigation canal	Interrupt water supply for irrigation during construction and operation. Affect water quality due to pollution from construction activities.	- Design culvert box with 1(3.0x2.0)m	- Inform local authorities and local community about construction schedule. - Collect waste and dump at approved place. - Washing of construction materials directly in canal is forbidden. - Select the time of construction does not coincide with peak irrigation demand. - Avoid to interrupt for water agriculture supplying of canal. Provide temporary trench to maintain continuity of irrigation during construction.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
			 	Cross irrigation canal	Interrupt water supply for irrigation during construction and operation. Affect water quality due to pollution from construction activities.	- Design bridge Km138+283 with 48.0m length, span arrangement 1x40m	
VI	**The alignment cross residential area**						
1	PKG 1	Km0+120- Km0+220 Km0+320-Km0+760 Km3+000 – Km3+080 Km5+500 – Km5+740 Km7+380 – Km7+460	 	- Cross the households	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives. - Spraying water periodically during the construction period.
	PKG 2	Km9+100 – Km9+600 Km10+700 – Km10+850 Km13+620 – Km13+750 Km14+060 – Km14+560		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 3A	Km16+760 – Km16+940 Km18+000 – Km18+080		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 3B	Km19+100 – Km19+290 Km19+490 – Km19+600		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 4	Km23+480 – Km23+540 Km24+000 – Km24+300 Km24+800 – Km24+850 Km28+850 – Km29+150		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 5	Km35+460 – Km35+540 Km41+180 – Km41+720		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG 6	Km42+120 – Km42+180 Km42+620 – Km43+040 Km44+880 – Km45+240 Km46+180 – Km46+380 Km47+080 – Km47+180 Km47+400 – Km47+500 Km48+340 – Km48+400 Km48+640 – Km48+750 Km49+040 – Km49+300 Km50+300 – Km51+100		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 7	Km53+160 – Km53+320 Km53+620 – Km53+740 Km54+040 – Km54+160 Km55+760 – Km56+080 Km56+500 –Km56+900 Km57+000 – Km57+280 Km57+500 – Km57+550 Km59+620 – Km60+250 Km61+700 –Km61+960 Km62+500 – Km62+750 Km63+240 – Km63+380 Km63+600 – Km65+000		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A1	Km69+560 – Km69+740 Km71+040 – Km71+300 Km72+500 – Km72+800		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A2	Km81+260 – Km81+400 Km84+660 –Km85+100 Km85+400 – Km85+800 Km87+500 – Km87+700 Km89+100 – Km89+860 Km93+380 - Km93+700		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A3	Km100+400-Km100+800 Km105+580-Km106+070 Km106+650-Km106+900 Km107+650-Km107+830 Km108+070-Km108+600 Km109+460-Km110+100		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG A4	Km114+300-Km114+820 Km116+420-Km116+510 Km116+720-Km116+840 Km119+920-Km120+180 Km121+540-Km121+780 Km122+160-Km122+260 Km123+840-Km124+140		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
	PKG A5	Km124+900-Km125+000 Km125+740-Km126+060 Km127+960-Km128+820 Km130660 - Km130+820 Km131+440-Km132+220 Km133+620-Km133+980 Km136+060-Km136+140		- Cross the residential area	- Impact on the lives and incomes of affected households. fragmentation of community Noise and air pollution during operation phase to households living nearby	To minimize the alignment cutting through residential areas	- Implement communication campaign to local people on the project and its benefits to the country - Provide compensation at reasonable cost. - Project owner Implement compensation and support the relocated households to stabilize their lives.
V	**The alignment cross graves area**						
	PKG 1	Km0+120- Km0+220 Km0+320-Km1+160 Km7+800 – Km8+000		Route cut through the graves	Impacts on spiritual life of local people when graves have to be moved.	PMU in coordination with local authorities to allocate land for grave relocation and associated worshiping procedures	- Implement communication campaigns to inform local people about the project and its benefits to the country - Provide compensation at reasonable cost.
	PKG 2	Km9+160-Km9+200 Km9+760 – Km9+800 Km10+700		Route cut through the graves.	- ditto -	- ditto -	- ditto -
	PKG 3B	Km20+730		Route cut through the graves.	- ditto -	- ditto -	- ditto -
	PKG 4	Km21+280 - Km21+950 Km23+420 – Km23+500 Km24+100 – Km24+300 Km24+550 – Km24+850 Km25+300 – Km25+400 Km25+700 – Km25+900 Km27+000 – Km27+240 Km27+650 – Km28+850 Km29+060 – Km29+800 Km30+040 – Km30+600 Km31+000 – Km31+500 Km32+000 – Km32+380		Route cut through the graves and cemetery	- ditto -	- ditto -	- ditto -

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
	PKG 5	Km36+480 – Km36+800 Km37+740 – Km37+840 Km38+700 – Km39+150 Km40+100 – Km40+600		Route cut through the graves.	Impacts on spiritual life of local people when graves have to be moved.	PMU in coordination with local authorities to allocate land for grave relocation and associated worshiping procedures	- Implement communication campaigns to inform local people about the project and its benefits to the country - Provide compensation at reasonable cost.
	PKG 6	Km43+700 – Km43+780 Km46+200 – Km46+400 Km47+000 – Km47+100 Km50+000 – Km50+600 Km50+800 – Km51+100		Route cut through the graves.	- ditto -	- ditto -	- ditto -
	PKG 7	Km52+000 – Km52+300 Km54+500 – Km54+800 Km56+500 – Km56+800 Km57+100 – Km57+300 Km57+500 – Km57+850 Km58+750 – Km59+100 Km59+600 – Km60+800 Km61+900 – Km62+150 Km62+500 – Km62+700 Km63+200 – Km63+650 Km63+870 - m64+150 Km64+400 – Km65+000		Route cut through the graves along alignment, cross over Nguyen family cemetery including 25 graves	- ditto -	- ditto -	- ditto -
	PKG A1	Km67+700 – Km68+300 Km70+740 – Km70+820 Km73+900 – Km74+100 Km74+300 – Km74+450		Route cut through the graves along alignment	- ditto -	- ditto -	- ditto -
	PKG A2	Km86+240 – Km87+700 Km88+380 – Km88+600 Km88+800 - Km89+000 Km93+200 – Km93+450 Km93+850 – Km94+200 Km94+400 – Km94+500 Km95+200 – Km95+300 Km95+750 - Km95+800 Km96+160 – Km96+240		Route cut through the graves along alignment	- ditto -	- ditto -	- ditto -
	PKG A3	Km105+100 –Km105+500		Route cut through the graves along alignment	- ditto -	- ditto -	- ditto -
	PKG A4	Km112+980 – Km113+600 Km113+900–Km116+000 Km116+270 – Km117+780 Km118+360 – Km118+900 Km119+200 – Km119+820 Km121+740 – Km122+200		Route cut through the graves along alignment	- ditto -	- ditto -	- ditto -

	Package	Location	Photo of the site	Characteristic	Issue/Typical Impacts	Detail Design Solution	Mitigation measures during construction phase[3]
		Km123+660 – Km123+800 Km124+500 – Km124+640					
	PKG A5	Km125+900 – Km126+000 Km127+900 – Km128+000 Km128+280 – Km128+450 Km129+460 – Km129+540 Km130+800 – Km131+100 Km132+400 – Km132+500 Km135+400 – Km135+600		Route cut through the graves along alignment	- ditto -	- ditto -	- ditto -

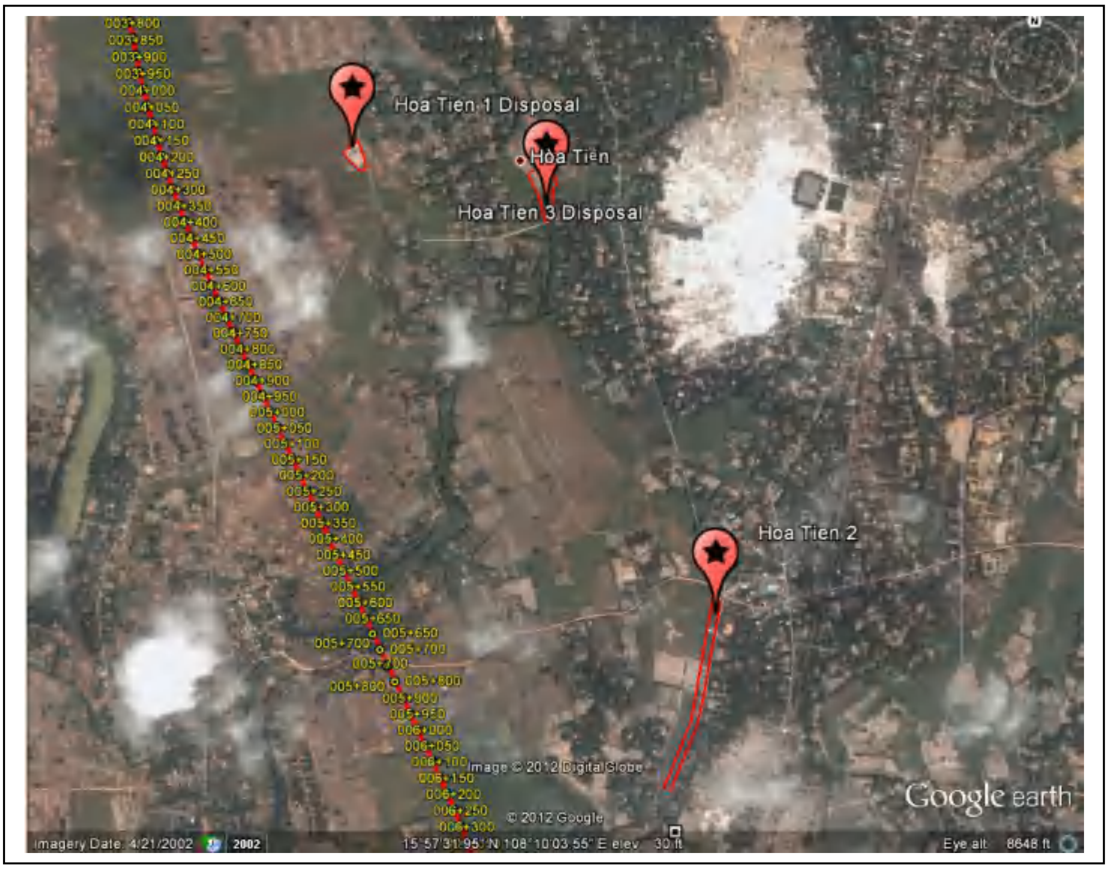
Appendix 7. List of candidate disposal sites by packages of the Da Nang – Quang Ngai Expressway Project

No.	Package	Location
1	P1	Hoa Tien 1 Disposal at La Bong hamlet, Hoa Tien commune, Hoa Vang district, Da Nang city
2	P1	Hoa Tien 2 Disposal at Le Xuan 1 hamlet, Hoa Tien commune, Hoa Vang district, Da Nang city
3	P1	Hoa Tien 3 Disposal at La Bong hamlet, Hoa Tien commune, Hoa Vang district, Da Nang city
4	P3B and P4	Duy Trinh 1 disposal at Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district, Quang Ngai province
5	P3B and P4	Duy Trinh 2 disposal at Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district, Quang Ngai province
6	P3B and P4	Duy Trinh 3 disposal at Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district, Quang Ngai province
7	P3B and P4	Duy Trinh 4 disposal at Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district, Quang Ngai province
8	P3B and P4	Duy Trinh 5 disposal at Chiem Son hamlet, Duy Trinh commune, Duy Xuyen district, Quang Ngai province
9	P6	My Tra disposal at My Tra hamlet, Binh Chanh commune, Binh Son district, Quang Ngai province
10	PA1	Aton – Go Du Disposal at Tam Anh South, Nui Thanh district, Quang Nam province
11	PA1	Public Area of My Son hamlet at Tam Anh South commune, Nui Thanh district, Quang Nam province
12	PA1	Dong Ho Disposal at Tam Anh South commune, Nui Thanh district, Quang Nam province
13	PA1	Go Vang Disposal at Tam Anh South commune, Nui Thanh district, Quang Nam province
14	PA2	Tam My East 1 at Phu Qui 3 hamlet, Tam My East commune, Nui Thanh district, Quang Nam province
15	PA2	Tam My East 2 at Da Phu 2 hamlet, Tam My East commune, Nui Thanh district, Quang Nam province
16	PA2	Tam My East 3 at Da Phu - Tra Tay hamlet, Tam My East commune, Nui Thanh district, Quang Nam province
17	PA3	Binh Nguyen 1 at Tri Binh hamlet, Binh Nguyen commune, Binh Son district, Quang Ngai province
18	PA3	Binh Nguyen 2 at Nam Binh hamlet, Binh Nguyen commune, Binh Son district, Quang Ngai province
19	PA3	Binh Nguyen 3 at Ngo Vo residence are, Binh Nguyen commune, Binh Son district, Quang Ngai province
20	PA3	Binh Nguyen 4 at Hung garden, Binh Nguyen commune, Binh Son district, Quang Ngai province
21	PA3	Binh Long 1 at premaritally shool of Binh Long, Binh Long commune, Binh Son district, Quang Ngai province
22	PA3	Binh Long 2 at Long Binh hamlet, Binh Long commune, Binh Son district, Quang Ngai province
23	PA4	Tinh Tho 1 at Tho Nam hamlet, Tinh Tho commune, Son Tinh district, Quang Ngai province
24	PA4	Tinh Tho 2 at Tho Tay hamlet, Tinh Tho commune, Son Tinh district, Quang Ngai province

No.	Package	Location
25	PA4	Tinh Tho 3 at Tho Tay hamlet, Tinh Tho commune, Son Tinh district, Quang Ngai province
26	PA5	Nghia Dien 1 at Dien Chanh hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province
27	PA5	Nghia Dien 2 at Dien Long hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province
28	PA5	Nghia Dien 3 at Dien Chanh hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province
29	PA5	Nghia Dien 4 at Dien Hoa hamlet, Nghia Dien commune, Tu Nghia district, Quang Ngai province
30	PA5	Nghia Trung 1 at Dien Trang hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province
31	PA5	Nghia Trung 2 at Tan Hoi hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province
32	PA5	Nghia Trung 4 at Dien Trang hamlet, Nghia Trung commune, Tu Nghia district, Quang Ngai province

1. Candidate disposal sites at Hoa Tien commune, Hoa Vang District, Da Nang city

No.	Disposal Location	Land use status	Area (ha)
1	Hoa Tien 1 Disposal at La Bong hamlet	Not used land	0.3 ha (2m height fill)
2	Hoa Tien 2 Disposal at Le Xuan 1 hamlet	Not used land. Residence area plan	0.5ha (2m height fill)
3	Hoa Tien 3 Disposal at La Bong hamlet	Not used land	1.0ha (1m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện UBND xã Hòa Tiến Huyện Hòa Vang ĐN.
  1. Ông (Bà) Nguyễn Đình Anh ... CT UBND xã
  2. Ông (Bà) Nguyễn Đức Hùng ... CB ĐC xã
- Đại diện: Tư vấn TKE dự án Đường cao tốc ĐN-QN.
  1. Ông (Bà) Phan Thế Quang
  2. Ông (Bà)
  3. Ông (Bà)

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: 03
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
01	Sân phơi Lệ Bông	Đất trống	3000 m² cao trình 2m
02	Khu đồng bông thông	"	5.000 m² cao trình 3m
03	Khu đồng Lệ Bông	"	10.000 m² cao trình 1m

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

Hòa Tiến, ngày .. tháng 8 năm 2012

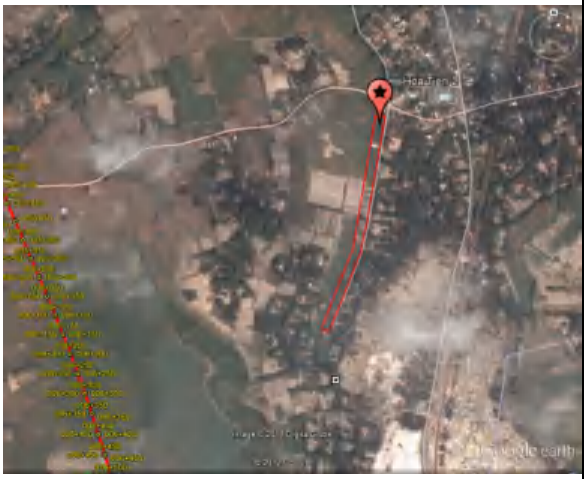
Đại diện Tư vấn thiết kế
Dự án đường cao tốc ĐN-QN

Đại diện địa phương
CHỦ TỊCH
Nguyễn Đình Anh

Ngô Đắc Hùng

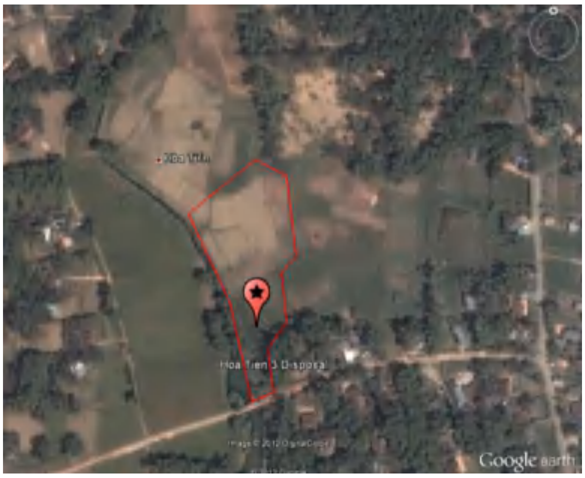
a. Hoa Tien 1 Disposal at La Bong hamlet: 0.3ha

b. Hoa Tien 2 Disposal (residence area plan along linking communes road) at Le Xuan 1 hamlet: 0.5ha



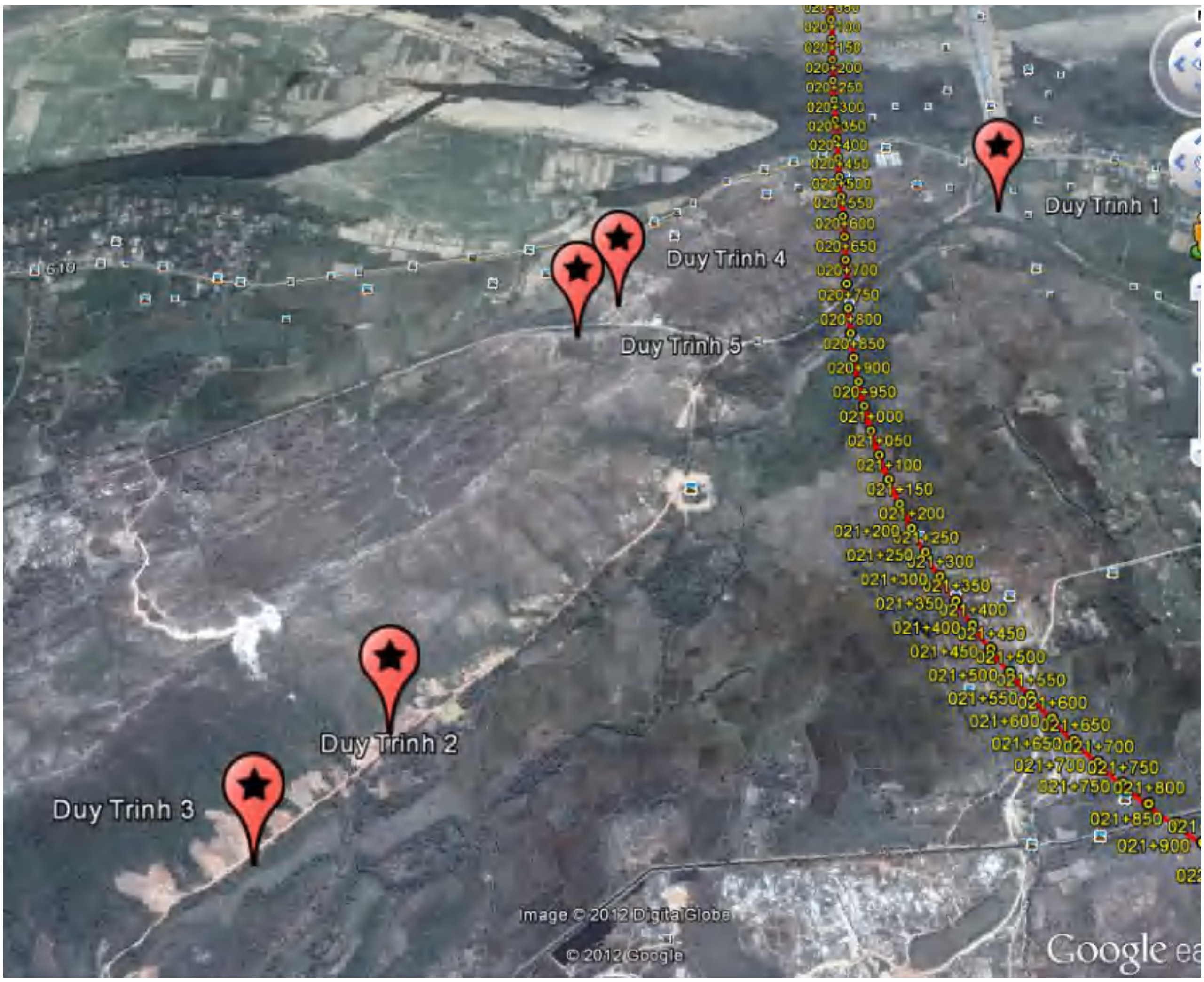



c. Hoa Tien 3 Disposal at La Bong hamlet: 1.0 ha



2. Candidate disposal sites at Duy Trinh commune, Duy Xuyen District, Quang Nam province

No.	Disposal Location	Land use status	Area (ha)
1	Duy Trinh 1 Disposal at Chiem Son hamlet	Forest trees mix not use land	0.5 ha (4m height fill)
2	Duy Trinh 2 Disposal (under power line 500KV along the road go to sub dam of Vinh Trinh reservoir) at Chiem Son hamlet	Forest trees	1.5ha (1.5m height fill)
3	Duy Trinh 3 Disposal (along the road go to sub dam of Vinh Trinh reservoir near Mr. five's field) at Chiem Son hamlet	Forest trees	2.0 ha (2m height fill)
4	Duy Trinh 4 Disposal at Chiem Son hamlet	Not used land	1.0 ha (8m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện UBND xã Duy Trinh, huyện Duy Xuyên
  1. Ông (Bà) Lưu Công Cả - Chủ tịch UBND
  2. Ông (Bà) Ngô Mai - Cán bộ địa chính - xây dựng
- Đại diện: Tư vấn thiết kế dự án đường cao tốc Đà Nẵng - Quảng Ngãi
  1. Ông (Bà) Phạm Thị Giang - chuyên gia môi trường
  2. Ông (Bà)...
  3. Ông (Bà)...

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: ...
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Hục ga (thôn Chiêm Sơn)	đất trống + cây lâm nghiệp	0,5 ha (cao 4 m)
2	Trên dưới đường dây 500 kW dọc đường vào đập Vĩnh Trinh (thôn Chiêm Sơn)	đất trống + cây lâm nghiệp	1,5 ha (cao 4,5 m)
3	Hố nương cây Nam dọc đường vào đập Vĩnh Trinh (thôn Chiêm Sơn)	cây lâm nghiệp	2 ha (cao 2 m)
4	Hóc trên trảm xe (thôn Chiêm Sơn)	đất trống	1 ha (cao 8 m)
5	Hóc nương trên trảm xe đập xã Duy Châu (thôn Chiêm Sơn)	đất trống + cây lâm nghiệp	2 ha (cao 12 m)

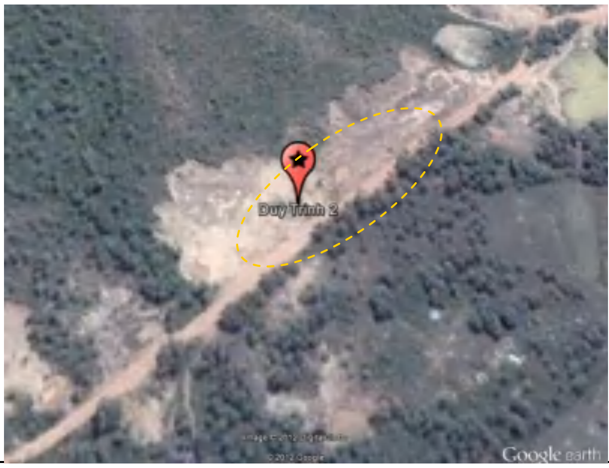
UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

Duy Trinh ..., ngày 02 tháng 8... năm 2012

Đại diện Tư vấn thiết kế **Dự án đường cao tốc ĐN-QN**	**Đại diện địa phương**
Phạm Thị Giang	CHỦ TỊCH Lưu Công Cả

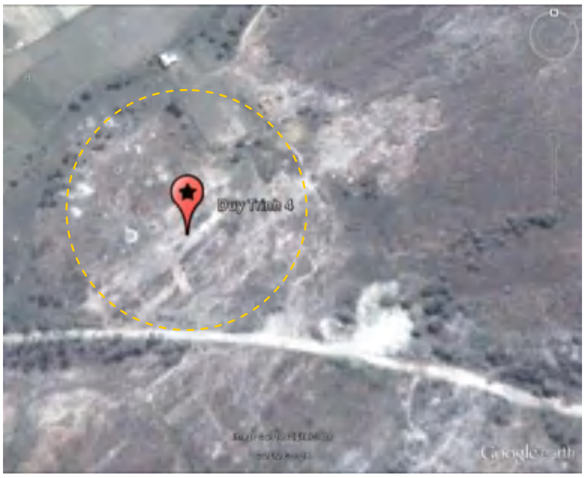
a. Duy Trinh 1 Disposal: 0.5ha

b. Duy Trinh 2 Disposal (under power line 500KV along the road go to sub dam of Vinh Trinh reservoir) at Chiem Son hamlet: 1.5ha



c. Duy Trinh 3 Disposal (along the road go to sub dam of Vinh Trinh reservoir near Mr. five's field) at Chiem Son hamlet: 2.0 ha

d. Duy Trinh 4 Disposal : 1 ha



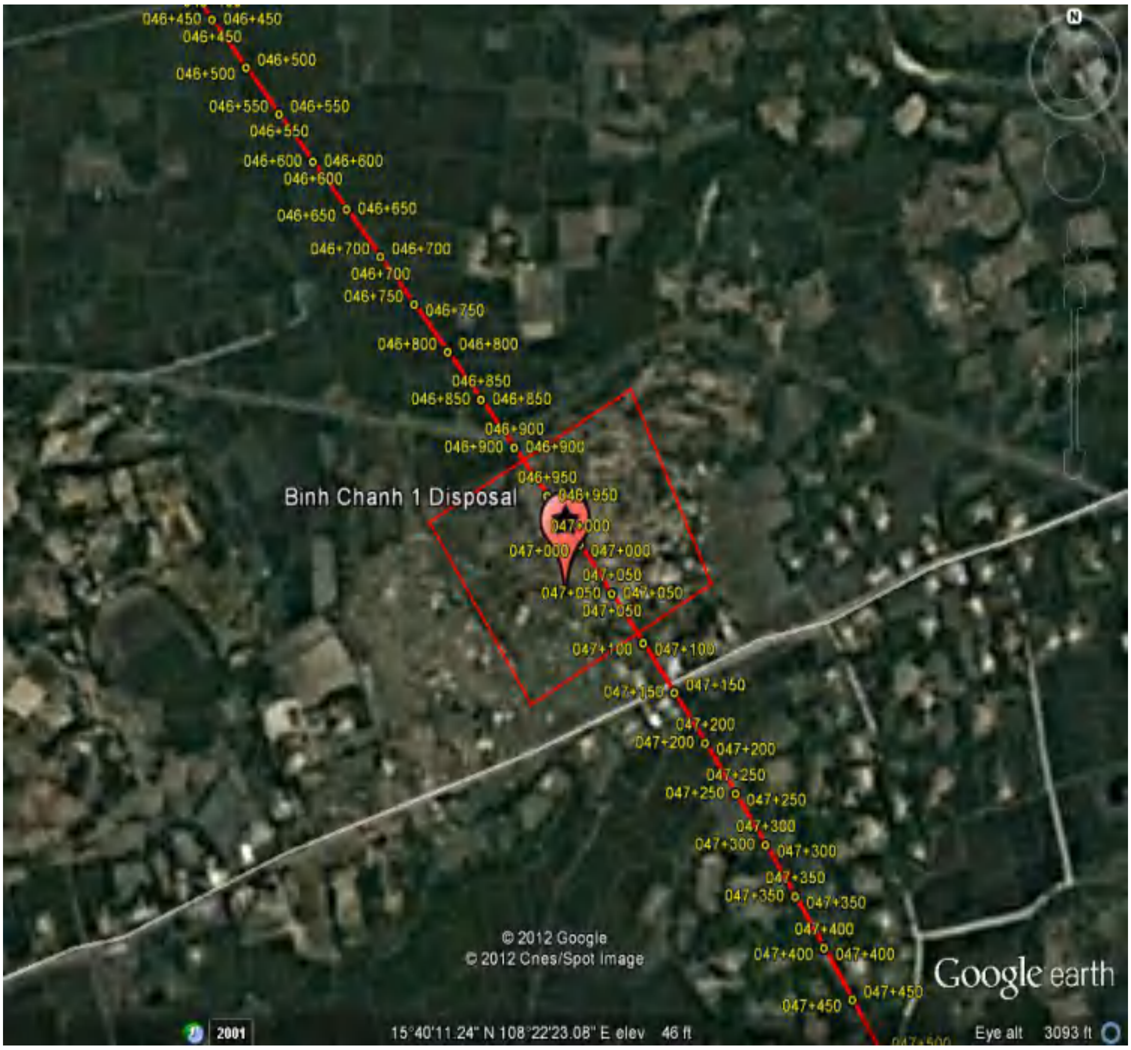




e. Duy Trinh 5 Disposal: 2.0 ha

3. Disposal sites at Binh Chanh commune, Thang Binh District, Quang Nam province

No.	Disposal Location	Land use status	Area (ha)
1	My Tra forest at My Tra hamlet	Forest of land's Binh Chanh People Committee	0.5 ha, 4m height



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện UBND xã Bình Chánh, huyện Thăng Bình
  1. Ông (Bà) Huỳnh Văn Hoàng – Chủ tịch UBND
  2. Ông (Bà) Nguyễn Văn Nhiêm – Cán bộ địa chính
- ~~Đại diện: Tư vấn thiết kế dự án đường cao tốc Đà Nẵng – Quảng Ngãi~~
  1. Ông (Bà) Phạm Thị Giang – Chuyên gia môi trường
  2. Ông (Bà)...
  3. Ông (Bà)...

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: ...
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Rừng Mỹ Trà – thuộc thôn Mỹ Trà	đất trồng cây lâm nghiệp	0,5ha

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

B. Chánh, ngày 14 tháng 8 năm 2012

Đại diện Tư vấn thiết kế
Dự án đường cao tốc ĐN-QN

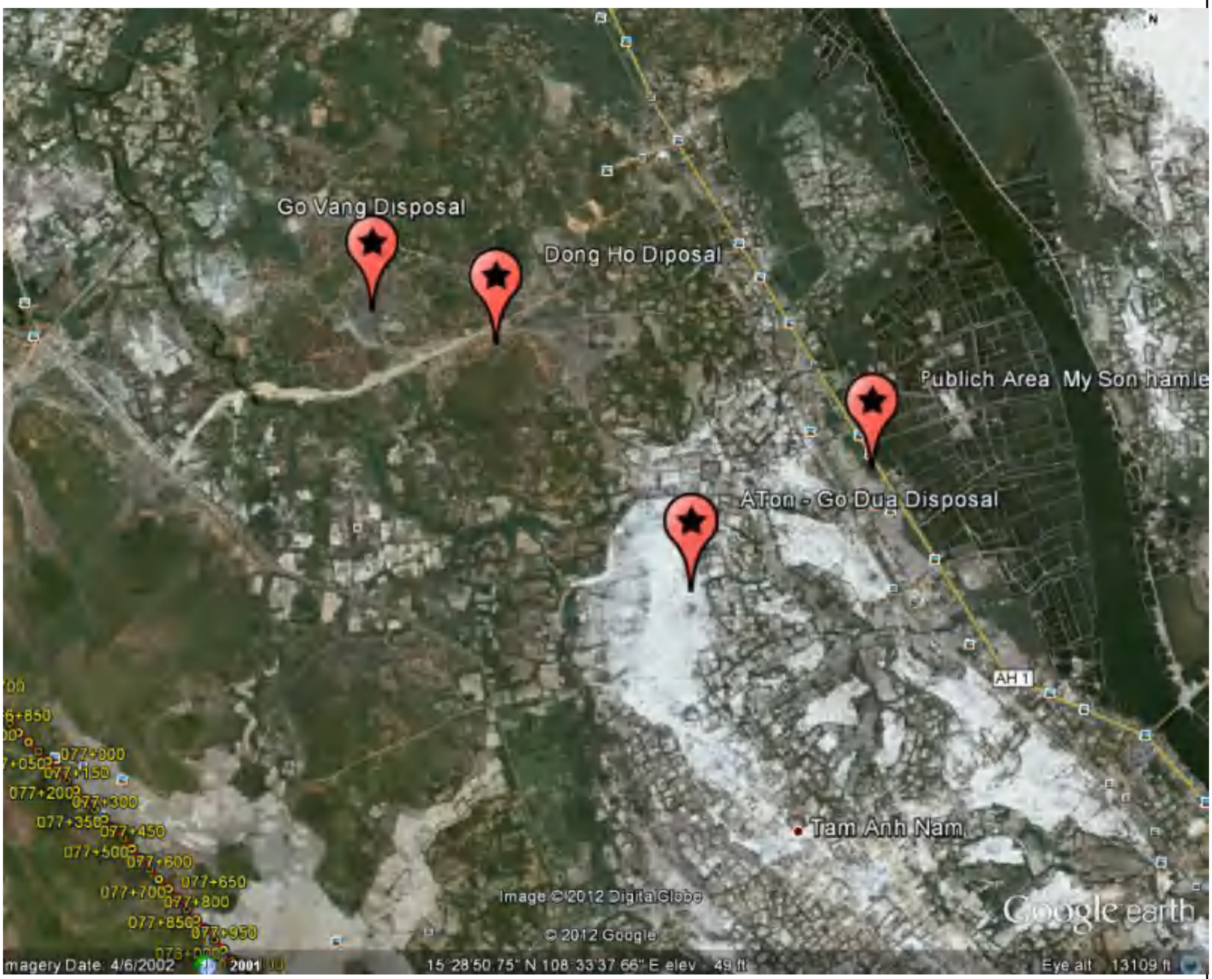
Đại diện địa phương
CHỦ TỊCH
Huỳnh Văn Hoàng






4. Candidate disposal sites at Tam Anh South commune, Nui Thanh District, Quang Ngai province

No.	Disposal Location	Land use status	Area (ha)
1	Aton – Go Du	Lower land, not used land	4 ha (2.0m height fill
2	Public Area of My Son hamlet	Football ground	0.65 ha (1.0m height fill)
3	Dong Ho	Lower land	10 ha (1.0m height fill)
4	Go Vang	Lower land	20 ha (1.5m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

– Đại diện: Tư vấn thiết kế Dự án đường Cao tốc Đà Nẵng - QNgãi
  1. Ông (Bà): Phạm Thế Giang
  2. Ông (Bà): ....

– Đại diện: UBND xã Tam Anh Nam
  1. Ông (Bà): Lê Văn Hùng - Phó Chủ tịch xã
  2. Ông (Bà): Nguyễn Tấn Hưng - Cán bộ Địa chính - Xây dựng
  3. Ông (Bà): Lương Hoài Vũ - Cán bộ Địa chính - Xây dựng

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: ....
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	ATTn - Gò Dừa	Đất nông nghiệp thấp trũng không sản xuất	4 ha (cao 2m)
2	Sân sinh hoạt văn hóa Mỹ Sơn	Đất sân bóng Đất trũng	0,65 ha (cao 1m)
3	Đồng Hồ	Đất trũng	10 ha (cao 1m)
4	Gò Vang	Đất trũng (sau khi khai thác cao lanh)	20 ha (cao 1,5m)

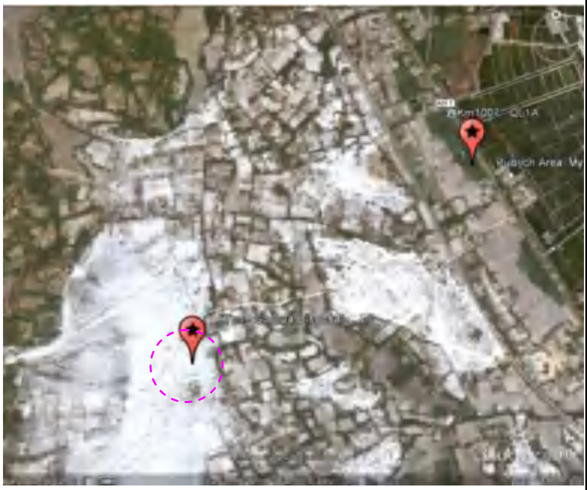
TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

Tam Anh Nam, ngày 13 tháng 1 năm 2012

Đại diện Tư vấn thiết kế Dự án đường cao tốc ĐN-QN	**Đại diện địa phương**
	ỦY BAN NHÂN DÂN CHỦ TỊCH LÊ VĂN HÙNG
Nguyễn Tấn Thủy	

a. Aton – Go Du Disposal: 4ha



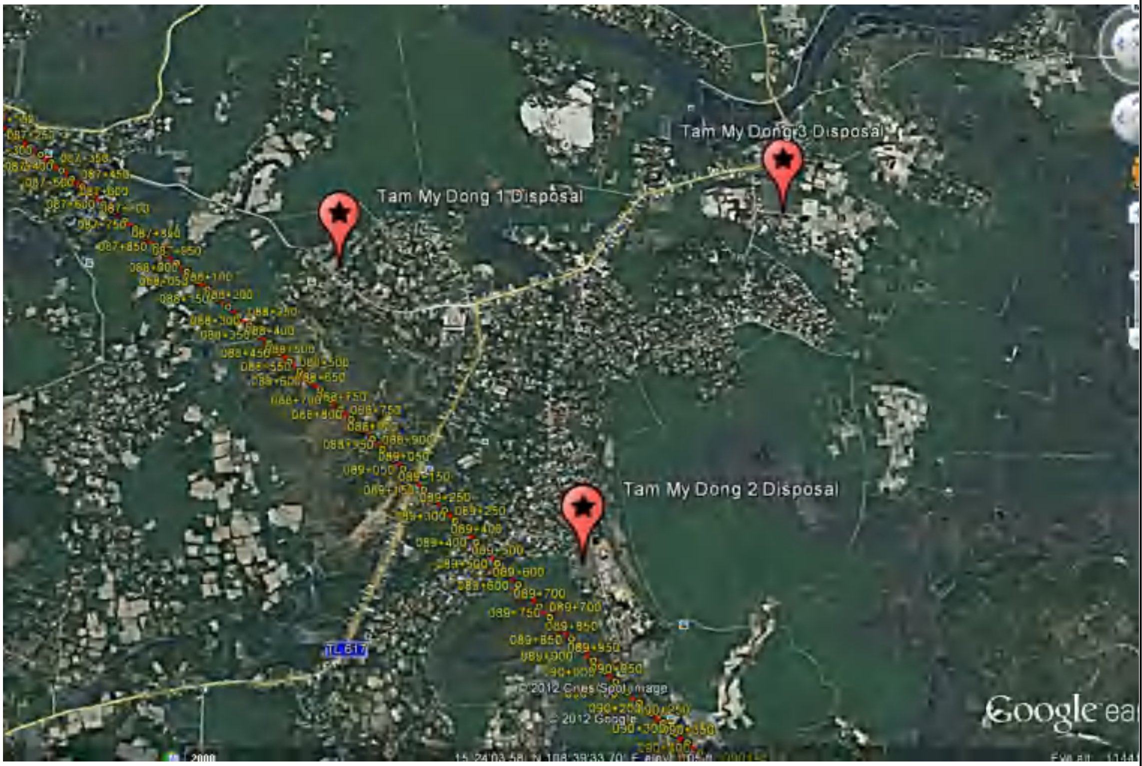
b. Public Area of My Son hamlet: 0.65ha

c. Dong Ho Disposal: 10ha

d. Go Vang Disposal: 20ha

5. Candidate disposal sites at Tam My East commune, Nui Thanh District, Quang Nam province

No.	Disposal Location	Land use status	Area (ha)
1	Tam My East 1 Disposal at Phu Qui 3 hamlet	Not used land	1.0 ha (2.5m height fill)
2	Tam My East 2 Disposal at Da Phu 2 hamlet	Lower land	3.0 ha (2m height fill)
3	Tam My East 3 Disposal at Da Phu - Tra Tay	Football ground	2.0 ha (0.5m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

– Đại diện UBND xã Tam Mỹ Đông, huyện Núi Thành

1. Ông (Bà) Châu Ngọc Phúc - Phó chủ tịch UBND
2. Ông (Bà) Ngô Văn Phú - Cán bộ Địa chính

– ~~Đại diện: Tư vấn Thiết kế Dự án đường cao tốc Đà Nẵng - Quảng Ngãi~~

1. Ông (Bà) Phan Thế Giang - chuyên gia môi trường
2. Ông (Bà)......
3. Ông (Bà)......

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: ......
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Thôn Phú Quý 3	đất bỏ hoang	1 ha (cao 2,5m) làm bãi trung chuyển
2	Thôn Đa Phú 2	đất trũng	3 ha (cao 2m) làm bãi vĩnh viễn
3	Sân bóng gò sỏi thôn Đa Phú Thổ Tây	sân bóng	2 ha (0,5m) tôn sân bóng (làm bãi vĩnh viễn)

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

Tam Mỹ Đông ngày 27 tháng 8 năm 2012

Đại diện Tư vấn thiết kế **Dự án đường cao tốc ĐN-QN**	**Đại diện địa phương** PHÓ CHỦ TỊCH *Châu Ngọc Phúc*

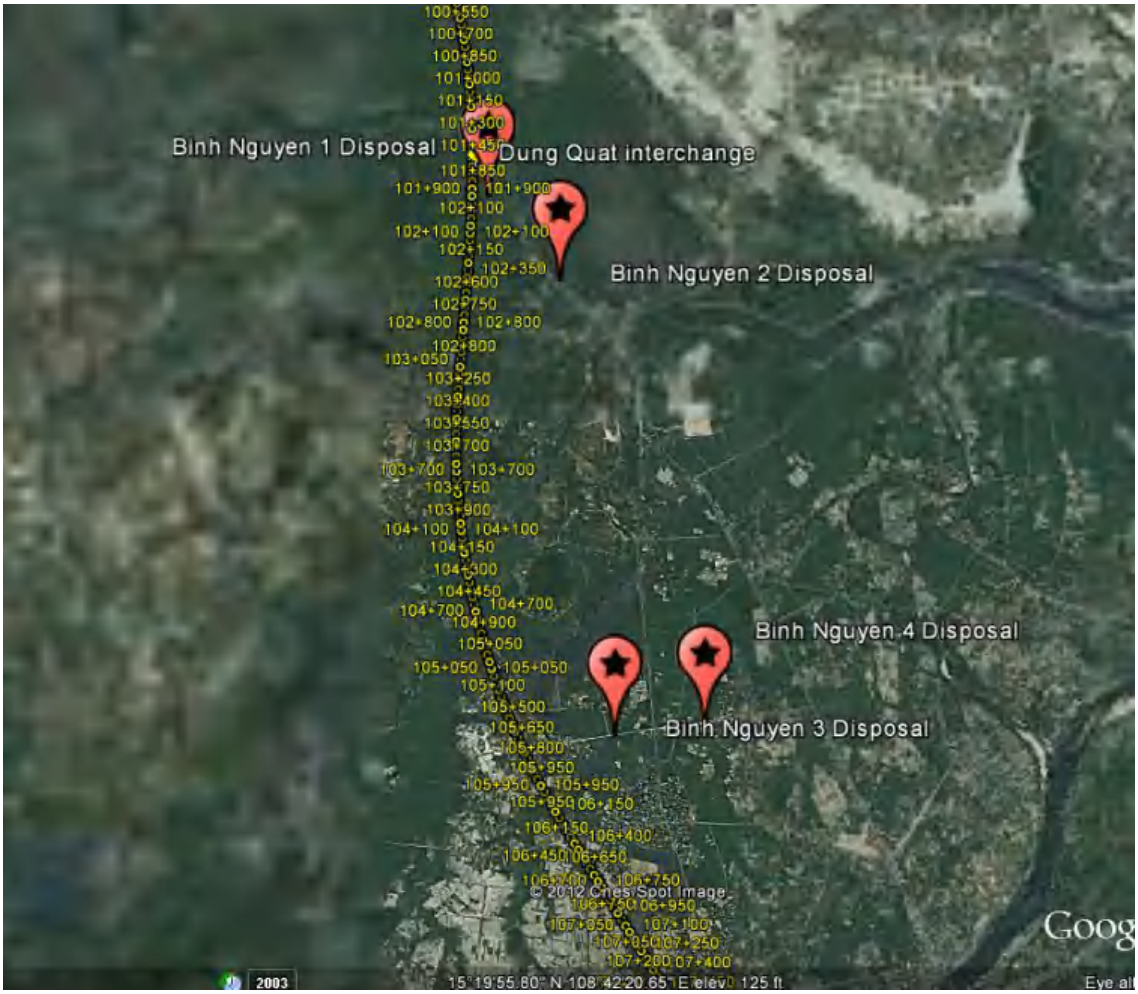
a. Tam My East 1 Disposal: 1.0 ha

b. Tam My East 2 Disposal: 3.0 ha

c. Tam My East 3 Disposal: 2.0 ha

6. Candidate disposal sites at Binh Nguyen commune, Binh Son District, Quang Ngai province

No.	Disposal Location	Land use status	Area (ha)
1	Binh Nguyen 1 disposal: Mau Dau at Tri Binh hamlet	Residence area plan	1 ha (2m height fill)
2	Binh Nguyen 2 disposal: the field under road at Nam Binh 2 hamlet	Commune stadium	1.2ha (2m height fill)
3	Binh Nguyen 2 disposal: Hung garden of Residence area	Residence area plan	0.5ha (1m height fill)
4	Binh Nguyen 3 disposal: Ngo Vo Residence area	Residence area plan	0.3ha (2m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện UBND xã Bình Nguyên, huyện Bình Sơn, Quảng Ngãi
  1. Ông (Bà) Lê Minh Trí – Chủ tịch UBND
  2. Ông (Bà)
- Đại diện: Tư vấn thiết kế dự án đường cao tốc Đà Nẵng – Quảng Ngãi
  1. Ông (Bà) Phạm Thế Giang – Chuyên gia môi trường
  2. Ông (Bà)
  3. Ông (Bà)

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải:
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Mấu Dâu - thôn Trì Bình	đất dự kiến quy hoạch khu dân cư	1 ha (cao 2m)
2	Đồng dưới lò thôn Nam Bình 2	dự kiến tôn tạo thành sân vận động	1,2 ha (cao 2m)
3	Khu dân cư vườn Hưng	dự kiến quy hoạch khu dân cư	0,5 ha (cao 1m)
4	Khu dân cư Ngõ Võ	dự kiến quy hoạch khu dân cư	0,3 ha (cao 2m)

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

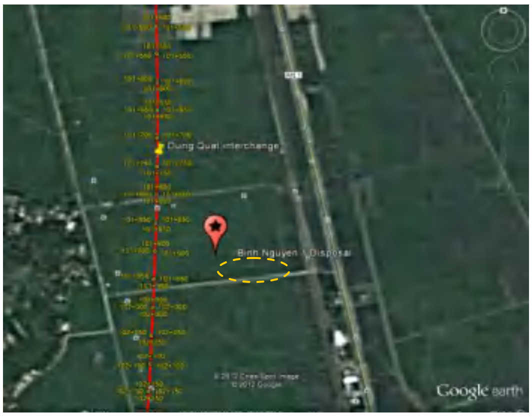
Bình Nguyên, ngày 27 tháng 8 năm 2012

Đại diện Tư vấn thiết kế
Dự án đường cao tốc ĐN-QN

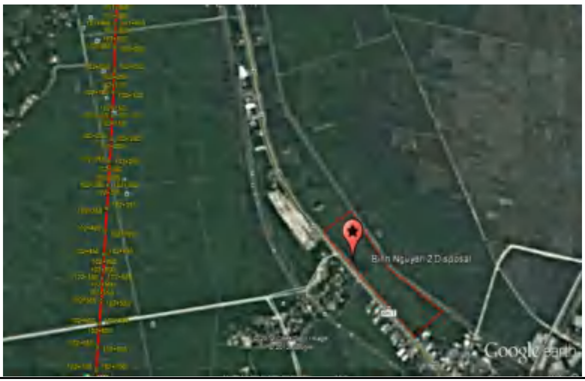
Đại diện địa phương
TM/UBND XÃ BÌNH NGUYÊN
CHỦ TỊCH

Lê Văn Trí

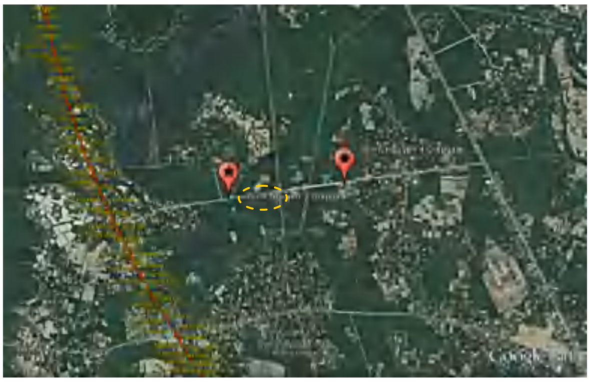
a. Binh Nguyen 1 Disposal (Mau Dau at Tri Binh hamlet): 1 ha



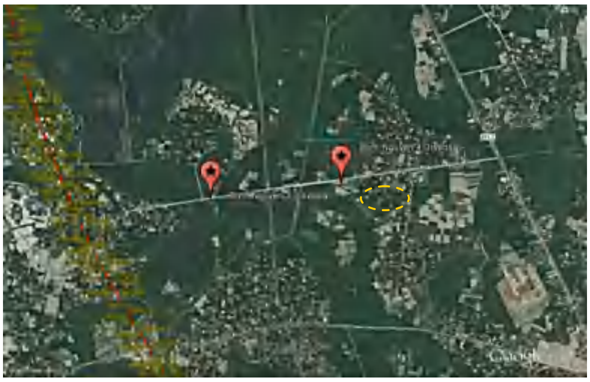
b. Binh Nguyen 2 Disposal (the field under road at Nam Binh 2 hamlet): 1.2 ha



c. Binh Nguyen 3 Disposal (Hung garden of Residence area): 0.5 ha

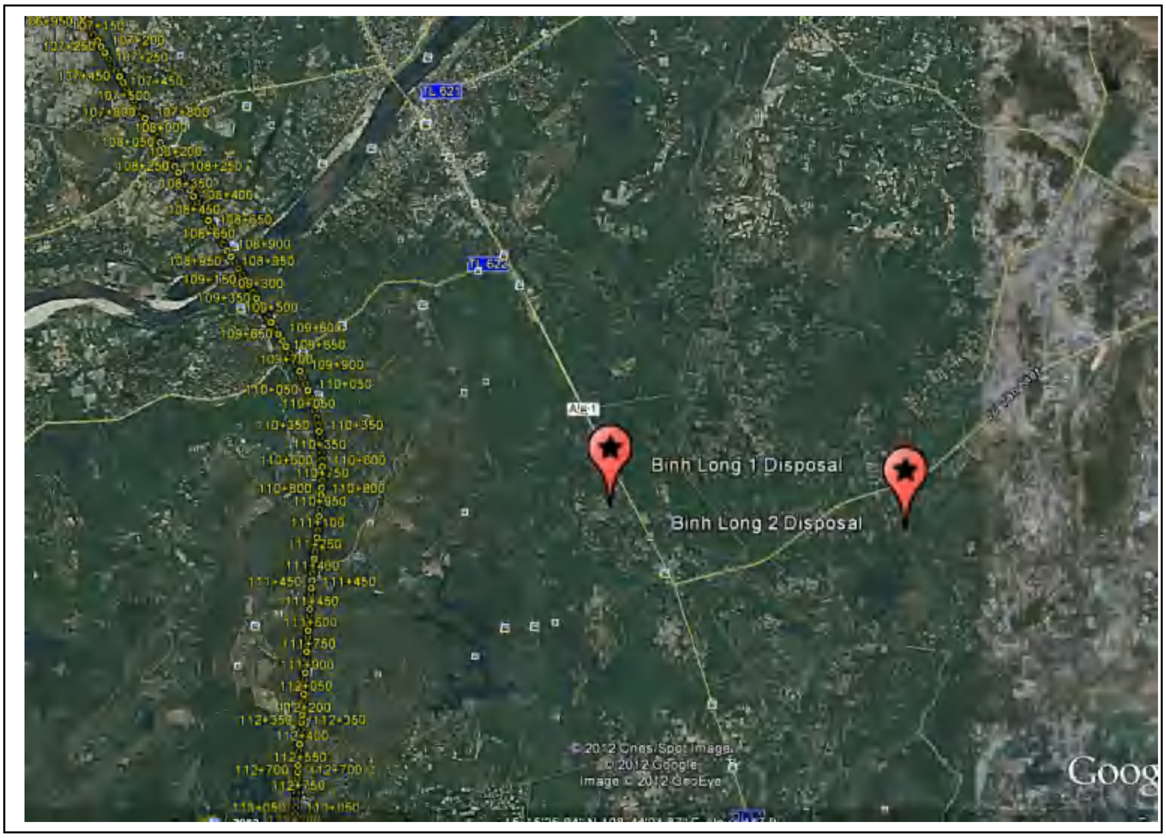


d. Binh Nguyen 4 Disposal (Ngo Vo residential area): 0.3 ha



7. Candidate disposal sites at Binh Long commune, Binh Son District, Quang Ngai province

No.	Disposal Location	Land use status	Area (ha)
1	Binh Long 1 Disposal at Branch of Binh Long primary school at Long Hoi hamlet	Not used land	0.35 ha (2.5m height fill)
2	New field area at Long Binh hamlet	Not used land	0.2 ha (2.0m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng - Quảng Ngãi

Chúng tôi gồm:

- Đại diện UBND xã Bình Long, huyện Bình Sơn, Quảng Ngãi
  1. Ông (Bà) Nguyễn Tấn Bình – Chủ tịch UBND
  2. Ông (Bà) Nguyễn Văn Toàn – Cán bộ Địa chính
- Đại diện: Tư vấn thiết kế dự án đường cao tốc Đà Nẵng – Quảng Ngãi
  1. Ông (Bà) Phạm Thế Giang – chuyên gia môi trường
  2. Ông (Bà) ....
  3. Ông (Bà) ....

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: 02
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Trường Tiểu học Cụm A thôn Long [illegible] – Khu [illegible]	Bỏ hoang chưa sử dụng	3500m² Chiều cao đắp [illegible]m
2	Khu [illegible] – thôn Long Bắc	Chưa sử dụng	[illegible]m² – Chiều cao đắp 2m

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

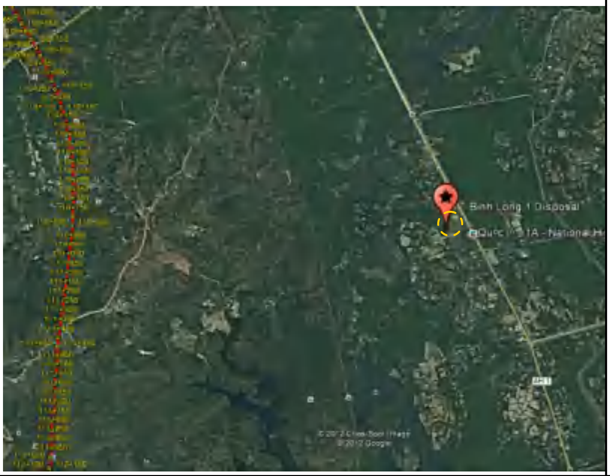
Bình Long, ngày 22 tháng 8 năm 2012

Đại diện Tư vấn thiết kế
Dự án đường cao tốc ĐN-QN

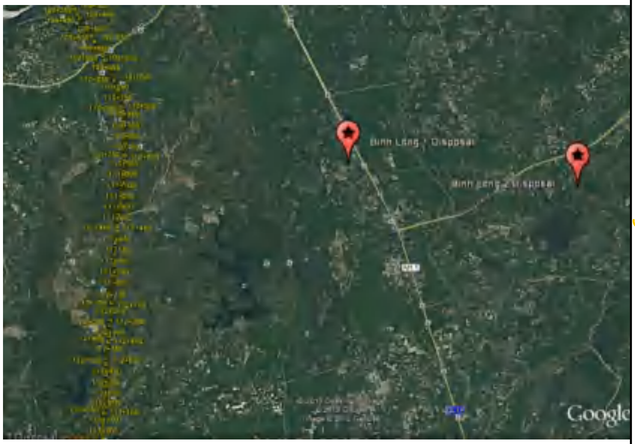
Đại diện địa phương

Nguyễn Tấn Bình

a. Binh Long 1 Disposal: 0.35 ha

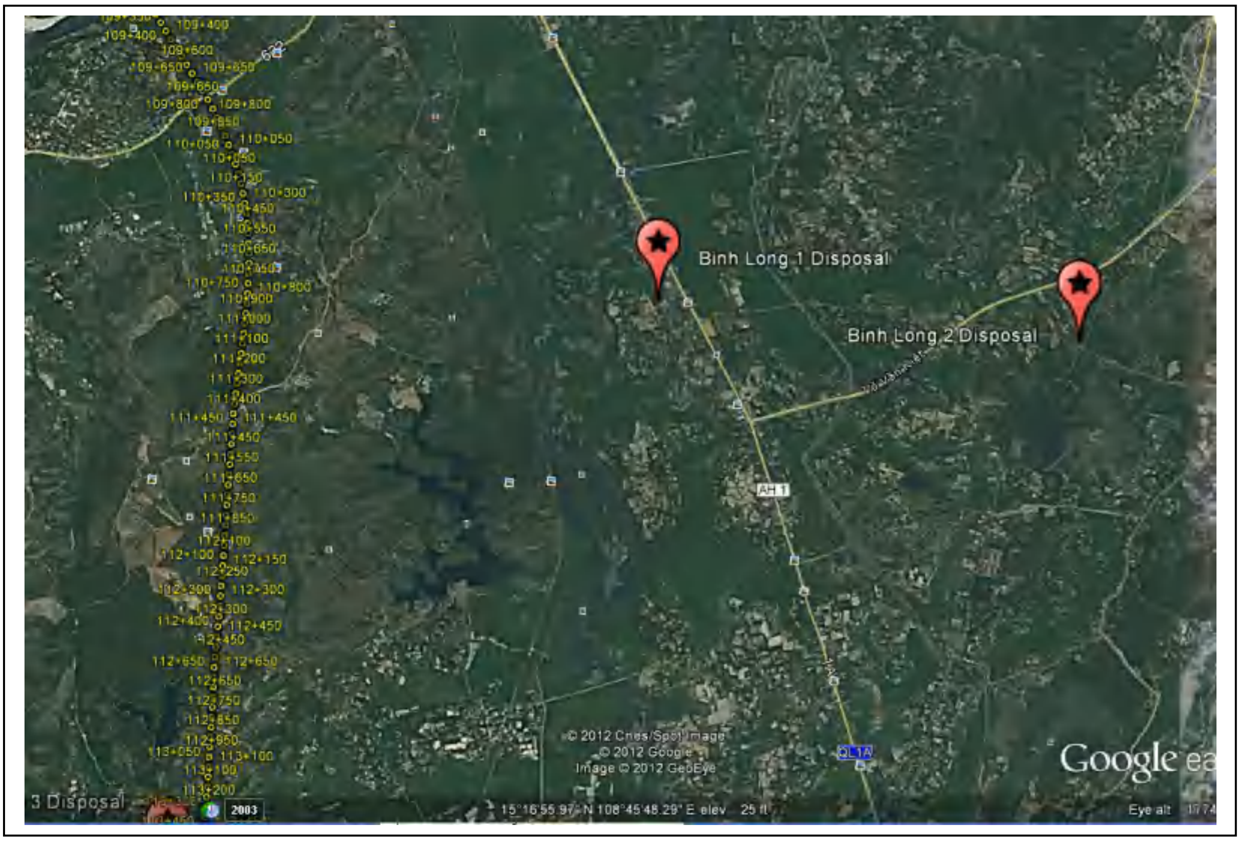


b. Binh Long 2 Disposal: 0.2 ha



8. Candidate disposal sites at Tinh Tho commune, Son Tinh District, Quang Ngai province

No.	Disposal Location	Land use status	Area (ha)
1	Tinh Tho 1 Disposal (Go Giua – Dong Choi) at Tho Nam hamlet	Forest trees and agriculture trees	2.0 ha (1.2m height fill)
2	Tinh Tho 2 Disposal (Dong Choi) at Tho Tay hamlet	Agriculture trees	4.0 ha (1.0m height fill)
3	Tinh Tho 3 Disposal (Dong Ngo – Bay Cuong) at Tho Tay hamlet	Forest trees and agriculture trees	3.0 ha (2.5m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện U.B.N.D xã Tịnh Thọ, Sơn Tịnh, Quảng Ngãi
  1. Ông (Bà) Lâm Văn Hào – Phó chủ tịch UBND
  2. Ông (Bà) Đinh Văn Quang – cán bộ địa chính
- Đại diện: Tư vấn thiết kế dự án đường cao tốc Đà Nẵng – Quảng Ngãi
  1. Ông (Bà) Phạm Thế Giang – chuyên gia môi trường
  2. Ông (Bà)........................
  3. Ông (Bà)........................

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: ....
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Gò giữa – Đồng Chồi thuộc Thọ Nam	trồng cây lâu năm (keo), cây hàng năm (lúa, màu)	2ha (cao 1,2 m)
2	Đồng Chồi xóm 1 Thọ Tây	trồng cây hàng năm (màu, lúa)	4ha (cao 1,0 m)
3	Đồng Ngỗ – Bảy Cưỡng xóm 6 thôn Thọ Tây	trồng cây lâu năm và cây hàng năm	3 ha (2,5 m dày)

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

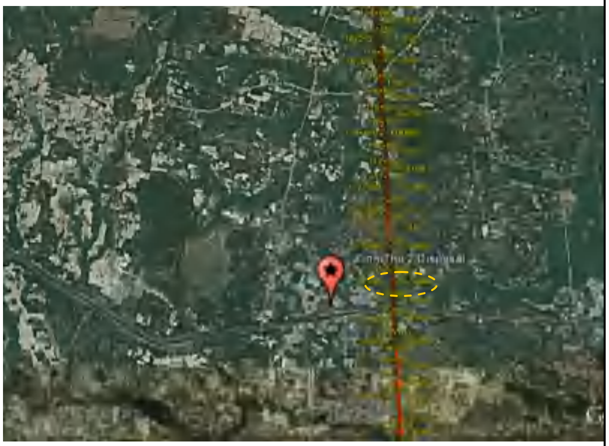
Tịnh Thọ, ngày 28 tháng 8 năm 2012

Đại diện Tư vấn thiết kế
Dự án đường cao tốc ĐN-QN

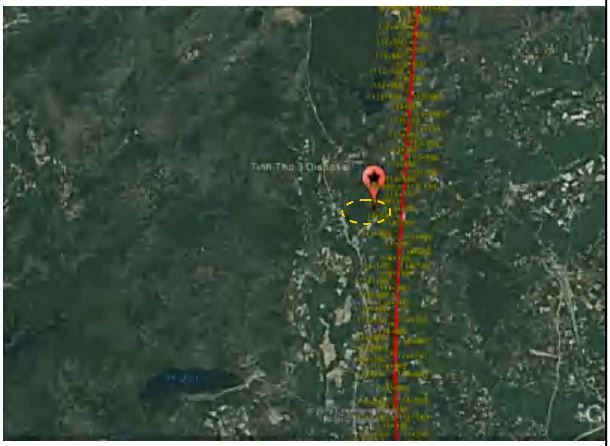
Đại diện địa phương
TM. UBND XÃ TỊNH THỌ
PHÓ CHỦ TỊCH
Lâm Văn Hào

a. Tinh Tho 1 Disposal: 2.0 ha

b. Tinh Tho 2 Disposal: 4.0 ha



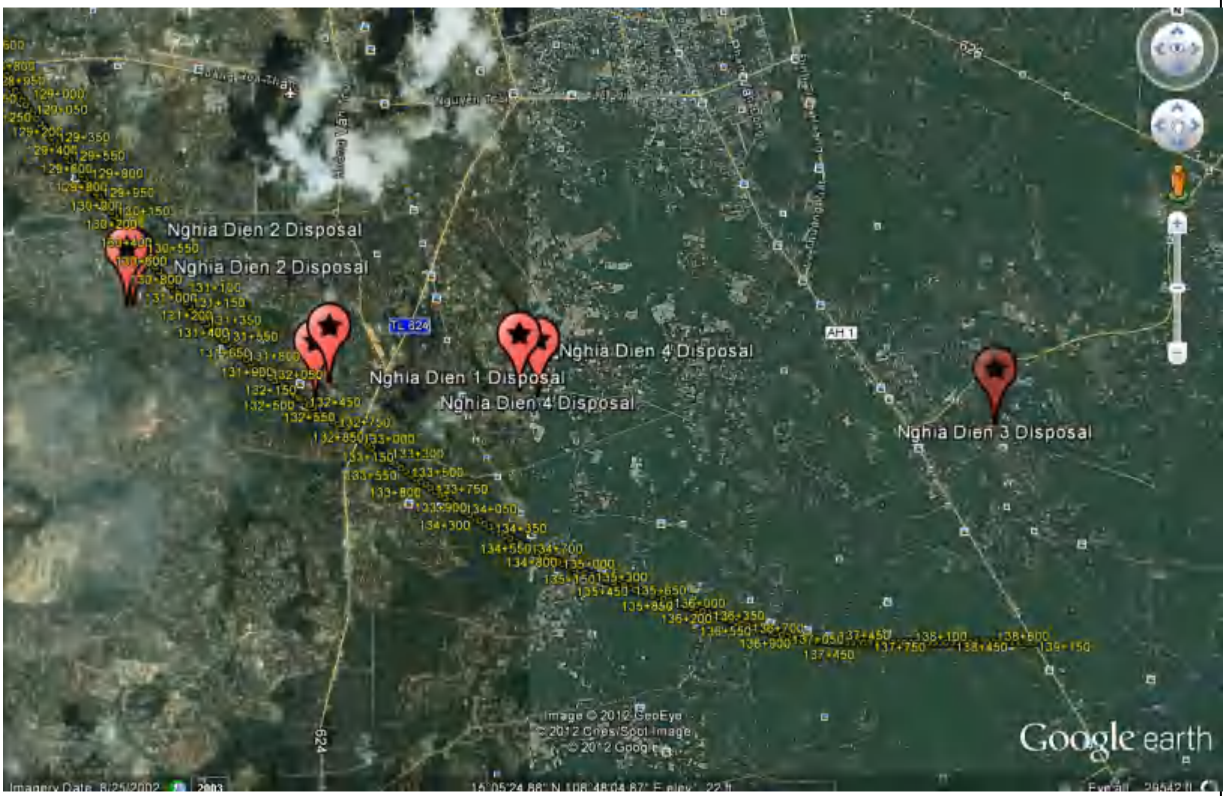
c. Tinh Tho 3 Disposal: 3.0 ha






9. Candidate disposal sites at Nghia Dien commune, Tu Nghia District, Quang Ngai province

No.	Disposal Location	Land use status	Area (ha)
1	Nghia Dien 1 Disposal (Dong Bau Nha) at Dien Chanh hamlet	Rice field – lower land	15 ha (1m height fill)
2	Nghia Dien 2 Disposal (Dong Bau Bo) at Dien Long hamlet	Rice field – lower land	3.0 ha (0.5m height fill)
3	Nghia Dien 3 Disposal (Dong Bau Thiet) at Dien Hoa hamlet	Agriculture land	7.0 ha (1.5m height fill)
4	Nghia Dien 4 Disposal (Dong Cau xom Xiec) at Dien Chanh hamlet	Agriculture land	2.0 ha (2.5m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC
ĐÀ NẴNG – QUẢNG NGÃI

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện: Tư vấn thiết kế Dự án đường Cao tốc Đà Nẵng - Quảng Ngãi
  1. Ông (Bà): Phạm Thế Giang – Chuyên gia Môi trường
  2. Ông (Bà): ....
- Đại diện: UBND Xã Nghĩa Điền
  1. Ông (Bà): Nguyễn Quang Lâm – PCT UBND xã
  2. Ông (Bà): Trần Thị Kim Ngân – PCT UBND xã
  3. Ông (Bà): Phan Tấn Trung – CB Địa chính xã

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải: 04
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Xứ đồng Bàu Na (Thôn Điện Chánh)	Đất Lúa - Vùng trũng	15 ha - Chiều cao đắp: 1 m
2	Xứ đồng Bàu Bộ (Thôn Điện Long)	Đất Lúa - Vùng trũng	3 ha - Chiều cao đắp: 1,5 m
3	Xứ đồng Gò Thùng (Thôn Điện Hòa)	Đất HNK - Trồng cây hàng năm khác	7 ha - Chiều cao đắp 1,5 m
4	Xứ đồng Cồn Xóm Liêu (Thôn Điện Chánh)	Đất Lúa + Hàng năm khác	9 ha - Chiều cao đắp 1,5 m

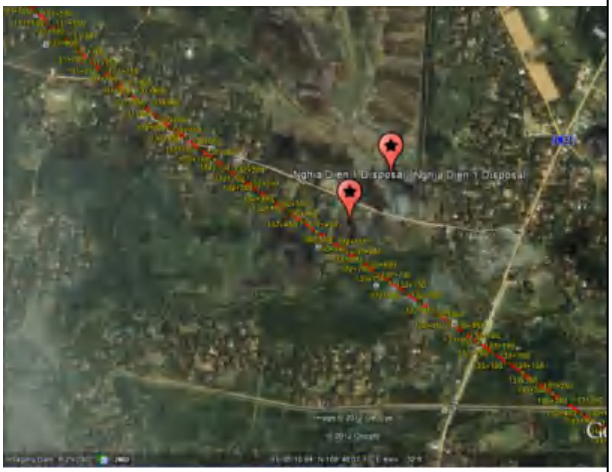
TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

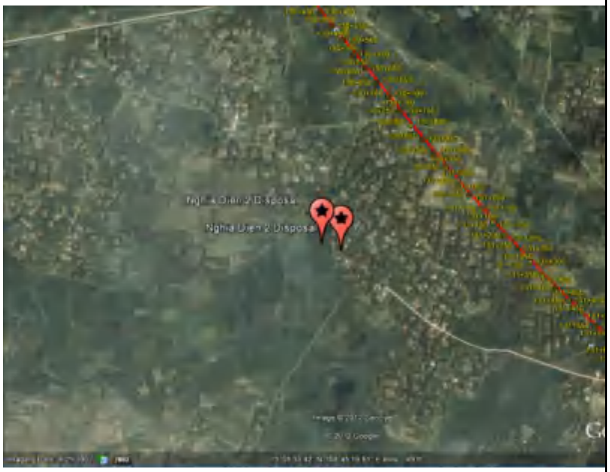
Nghĩa Điền, ngày 28 tháng 8 năm 2012

Đại diện Tư vấn thiết kế Dự án đường cao tốc ĐN-QN	Đại diện địa phương
Phạm Thế Giang	Phan Tấn Trung
	TM. UBND XÃ NGHĨA ĐIỀN KT. CHỦ TỊCH PHÓ CHỦ TỊCH Nguyễn Quang Lâm

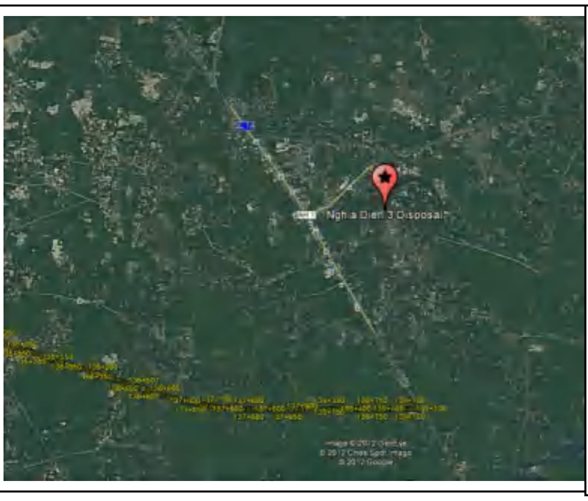
a. Nghia Dien 1 Disposal: 15.0 ha



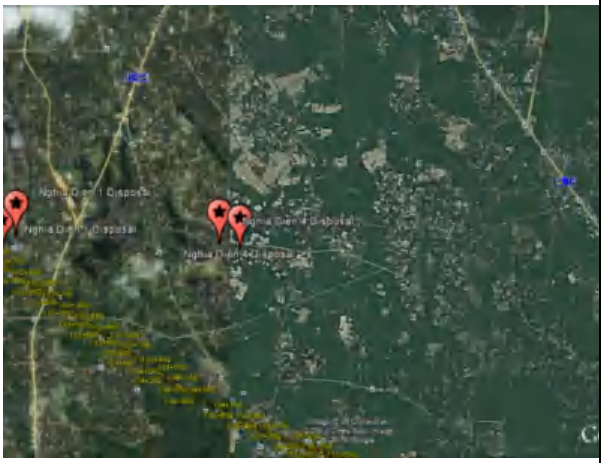
b. Nghia Dien 2 Disposal: 3.0 ha



c. Nghia Dien 3 Disposal: 7.0 ha

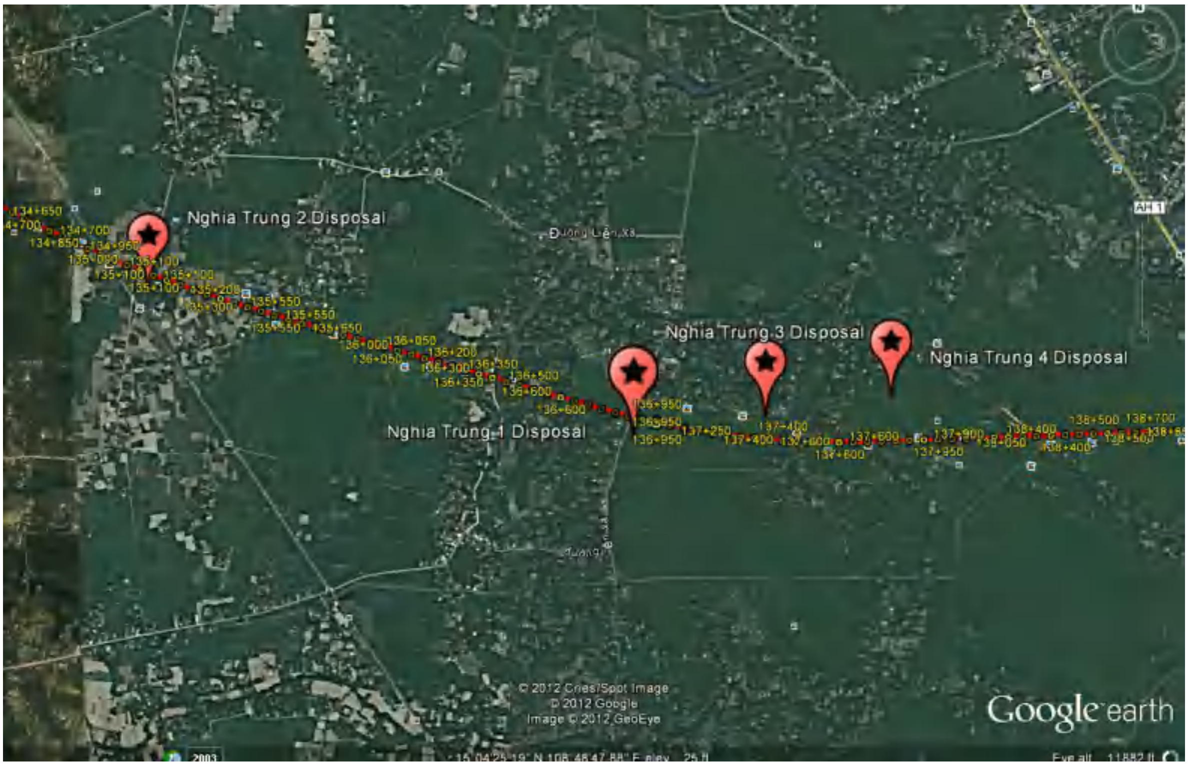


d. Nghia Dien 4 Disposal: 2.0 ha



10. Candidate disposal sites at Nghia Trung commune, Tu Nghia District, Quang Ngai province

No.	Disposal Location	Land use status	Area (ha)
1	Nghia Trung 1 Disposal at Dien Trang hamlet	Rice field, Market area planning	0.5 ha (0.8 m height fill)
2	Nghia Trung 2 Disposal at Tan Hoi hamlet	Rice field	0.3 ha
3	Nghia Trung 3 Disposal at An Hai 3 hamlet	Rice field	0.3 ha
4	Nghia Trung 4 Disposal (Bau truoc – Bau sau) at Dien Trang hamlet	Pond	1.0 ha (2.5m height fill)



DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc

PHIẾU THU THẬP THÔNG TIN VỀ BÃI ĐỔ THẢI TẠI ĐỊA PHƯƠNG

Dự án: Đường cao tốc Đà Nẵng – Quảng Ngãi

Chúng tôi gồm:

- Đại diện UBND xã Nghĩa Trung, huyện Tư Nghĩa, Quảng Ngãi
  1. Ông (Bà) Phan Văn Phải – Chủ tịch UBND
  2. Ông (Bà) Cao Thanh Thắng – Cán bộ xây dựng
- Đại diện: Tư vấn thiết kế dự án đường cao tốc Đà Nẵng Quảng Ngãi
  1. Ông (Bà) Phạm Thị Giang – chuyên gia môi trường
  2. Ông (Bà)
  3. Ông (Bà)

Sau khi nghiên cứu Dự án, thảo luận về các vấn đề liên quan đến bãi đổ thải phục vụ cho Dự án. Phía địa phương cung cấp các thông tin về các vị trí có thể bố trí làm bãi đổ thải như sau:

1. Số lượng vị trí có thể bố trí làm bãi đổ thải:
2. Các thông tin về vị trí có thể bố trí làm bãi đổ thải

TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)
1	Thôn Điền Trang	đất trồng lúa qui hoạch làm chợ	0,5ha (cao độ 0,8m)
2	Thôn Tân Hội (làm bãi ~~trung chuyển~~) vĩnh cửu	đất trồng lúa	0,3ha (
3	Thôn An Hải 3 (điểm bãi trung chuyển)	đất trồng lúa	0,3ha
4	Bàu Trưới – Bàu sau thôn Điền Trang	ao, hồ	1ha (cao độ 0,5m)

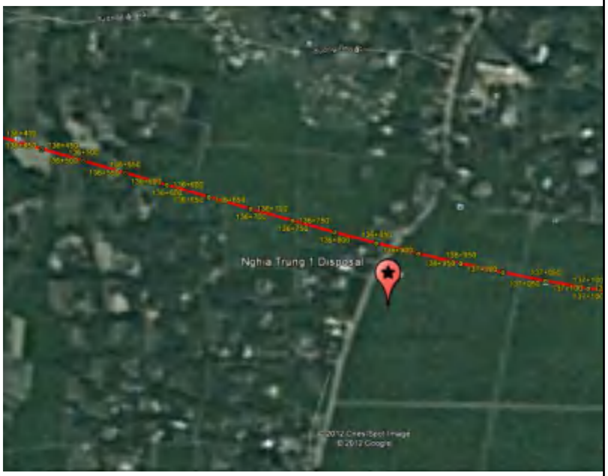
TT	Vị trí	Tình trạng sử dụng đất hiện tại	Diện tích (ha)

UBND xã giới thiệu các vị trí thuộc địa bàn của xã có khả năng bố trí làm bãi đổ thải phục vụ cho Dự án đường cao tốc Đà Nẵng – Quảng Ngãi. Trong các bước tiếp theo của Dự án, đề nghị phía Dự án cần phối hợp để triển khai chi tiết.

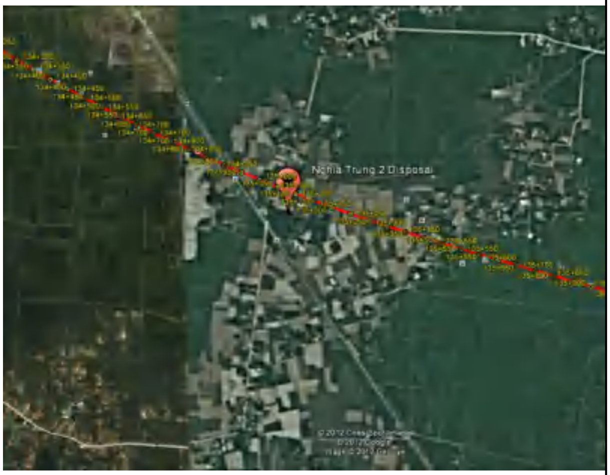
Nghĩa Trung, ngày 28 tháng 8 năm 2012

Đại diện Tư vấn thiết kế Dự án đường cao tốc ĐN-QN	Đại diện địa phương CHỦ TỊCH Phan Văn Phải

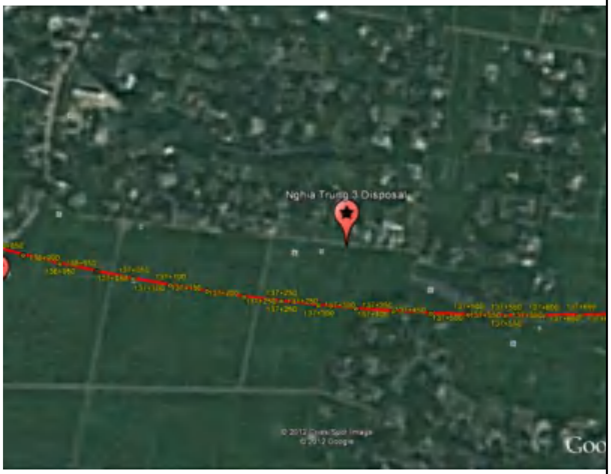
a. Nghia Trung 1 Disposal: 0.5 ha



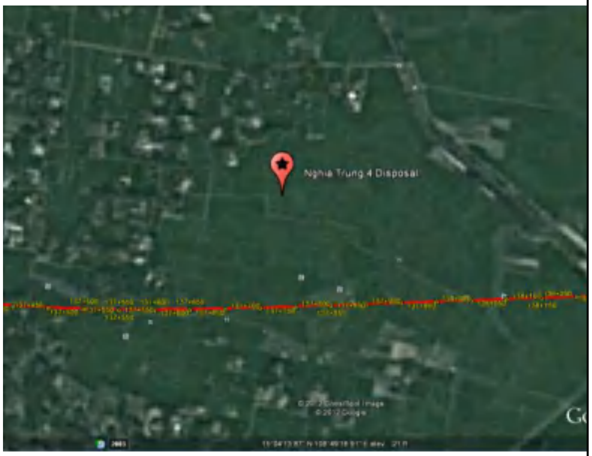
b. Nghia Trung 2 Disposal: 0.3 ha



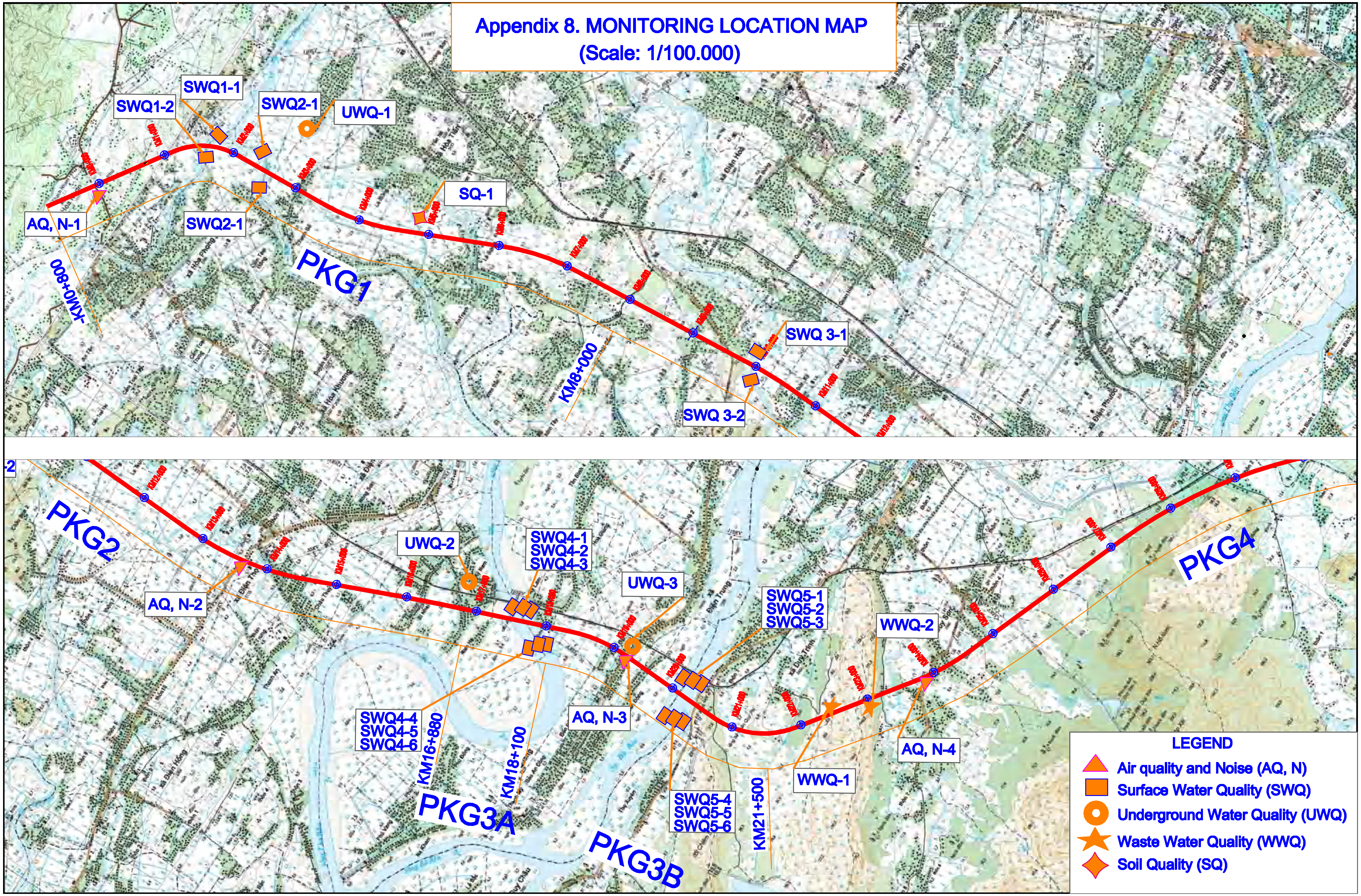
c. Nghia Trung 3 Disposal: 0.3 ha

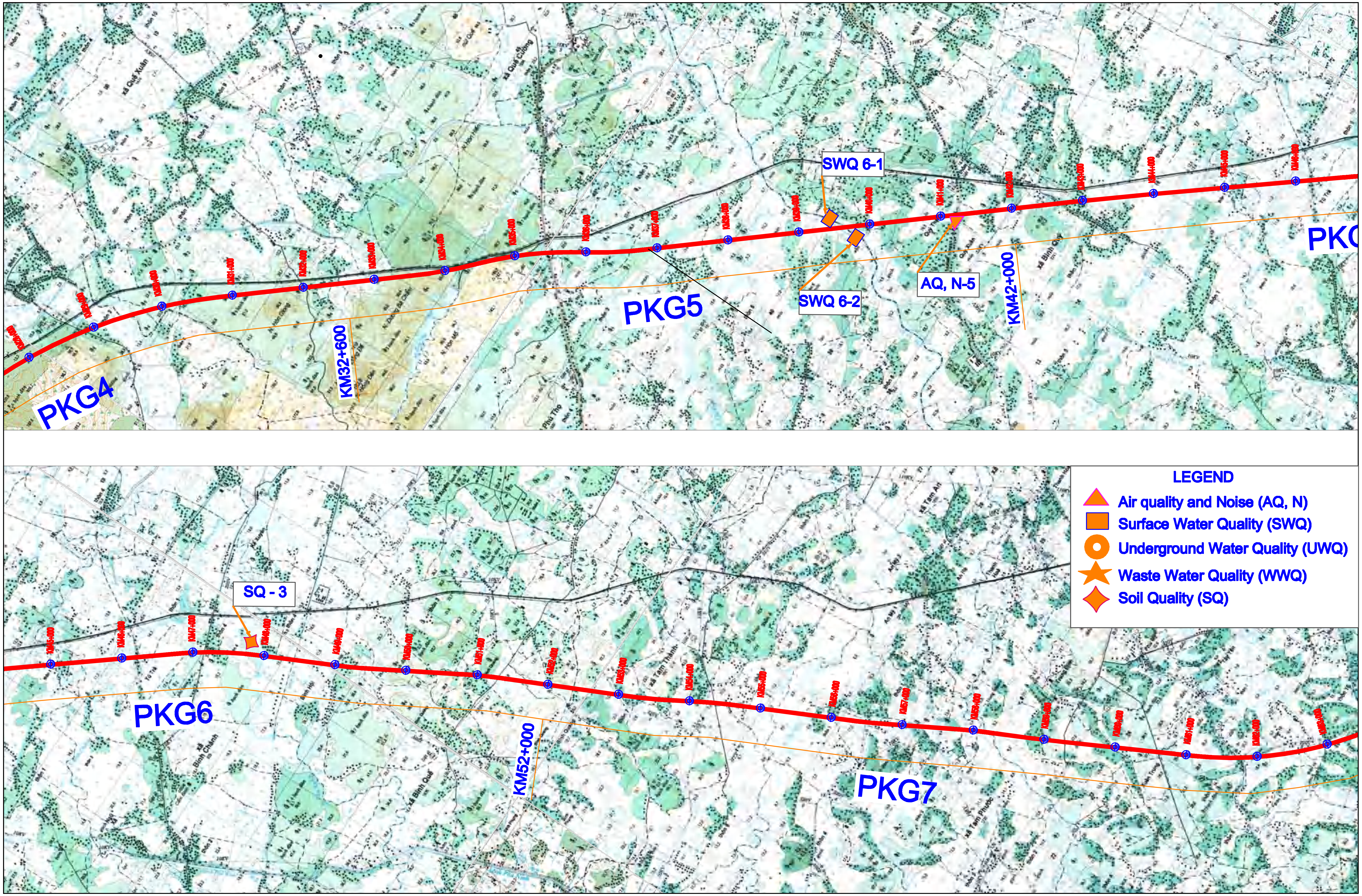


d. Nghia Trung 4 Disposal: 1.0 ha

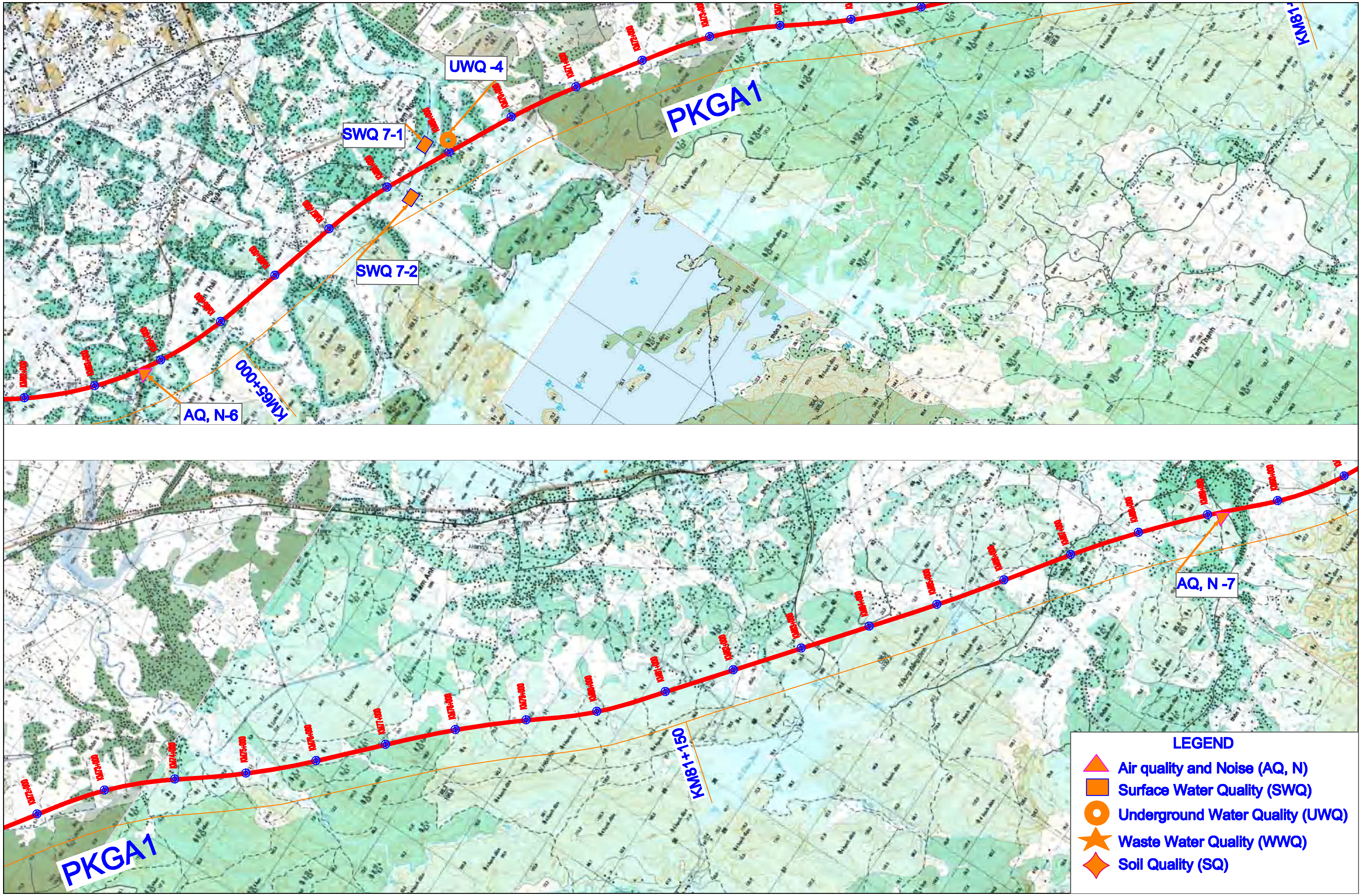


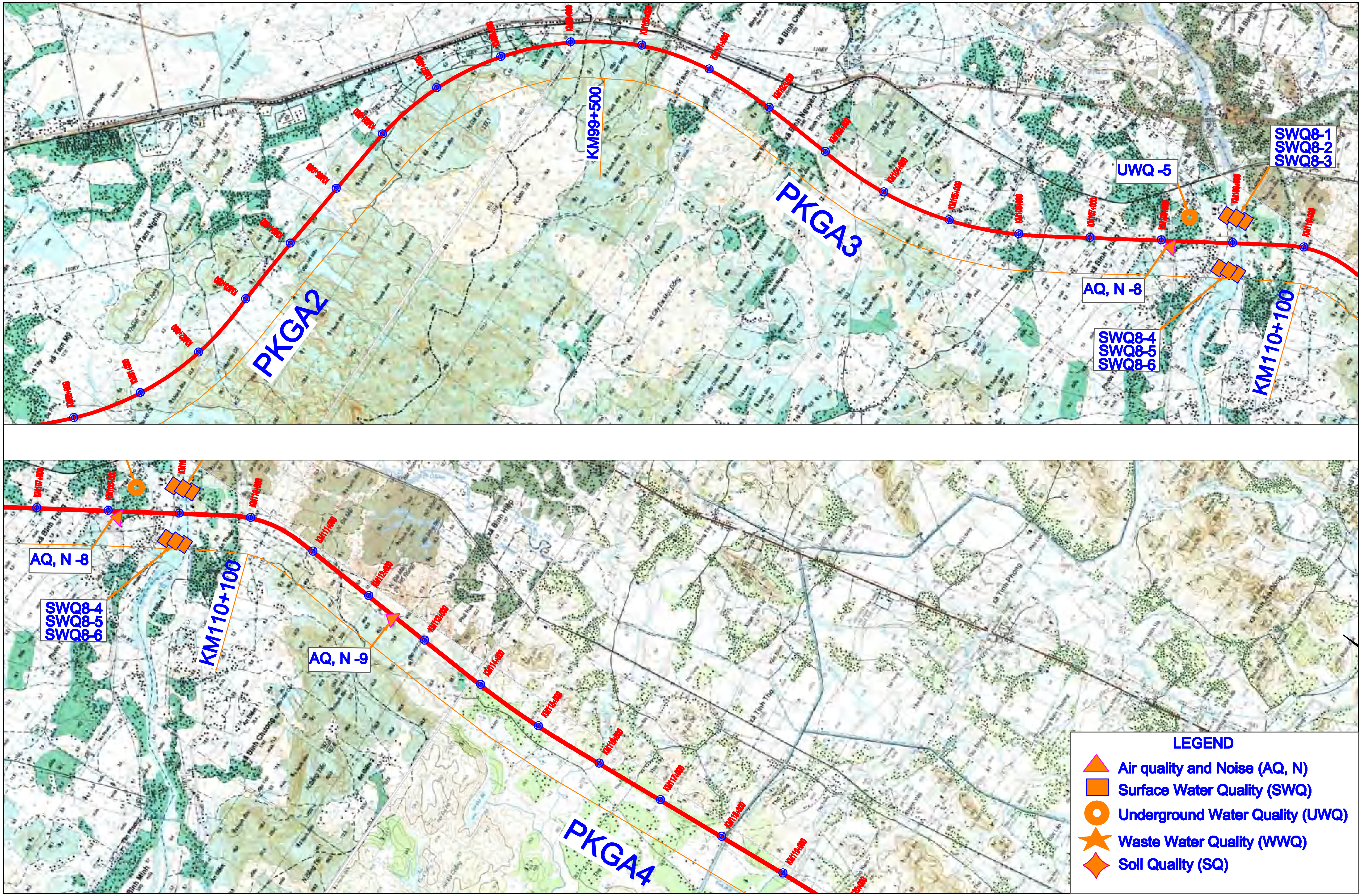
Appendix 8. MONITORING LOCATION MAP
(Scale: 1/100.000)



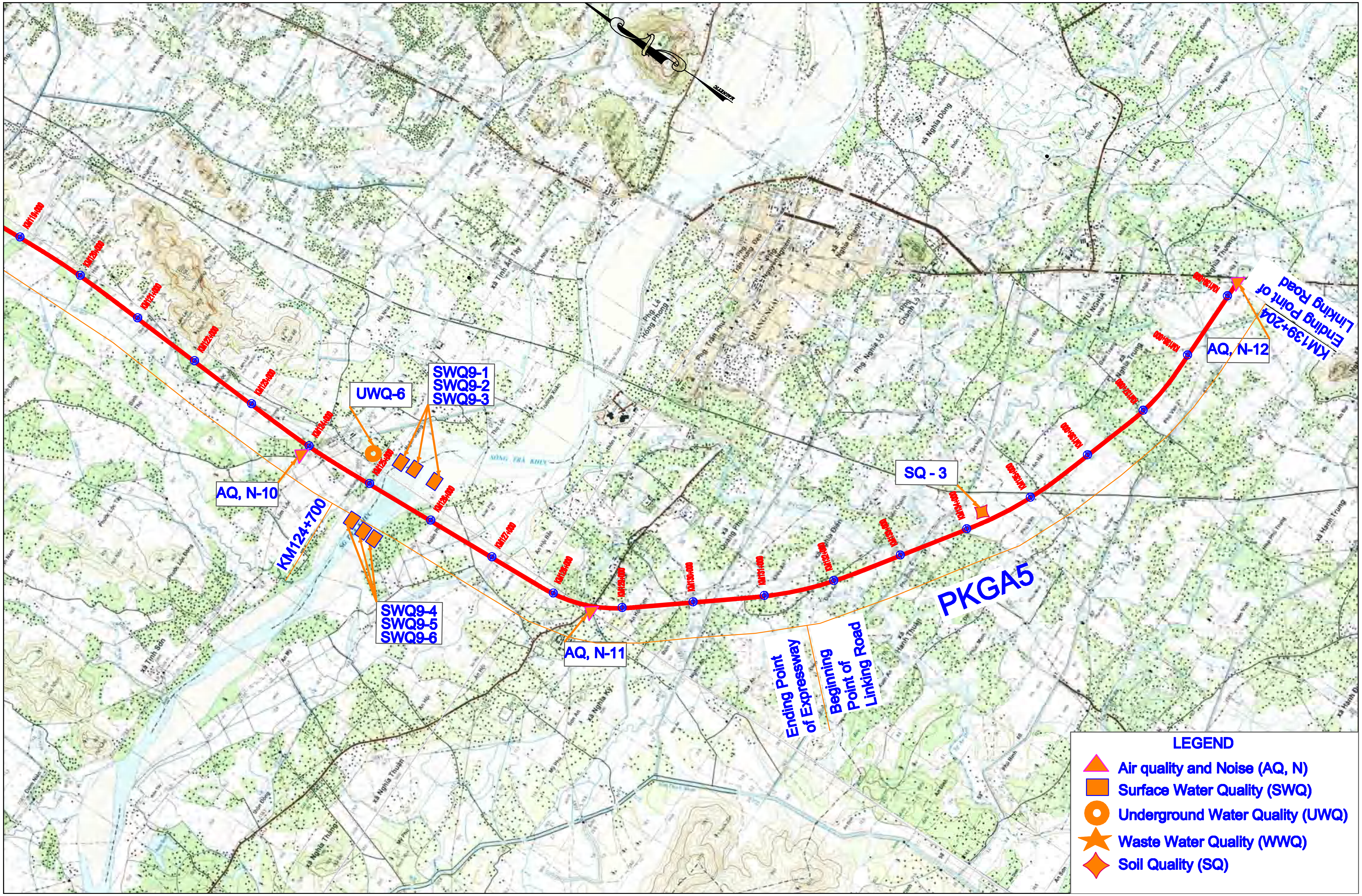


SWQ 6-1
SWQ 6-2
AQ, N-5
KM32+600
KM42+000
PKG4
PKG5
SQ - 3
KM52+000
PKG6
PKG7
LEGEND
Air quality and Noise (AQ, N)
Surface Water Quality (SWQ)
Underground Water Quality (UWQ)
Waste Water Quality (WWQ)
Soil Quality (SQ)


UWQ -4
SWQ 7-1
SWQ 7-2
PKGA1
AQ, N-6
KM65+000
KM81+150
AQ, N -7
PKGA1
LEGEND
Air quality and Noise (AQ, N)
Surface Water Quality (SWQ)
Underground Water Quality (UWQ)
Waste Water Quality (WWQ)
Soil Quality (SQ)



KM99+500
PKGA2
PKGA3
UWQ -5
SWQ8-1
SWQ8-2
SWQ8-3
AQ, N -8
SWQ8-4
SWQ8-5
SWQ8-6
KM110+100
AQ, N -8
SWQ8-4
SWQ8-5
SWQ8-6
KM110+100
AQ, N -9
PKGA4
LEGEND
Air quality and Noise (AQ, N)
Surface Water Quality (SWQ)
Underground Water Quality (UWQ)
Waste Water Quality (WWQ)
Soil Quality (SQ)



UWQ-6
SWQ9-1
SWQ9-2
SWQ9-3
AQ, N-10
KM124+700
SWQ9-4
SWQ9-5
SWQ9-6
AQ, N-11
Ending Point of Expressway
Beginning Point of Linking Road
PKGA5
SQ - 3
AQ, N-12
KM139+204
Ending Point of Linking Road
LEGEND
Air quality and Noise (AQ, N)
Surface Water Quality (SWQ)
Underground Water Quality (UWQ)
Waste Water Quality (WWQ)
Soil Quality (SQ)

Appendix 10:

Sample of Booklet and Minute of Meeting
(Public Consultation Meeting).

Bộ Giao Thông Vận Tải

THE WORLD BANK

Tổng Công Ty Đầu Tư Phát Triển Đường Cao Tốc Việt Nam

Ban Quản Lý Dự Án 85

Số tín dụng IDA	:	3843-VN
Mã dự án	:	P106235

Dịch Vụ Tư Vấn
cho
Thiết Kế Chi Tiết Dự Án Đường Cao Tốc
Đà Nẵng – Quảng Ngãi

TÀI LIỆU HỘI THẢO
THAM VẤN CỘNG ĐỒNG

XÃ BÌNH CHÁNH, HUYỆN BÌNH SƠN
TỈNH QUẢNG NGÃI

Tháng 11, 2012

Liên danh

NIPPON KOEI CO.,LTD.

NIPPON ENGINEERING CONSULTANTS CO.,LTD.

CHODAI CO.,LTD.

THAI ENGINEERING CONSULTANTS CO., LTD.

CHƯƠNG TRÌNH HỘI THẢO THAM VẤN CỘNG ĐỒNG
DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI

Ngày 07/11/2012 - XÃ BÌNH CHÁNH

THỜI GIAN	NỘI DUNG	CHỊU TRÁCH NHIỆM
Phần 1: Mở đầu		
7:30 – 8:00	Đón tiếp đại biểu	UBND Xã
8:00 – 8:10	Khai mạc hội thảo, giới thiệu đại biểu	Chủ tịch UBND Xã
8:10 – 8:20	Phát biểu của UBND Huyện	Lãnh đạo UBND Huyện
8:20 – 8:35	Giới thiệu dự án đường cao tốc Đà Nẵng – Quảng Ngãi	Ban quản lý dự án 85 (PMU85) / PMU1
Phần 2: Trình bày tham luận và hướng dẫn thảo luận – Chủ trì: TS. Vũ Ngọc Long (Trưởng nhóm Tư vấn Tái định cư)		
8:35 – 8:50	Phát biểu của Đại diện tư vấn Thiết kế	Giám đốc dự án
8:50 – 9:05	Giới thiệu thiết kế kỹ thuật của dự án	Tư vấn Thiết kế Kỹ thuật
9:05 – 9:20	Trình bày những tác động môi trường tự nhiên của dự án và kế hoạch giảm thiểu.	Tư vấn Môi trường
9:20 – 9:35	Trình bày những tác động xã hội của dự án và kế hoạch giảm thiểu	Tư vấn Xã hội
9:35 – 10:00	Chính sách bồi thường, hỗ trợ và tái định cư đối với các hộ bị ảnh hưởng.	Ban Bồi thường và GPMB
10:00 – 10:15	**Nghỉ giải lao**	
10:15 – 11:15	Tham vấn cộng đồng, thảo luận và đóng góp ý kiến	Tất cả thành viên tham dự
	Trả lời, giải đáp thắc mắc	PMU85, Ban BTGPMB và Tư vấn
11:15 – 11:25	Tổng kết, lập biên bản hội thảo	TS. Vũ Ngọc Long, Trưởng nhóm tư vấn tái định cư.
11:25 – 11:30	Bế mạc	Chủ tịch UBND Xã

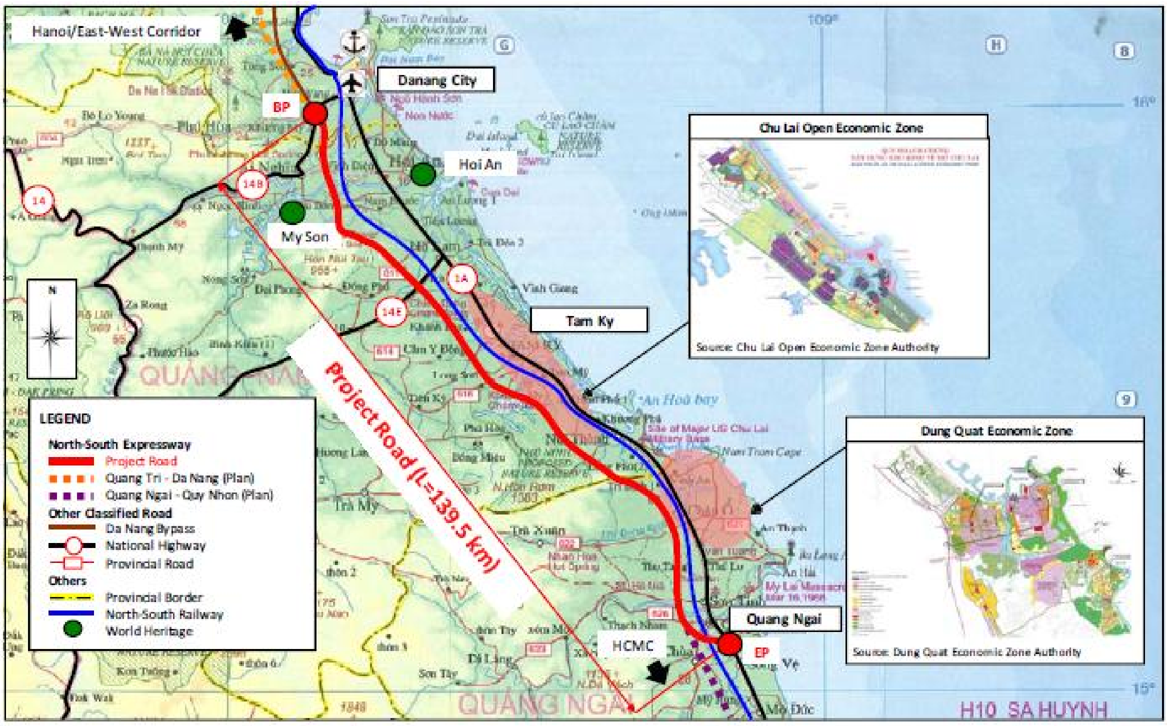
Mục Lục

BÀI 1: GIỚI THIỆU THIẾT KẾ KỸ THUẬT DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI

1. Tổng quát

1.1 Tổng thể dự án

Tuyến đường của Dự án là một phần của tuyến đường cao tốc Bắc-Nam chạy song song với QL1A và Đường sắt Bắc-Nam hiện tại, đi qua địa phận thành phố Đà Nẵng, tỉnh Quảng Nam và tỉnh Quảng Ngãi. Tuyến đường bắt đầu từ nút giao giữa Đường tránh Đà Nẵng và QL14B tại thành phố Đà Nẵng và kết thúc tại điểm nối với Đường vành đai thành phố quy hoạch trên QL1A tại tỉnh Quãng Ngãi. Những công trình phát triển về kinh tế - xã hội chính dọc tuyến bao gồm Khu kinh tế mở Chu Lai tại tỉnh Quảng Nam và Khu công nghiệp Dung Quất tại tỉnh Quảng Ngãi. Đối với các di sản văn hóa, khu phố cổ Hội An và thánh địa Mỹ Sơn là những di tích đã được đăng ký là di sản thế giới (di sản văn hóa) đều nằm ở dọc tuyến đường này.



Hình 1: Bản đồ vị trí dự án

1.2 Mục tiêu

Mục tiêu chính của Dự án là tăng cường thuận thiện giao thông và an toàn bằng cách xây dựng tuyến đường cao tốc từ Đà Nẵng đến Quảng Ngãi, đóng góp vào sự phát triển kinh tế của khu vực Miền Trung.

1.3 Ranh giới hành chính

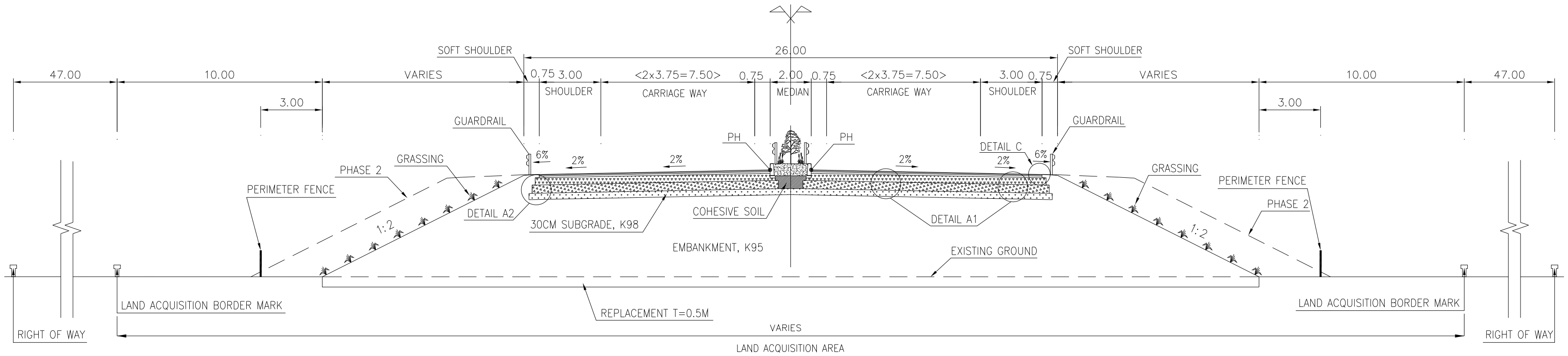
Trong địa bàn huyện Bình Sơn, đường cao tốc đi qua các xã như sau

Bảng1.Ranh giới xã liên quan

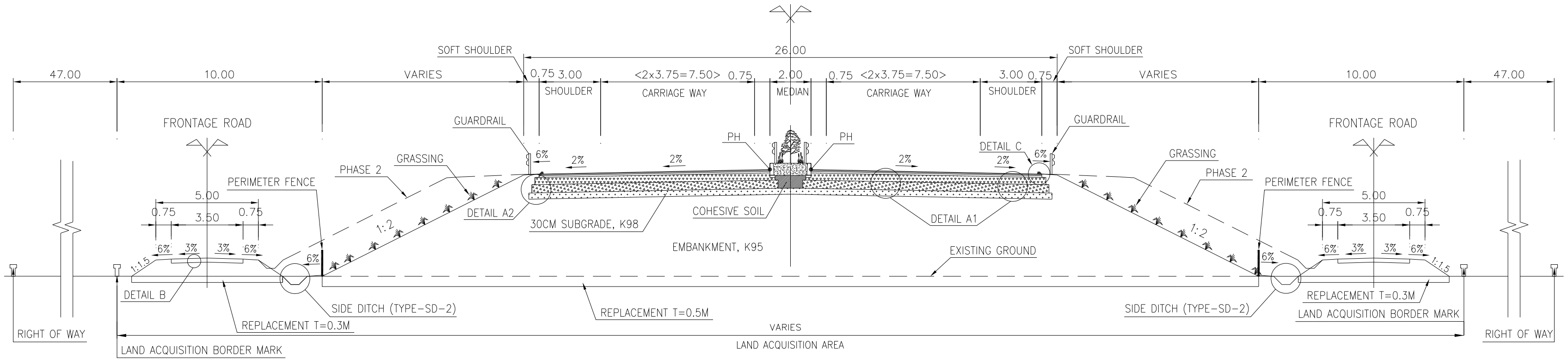
Binh Son 12.31km	Binh Chanh (1.08km)	KM099+200-KM100+285
	Binh Nguyen (5.51km)	KM100+285-KM105+800
	Binh Trung (3.30km)	KM105+800-KM109+100
	Binh Chuong (0.5km)	KM109+100-KM109+600
	Binh Long (1.91km)	KM109+600-KM111+512

2. Mặt cắt ngang điển hình

Tổng chiều rộng của nền đường là 25.5m trong giai đoạn đầu và ranh giới giải phóng mặt bằng là 10m tính từ mép taluy của tuyến đường cao tốc

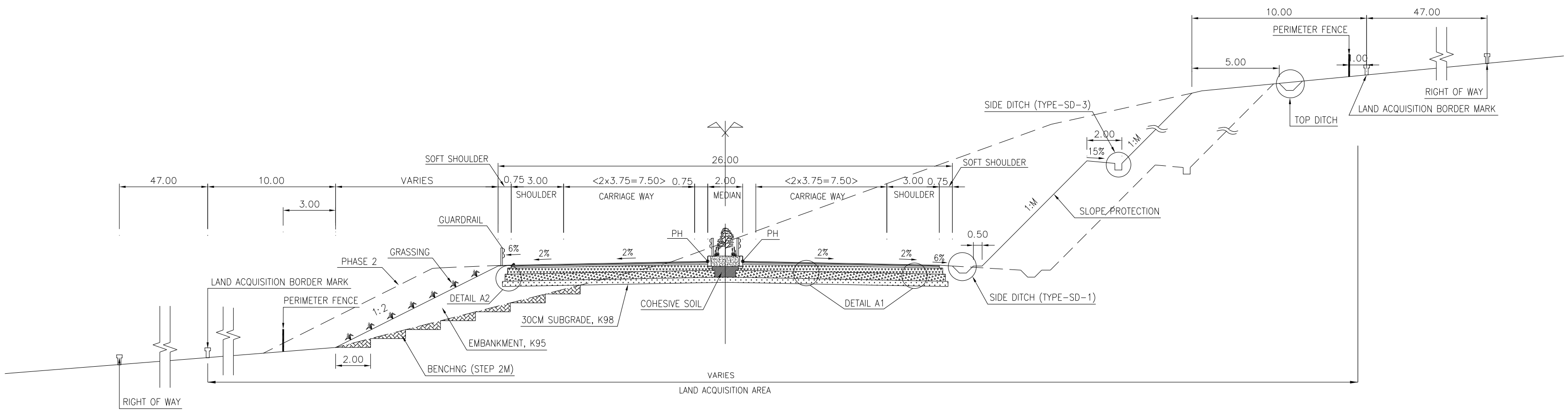


Hình 2: Mặt cắt ngang điển hình của đoạn nền đắp

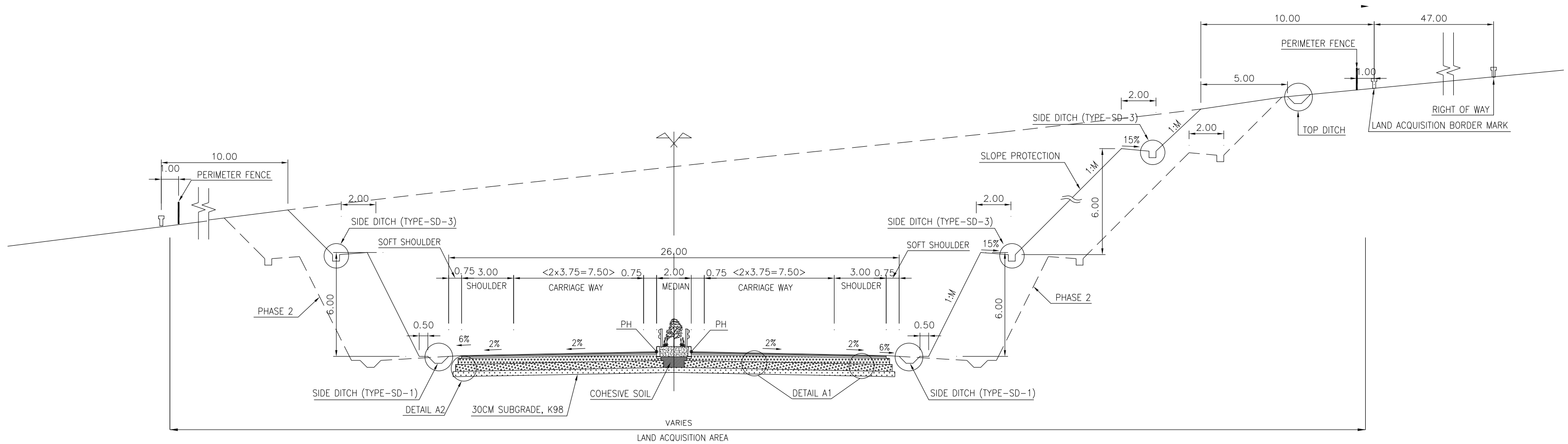


Hì

Hình 3: Mặt cắt ngang điển hình của đoạn nền đắp có đường gom



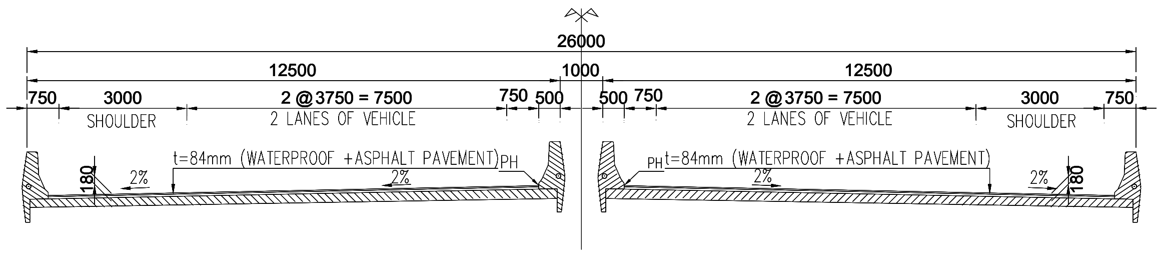
Hình 4: Mặt cắt ngang điển hình của đoạn nền đào và đắp



Hình 5: Mặt cắt ngang điển hình đoạn nền đào

(2) Phần cầu

Mặt cắt ngang điển hình đề xuất cho cầu được thể hiện trong Hình 6.



Hình 6: Mặt cắt ngang điển hình của cầu chính tuyến cao tốc

3. Các điểm khống chế thiết kế

(1) Phạm vi huyện Bình Sơn

	Lý trình	Mô tả
Điểm đầu	KM99+200	Phân đoạn bắt đầu từ ranh giới tỉnh tại xã Bình Chánh huyện Bình Sơn.
Điểm cuối	KM110+100-KM111+512	Phân đoạn kết thúc tại KM111+512 tại ranh giới giữa huyện Bình Sơn và huyện Sơn Tịnh.

(2) Các khống chế thiết kế hướng tuyến

Các khống chế thiết kế hướng tuyến ngang chính được tổng hợp trong Bảng 1. Về cơ bản, không có khống chế thiết kế đặc biệt nào làm cải tuyến ngang so với F/S.

Bảng 1: Các khống chế thiết kế hướng tuyến ngang chính

Gói thầu	Phân đoạn	Mô tả
A3	KM99+500-KM110+100	· Đập Hàm Rồng · Núi Cau · Khu dân cư Phước Bình · Khu dân cư Phu Le · Khu dân cư An Thuận
A4	KM110+100-KM111+512	· Núi Đá Mài

4. Các kết cấu ngang

4.1 Cống chui dân sinh

Các công trình dân sinh: về cơ bản các vị trí đường cao tốc cắt đường hiện tại sẽ bố trí các công trình cống chui (hoặc cầu vượt). Một số vị trí không bố trí cống chui (hoặc cầu vượt) sẽ thiết kế đường gom hai bên đường cao tốc để thu gom về các vị trí chui/vượt phù hợp.

Các chính sách quy hoạch dưới đây được áp dụng cho mặt bằng cống hộp (đường ngang):

- Kích thước bên trong của cống hộp (đường ngang) phải đảm bảo bằng bề rộng của đường hiện tại cũng như phải tuân theo các giá trị tiêu chuẩn thể hiện trong Bảng 3.
- Vị trí và phân loại các dự án đường đã quy hoạch hoặc đang thực hiện giao với đường cao tốc sẽ được xác nhận và đưa vào mặt bằng các kết cấu ngang.
- Để đảm bảo tính hiệu quả của thiết kế và thi công cống hộp, cần áp dụng tiêu chuẩn hóa loại kết cấu. Góc giao của cống hộp với đường cao tốc được phân thành các góc 90^0, 80^0, và 70^0.

Bảng 3. Giá trị tĩnh không tiêu chuẩn đề xuất

Phân cấp	Lưu lượng giao thông thiết kế (PCU/ngày)	Cấp quản lý đường				Tốc độ thiết kế (km/h)	Khẩu độ (m)	Bề rộng đường xe chạy tối thiểu	Ghi chú
		QL	TL	HL	ĐX				
VI (AH)	<200			✔	✔	30(20)	4.5	1×.5m+3.0m (Tổng cộng 6.5m)	TCVN4054-05 315/QD-BGTVT
A	Xe cơ giới hạng trung (6tấn/trục)				✔	10-15	3.5	1×3.5m+1.5m (Tổng cộng 5.0m)	315/QD-BGTVT
B	Xe cơ giới hạng nhẹ (2.5tấn/trục)				✔	10-15	3.0	1×3.0m+1.0m (Tổng cộng 4.0m)	315/QD-BGTVT
C	Xe đạp/Xe thô sơ				✔	10-15	3.0	1×2.0m+1.0m (Tổng cộng 3.0m)	315/QD-BGTVT

Ghi chú: QL: Quốc lộ, TL: Tỉnh lộ, HL: Huyện lộ, ĐX: Đường xã

Danh mục các kết cấu ngang (cho đường bộ) được trình bày trong Phụ lục 1;

4.2 Cống thoát nước

Đường cao tốc cắt ngang qua nhiều hệ thống thoát nước thủy lợi hiện có và các cống hộp/cống tròn sẽ được bố trí phù hợp nhằm duy trì chức năng hiện có.

Các chính sách quy hoạch dưới đây được áp dụng cho cống hộp thoát nước:

- Vị trí cống hộp thoát nước sẽ được quyết định phù hợp với điều kiện hiện tại;
- Công trình cầu sẽ được thiết kế tại các vị trí giao cắt qua sông tự nhiên và cống hộp sẽ được thiết kế tại các vị trí giao cắt qua các mương thủy lợi và suối nhỏ.

Danh mục các cống thoát nước được trình bày trong Phụ lục 3;

4.3 Đường gom

Các chính sách quy hoạch sau được áp dụng cho đường gom:

- Đối với đường ngang cấp cao, về cơ bản là Quốc lộ và Tỉnh lộ, áp dụng cầu vượt chính tuyến;
- Đối với đường ngang có cấp đường thấp, sẽ xem xét cho nhập chung với đường cấp cao gần đó để duy trì hệ thống đường bộ đã được hợp lý hóa, và sẽ bố trí một đường gom để nối giữa các đường nhập lại;

Mặt cắt ngang điển hình của đường gom theo Tiêu chuẩn thiết kế đường nông thôn 22TCN 210-1992 và hướng dẫn tại Quyết định 315/QĐ-BGTVT của Bộ Giao thông vận tải.

Danh mục đường gom được trình bày trong Phụ lục 2;

4.4 Các công trình khác

Đường cao tốc cắt ngang qua nhiều kênh mương tưới tiêu hiện có. Tại các vị trí này sẽ bố trí cống và ở một số vị trí phải di dời kênh mương. Danh mục kênh mương di dời được thể hiện trong Phụ lục 4

Phụ lục 1: Danh sách kết cấu đường ngang

STT	Lý trình	Xã	B hiện tại (m)	Cấp đường	Loại kết cấu ngang	Kích thước (m)	Ghi chú / Đề xuất của địa phương
1	Km99+224	Bình Chánh	4.5	C	Cống chui	BxH= 3x3	Đường lâm nghiệp – Quảng Nam
2	**Km99+543.5**		**7**	**AH**	**Cầu vượt**	**6.5x4.5**	**Đường Bình Chánh - Bình An ĐH.01D – Cấp 4 ĐB**
3	Km100+510	Bình Nguyên	3	C	Cống chui	BxH= 3x3	Làng Trị Bình
4	Km100+850		4	C	Cống chui	BxH= 3x3	Đường làm ruộng
5	Km101+393		4	A	Cống chui	BxH=5x3.5	QL1A - Làng Trị Bình
6	Km102+180		3	B	Cống chui	BxH= 4x3	Đồng lúa
7	Km102+617		5	A	Cống chui	BxH=5x3.5	Làng Nam Bình 1
8	**Km102+894**		**6**	**AH**	**Cầu vượt**	**6.5x4.5**	**ĐH.01C (N.Mặn – B. Khương) – Cấp 5**
9	Km103+564		2	C	Cầu vượt	W=4	Đường lâm nghiệp
10	Km103+950		3	B	Cống chui	BxH= 4x3	
11	Km104+523		1.5	C	Cống chui	BxH= 3x3	
12	Km104+900		3	B	Kết hợp với cầu vượt kênh		Phước Bình
13	Km105+640		4	A	Cống chui	BxH=5x3.5	Phước Bình - Bình Khương
14	**Km106+368**		**6**	**AH**	**Cầu**	**6.5x4.5**	**ĐH.01B (Bình Trung - Bình An) Cấp 4 ĐB**

STT	Lý trình	Xã	B hiện tại (m)	Cấp đường	Loại kết cấu ngang	Kích thước (m)	Ghi chú / Đề xuất của địa phương
					vượt		
15	Km106+600		1.5	C	Cầu vượt	L=60m	Kênh B3
16	Km106+695		4	A	Cống chui	BxH=5x3.5	Phú Lễ
17	Km107+829		5	A	Cống chui	BxH=5x3.5	Đề nghị bổ sung cầu hoặc cống để thoát lũ
18	**Km108+102**		**6**	**AH**	**Cầu vượt**	**6.5x4.5**	**ĐH.01 (Châu Ổ - Bình Minh) Cấp 4 ĐB**
19	Km108+622		2.5	A	Cống chui	BxH=5x3.5	Tiên Đào
20	Km109+479	B.Chương	3	A	Cống chui	BxH=5x3.5	
21	**Km109+810**	Bình Long	**7**	**IV**	**Cầu vượt**	**9x4.5**	**TL622B (QL1A – Trà Phong)**
22	Km110+070		3.5	B	Cống chui	BxH=4x3	
23	Km110+610		2	C	Kết hợp với cầu cạn		
24	Km111+720		3	B	Cầu vượt	W=5	

Phụ lục 2: Danh sách phạm vi bố trí đường gom dân sinh

STT	Xã	Lý trình		Chiều dài (m)	Phía	Ghi chú
		Từ	Đến			
1	Bình Nguyên	Km102+55	Km102+180	125	Phải	
2		Km102+180	Km102+280	90	Trái	
3		Km103+535	Km103+560	25	Trái	
4		Km104+445	Km104+560	115	Trái	
5		Km104+523	Km104+543	20	Phải	
6		Km104+900	Km104+940	110	Trái+Phải	
7		Km105+545	Km105+675	165	Trái	
8	Bình Trung	Km105+620	Km105+880	260	Phải	
9		Km105+792	Km105+867	75	Trái	
10		Km106+075	Km106+105	30	Trái	
11		Km106+065	Km106+176	111	Phải	
12		Km106+700	Km106+765	65	Phải	
13		Km106+680	Km106+890	210	Trái	
14		Km107+605	Km107+640	35	Trái	
15		Km107+750	Km107+850	100	Trái	
16		Km108+102	Km108+350	248	Trái	
17		Km108+622	Km108+697	75	Trái	
18		Km108+545	Km108+625	80	Phải	
19	Bình Long	Km109+435	Km109+545	110	Phải	
20		Km110+394	Km110+611	217	Phải	
21		Km111+388	Km111+512	124	Trái + Phải	
		Tổng chiều dài		**2390**		

Phụ lục 3: Danh sách công trình thoát nước

STT	Lý trình	Xã	Loại	Kích thước dự kiến (m)	Ghi chú
1	Km99+408.00	Bình Chánh	Cống tròn	D1.5	
2	Km99+632.00		Cống tròn	D1.5	
3	Km100+120.00		Cống hộp	3(3.0x3.0)	
4	Km100+843 .00	Bình Nguyên	Cống hộp	3(2.5x2.5)	
5	Km101+130.00		Cống tròn	D1.5	
6	Km101+218.00		Cống tròn	D1.5	
7	Km101+629.00		Cống tròn	D1.5	
8	Km101+934.00		Cống tròn	D1.5	

STT	Lý trình	Xã	Loại	Kích thước dự kiến (m)	Ghi chú
9	Km101+988.00		Cống hộp	3.0x3.0	
10	Km102+327.00		Cống hộp	5.0x4.0	
11	Km102+443.00		Cống tròn	D1.5	
12	Km102+516.00		Cống tròn	D1.5	
13	Km102+672.00		Cống tròn	D1.5	
14	Km102+846.00		Cống tròn	D1.5	
15	Km103+090.00		Cống hộp	5.0x3.5	
16	Km105+831.00	Bình Trung	Cống tròn	D1.5	
17	Km106+176.00		Cống hộp	2.0x2.0	
18	Km106+660.00		Cống tròn	D1.5	
19	Km107+307.00		Cống tròn	D1.5	
20	Km107+866.00		Cống tròn	D1.5	
21	Km108+269.00		Cống tròn	D1.5	
22	Km108+540.00		Cống hộp	2.0x2.0	
23	Km108+687.50		Cống hộp	2x(2x2)	
24	Km109+410				
25	Km110+140.00	Bình Long	Cống tròn	D1.5	
26	Km110+280.00		Cống hộp	2x(2x2)	
27	Km110+280.00		Cống hộp	2x2	

Phụ lục 4: Danh sách phạm vi cải mương

STT	Xã	Lý trình		Chiều dài	Phía (m)	Ghi chú
		Từ	Đến			
	Bình Nguyên	Km101+530	Km101+630	Phải	100	
2		Km101+571	Km101+685	Trái	144	
3		Km101+754	Km101+813	Trái	59	
4		Km101+761	Km101+824	Phải	63	
5		Km101+896	Km101+956	Trái	60	
6		Km101+988	Km102+052	Phải	64	
7		Km101+990	Km102+075	Trái	85	
8		Km102+060	km102+160	Phải	100	
9		Km104+415	km104+525	Phải	110	
10		Km104+445	km104+550	Trái	105	
11	Bình Trung	Km106+130	km106+185	Phải	55	
12		Km106+595	km106+670	Phải	110	
		Tổng chiều dài			**1055**	

BÀI 2: NHỮNG TÁC ĐỘNG MÔI TRƯỜNG CỦA DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI

1. Tác động đến môi trường tự nhiên

1.1 Môi trường nước và lũ lụt

Trong giai đoạn trước và trong khi thi công, các yếu tố tác động đến môi trường nước có thể kể đến là dầu thải máy móc, vật liệu xây dựng, nước thải từ lán trại của công nhân, ô nhiễm nguồn nước mặt do quá trình thi công cầu cống.

Trong giai đoạn vận hành, với lưu lượng giao thông ngày càng tăng thì dầu và các chất độc hại khác rơi trên mặt đường từ phương tiện vận chuyển cũng sẽ tăng lên hàng năm. Ngay khi các chất gây ô nhiễm như đã đề cập xâm nhập vào nguồn nước dọc theo dòng nước mưa, chúng sẽ gây tác động lên chất lượng nước quanh khu vực dự án.

Lũ lụt: Trong quá trình thi công xây dựng nhất là vào mùa lũ sẽ làm ảnh hưởng đến hướng của dòng chảy lũ của các con sông và kênh gây cản trở cho quá trình thoát lũ tự nhiên.

1.2 Môi trường không khí xung quanh

Trong giai đoạn thi công có hai nguồn gây ô nhiễm không khí chủ yếu bao gồm có bụi và khí thải của máy móc thi công. Bụi chủ yếu sinh ra do vận chuyển vật liệu, đất đá thải và hoạt động thi công là bụi có kích thước hạt nhỏ và trung bình. Phạm vi ảnh hưởng chủ yếu xung quanh khu vực có bán kính 100m từ công trường và dọc các đường công vụ.

Trong giai đoạn vận hành, nguồn gây ảnh hưởng đến mối trường không khí chủ yếu do khí thải từ các phương tiện giao thông, tuy nhiên với mức độ không quá lớn.

Công tác nổ mìn phá đá cũng sẽ gây bụi. Tuy nhiên việc nổ mìn chỉ thực hiện trong giai đoạn rất ngắn.

1.3 Môi trường đất

Trong giai đoạn thi công trên địa bàn xã sẽ có các hoạt động như đào đắp nền đường, vận chuyển tập kết vật liệu, đất thải… gây xáo trộn và ảnh hưởng đến sự ổn định của đất tự nhiên.

Trong giai đoạn vận hành của tuyến đường có khả năng sẽ kéo theo tình trạng di chuyển tập trung dân cư, đặc biệt một vài vị trí có đường gom là nguyên nhân thay đổi cơ cấu đất đai của địa phương.

2. Tác động do ảnh hưởng của việc chia cắt tự nhiên

2.1 Đối với các khu dân cư, đường giao thông

Việc tuyến đường cắt ngang qua các khu dân cư, đường giao thông cấp thấp sẽ làm chia cắt các khu dân cư hiện nay, và cũng gây ra một số khó khăn cho công tác sắp xếp và quản lý của chính quyền sau này.

Tăng lưu lượng giao thông trên các tuyến đường trong thời gian thi công có thể gây ra ùn tắc và tai nạn giao thông tại địa phương.

Việc có một tuyến đường đi qua có thể tác động đến cảnh quan hiện có của khu vực.

2.2 Đối với các khu vực sinh thái

Trên địa bàn xã đoạn tuyến đường cắt qua không có hệ sinh thái lớn, rừng phòng hộ hay hệ sinh thái ngập nước nên tác động của tuyến đường trong việc chia cắt các hệ sinh thái và các loài động thực vật trong khu vực là rất nhỏ.

3. Tác động của tiếng ồn

Các nguồn gây ô nhiễm tiếng ồn chủ yếu trong giai đoạn thi công là các thiết bị xây dựng và phương tiện vận chuyển. Mặc dù tiếng ồn phát sinh từ các nguồn này là tạm thời song nó có thể ảnh hưởng đến các đối tượng tiếp nhận ở gần nếu không có giải pháp kiểm soát nghiêm ngặt. Theo kết quả tính toán thì những máy móc xây dựng gây ra ô nhiễm tiếng ồn nghiêm trọng nhất là máy đóng cọc và búa đầm, các loại thiết bị này được sử dụng khi thi công lớp móng và cầu, trong khi đó tiếng ồn gây ra từ các máy móc khác lại tương đối thấp.

Trong giai đoạn vận hành của tuyến đường, tiếng ồn phát sinh chủ yếu do phương tiện giao thông vận hành trên đường. Trên địa bàn xã đoạn tuyến đường cao tốc gần các khu dân cư với mật độ thưa cách xa các công trình quan trọng nên ảnh hưởng tiếng ồn không lớn.

4. Các biện pháp đề xuất giảm thiểu tác động môi trường của dự án

4.1 Giảm thiểu tác động đối với môi trường tự nhiên

Đối với môi trường nước: Tổ chức thi công hợp lý, hạn chế thi công vào mùa lũ, thường xuyên khơi thông dòng chảy cho sông suối và kênh mương trên địa bàn thi công.

Môi trường không khí: Trong giai đoạn thi công cần che chắn đầy đủ cho xe chở, bãi tập kết vật liệu, ngoài ra cần phun nước tưới đường công vụ khi đường khô và phát tán nhiều bụi bay.

Che chắn

Tưới nước

4.2 Giảm thiểu tác động do chia cắt tự nhiên

Tại các vị trí tuyến đường cắt qua đường dân sinh và một số điểm khác tư vấn thiết kế đã bố trí các cầu, cống chui dân sinh với hệ thống đường gom để đảm bảo sự liên kết giao thông trong khu vực.

Các kênh tưới tiêu bị tuyến đường cao tốc cắt ngang qua cũng được bố trí hệ thống cống và cầu phục vụ việc tưới và tiêu thoát nước.

4.3 Giảm thiểu tác động do tiếng ồn

Yêu cầu thiết kế tuyến đường vận chuyển nguyên vật liệu phải hợp lý để giữ khoảng cách phù hợp so với khu dân dư nhằm tránh tác động do bụi bay theo chiều gió và tiếng ồn lên khu dân cư.

Bố trí thời gian vận hành các phương tiện thi công phù hợp, tránh gây ô nhiễm tiếng ồn vào những giờ nhạy cảm. Ở những khu vực gần trường học, các trang thiết bị thi công có độ ồn cao sẽ bị hạn chế hoạt động trong giờ học. Ở những đoạn đường gần khu dân cư, các thiết bị thi công này cũng bị cấm hoạt động về đêm, nếu cần thiết sẻ lập rào chắn ồn di động.

Có các giải pháp chống hoặc giảm ồn tại các vị trí tiếp nhận nhạy cảm với tiếng ồn như khu dân cư, đền chùa …

4.4 Giảm thiểu tác động do phương tiện vận tải gây ra

Các tuyến đường địa phương, đường sẽ được duy tu, bảo dưỡng thường xuyên trong quá trình thi công. Công tác phun nước giảm bụi cũng sẽ được thực hiện trên các tuyến đường này nếu cần thiết.

Các phương tiện vận tải khi hoạt động trên các tuyến đường địa phương sẽ bị giới hạn tải trọng phù hợp. Thời gain hoạt động cũng sẽ được bố trí phù hợp, tránh thời gian học sinh đến và tan trường.

BÀI 3: TÁC ĐỘNG XÃ HỘI CỦA DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI

1. Đối tượng và phạm vi ảnh hưởng của dự án

1.1 Khái niệm chung

Những người bị ảnh hưởng là cá nhân hay hộ gia đình, tổ chức, cơ quan tư nhân hay công cộng bị ảnh hưởng về: i) các tiêu chuẩn sống; ii) các quyền sử dụng nhà, đất, nguồn nước hoặc bất kỳ các tài sản cố định hay lưu động bị thu hồi, bị chiếm hữu, bị thu hẹp hoặc các tài sản khác bị thiệt hại hoàn toàn hoặc từng phần, lâu dài hay tạm thời; iii) công việc kinh doanh, việc làm, địa điểm làm việc, nơi ở bị thiệt hại cho dù có hay không có phương án thay thế.

Những người dễ bị tổn thương là cá nhân hoặc nhóm người có thể phải chịu sự mất cân đối hoặc đối mặt với nguy cơ bị thiệt thòi hơn nữa do tác động của thu hồi đất và tài sản hoặc tái định cư, bao gồm: (i) Phụ nữ là chủ hộ có người phụ thuộc; (ii) Hộ gia đình có người tàn tật; (iii) Hộ gia đình nằm dưới mức nghèo theo chuẩn của Bộ LĐ, TB&XH; (iv) Hộ gia đình có trẻ em và người già neo đơn; (v) Hộ gia đình không có đất; (vi) Hộ gia đình chính sách; và (vii) Người dân tộc thiểu số.

1.2 Phạm vi ảnh hưởng của dự án trên địa bàn xã Bình Chánh

Đường cao tốc đi qua hơn 01km trên địa bàn xã, ảnh hưởng đến 01 thôn Bình Đông, trong đó, diện tích bị ảnh hưởng chủ yếu là đất đồi núi, 01 hộ phải di dời và khoảng 20 hộ bị mất đất sản xuất.

2. Những tác động xã hội của dự án và biện pháp giảm thiểu

STT	Vấn đề	Tác động	Biện pháp giảm thiểu
1	**Nơi ở và sinh hoạt**	**Đối với hộ di dời tái định cư (01 hộ):** - Tốn nhiều chi phí, công sức và thời gian để di dời nhà cửa, tài sản và tái thiết công ăn việc làm cũng như ổn định sinh hoạt tại nơi ở mới, trong đó có nhiều **chi phí phát sinh** không tính trước được. Ngoài ra, nền móng ở khu đất mới có thể thiếu ổn định. - Diện tích đất và nhà ở nơi tái định cư thường không đáp ứng đủ nhu cầu sản xuất và sinh hoạt của người nông dân. Sự thiếu hụt đất sẽ gây áp lực lớn đối với những hộ có nhu cầu tách khẩu trong tương lai, nhất là những gia đình có đông con cái. **Đối với hộ tái định cư tại chỗ hoặc nhà ở sát đường cao tốc:** - Không gian sống bị thu hẹp; ô nhiễm tiếng ồn và khói bụi. - Không thể chia đất tách khẩu, xây dựng, nâng cấp, sửa chữa nhà cửa trong khu vực hành lang lộ giới; trong khi việc thực hiện giai đoạn 2 của dự án chưa có thời gian cụ thể. - Đường cao tốc có thể cản trở dòng thoát lũ tự nhiên, tăng cường độ và thời gian ngập úng. - Kết cấu nhà cửa bị ảnh hưởng do độ rung của đường, nhất là ở những nơi sản xuất nông nghiệp có nền đất yếu.	- Thực hiện đúng và đủ chính sách của Ngân hàng Thế giới (OP 4.12), Chính sách của Chính phủ Việt Nam và các cấp chính quyền địa phương về tái định cư không tự nguyện. - Đánh giá cụ thể và bồi thường, hỗ trợ người dân di dời theo nguyện vọng của họ trong những trường hợp đặc biệt. - Xây dựng hệ thống thoát lũ và thực hiện chương trình quản lý môi trường thích hợp.
2	Sinh kế và thu nhập	- Đất sản xuất bị mất hoặc diện tích còn lại có hình dạng khó sản xuất (dải hẹp, hình tam giác,…). Đất là cuộc sống của hầu hết nông dân, dù thu nhập không cao nhưng vẫn đáp ứng trang trải hàng ngày. Người nông dân vốn quen với đồng ruộng nên thường khó khăn khi chuyển qua những nghề khác, nhất là người lớn tuổi. Tình trạng thất nghiệp có thể xảy ra, kéo theo những vấn đề xã hội khác như rượu chè, cờ bạc, bạo lực gia đình,… Sử dụng tiền bồi thường bền vững cũng là mối quan tâm chính của nhiều hộ BAH. - Cản trở đường đi lại sản xuất và vận chuyển nông sản.	- Tạo điều kiện thuận lợi cho nông dân tiếp tục có đất sản xuất (cho mượn đất dự phòng của xã). - Thực hiện các chương trình dạy nghề, đào tạo kỹ năng, hỗ trợ giống vật nuôi, trong đó chú ý đến người lớn tuổi. - Xây dựng hệ thống giao thông và thoát lũ hợp lý.

		- Hạn chế dòng chảy lũ, gia tăng ngập úng gây hư hại mùa màng. - Diện tích đất còn lại có thể bị ảnh hưởng trượt lở, khó sản xuất. - Tác động đến nguồn nước tưới tiêu.	
3	Đời sống tinh thần	- Mất những giá trị cảnh quan như không gian thoáng mát, trong lành,…	
4	Tiếp cận xã hội và các dịch vụ công cộng	Xáo trộn hoặc cản trở người dân đi lại, tiếp cận với các mối quan hệ xã hội.	- Xây dựng hệ thống giao thông hợp lý
5	Vấn đề giới và an ninh	- Các lực lượng lao động trong giai đoạn xây dựng có thể phá vỡ trật tự xã hội địa phương và tăng nguy cơ tai nạn giao thông. - Tăng rủi ro của nạn buôn bán người, lây nhiễm HIV/AIDS và các bệnh lây qua đường tình dục khác; đặc biệt ảnh hưởng đến phụ nữ và trẻ em. - Nữ giới thường gặp nhiều khó khăn hơn so với nam giới nếu ở nhà tạm trong thời gian di dời. Ngoài ra còn có lo lắng chồng con sẽ tiêu dùng số tiền bồi thường không bền vững.	- Chương trình hành động về giới và nâng cao nhận thức cộng đồng, phát huy vai trò của phụ nữ trong cộng đồng - Đưa cụ thể vấn đề an toàn và an ninh vào hợp đồng xây dựng. Nhà thầu được tư vấn để đưa kế hoạch quản lý người lao động tại chỗ nhằm đảm bảo không có xung đột giữa các nhân viên dự án và cư dân trong vùng dự án diễn ra
6	Hộ dễ bị tổn thương	Nhạy cảm, bị áp lực và thường thiệt thòi hơn so với các hộ bình thường khác.	- Hỗ trợ bổ sung. - Ưu tiên tham gia chương trình phục hồi sinh kế, đào tạo kỹ năng

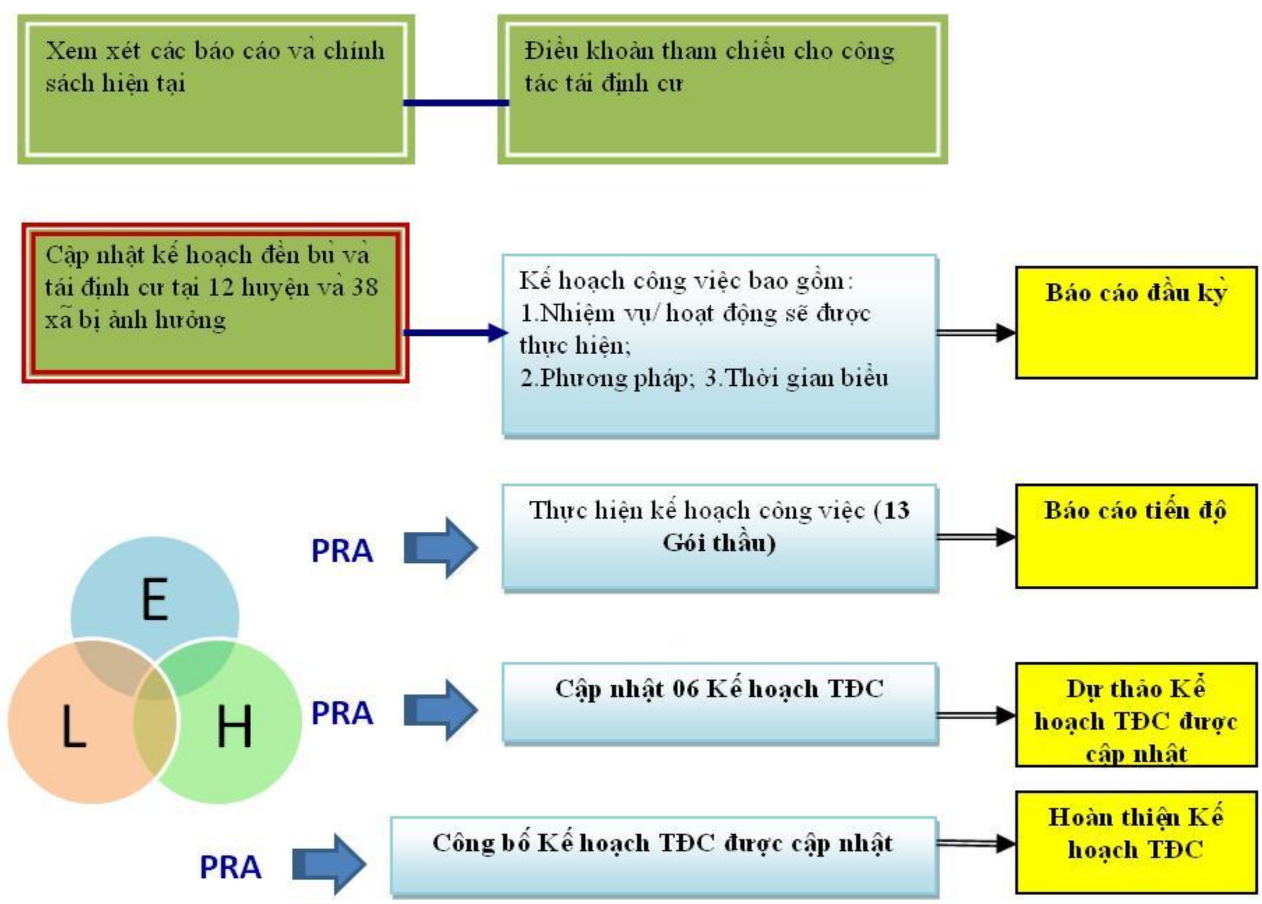
BÀI 4: KẾ HOẠCH HÀNH ĐỘNG TÁI ĐỊNH CƯ

1. Phạm vi công việc của nhóm tư vấn TĐC

- Chuẩn bị bản cập nhật Kế hoạch Hành động Tái định cư (TĐC) theo quy định của Ngân hàng Thế giới (WB) dựa trên kế hoạch TĐC của Ban Quản lý Dự án 85 (PMU85) và thiết kế chi tiết. Quy định của WB được áp dụng trong dự án bao gồm chính sách TĐC OP 4.12 (xác định và giảm nhẹ những rủi ro về kinh tế, xã hội và môi trường do TĐC không tự nguyện), OP 4.11 về Tài sản Văn hóa và OP 4.10 về người bản địa.
- Tiến hành phân tích xã hội, đói nghèo và giới (đánh giá tác động xã hội) theo quy định của WB và Việt Nam.
- Những chủ đề trên cũng bao gồm tác động của dự án lên những nhóm thiểu số và dễ bị tổn thương, hiện trạng kinh tế - xã hội và hiệu quả giảm nghèo của cộng đồng bị ảnh hưởng.

2. Cách tiếp cận

Tiến trình công việc được thể hiện trong sơ đồ sau:



E-Môi trường

L-Sử dụng đất

H-Nhân sinh

3. Những nhiệm vụ chính và phương pháp

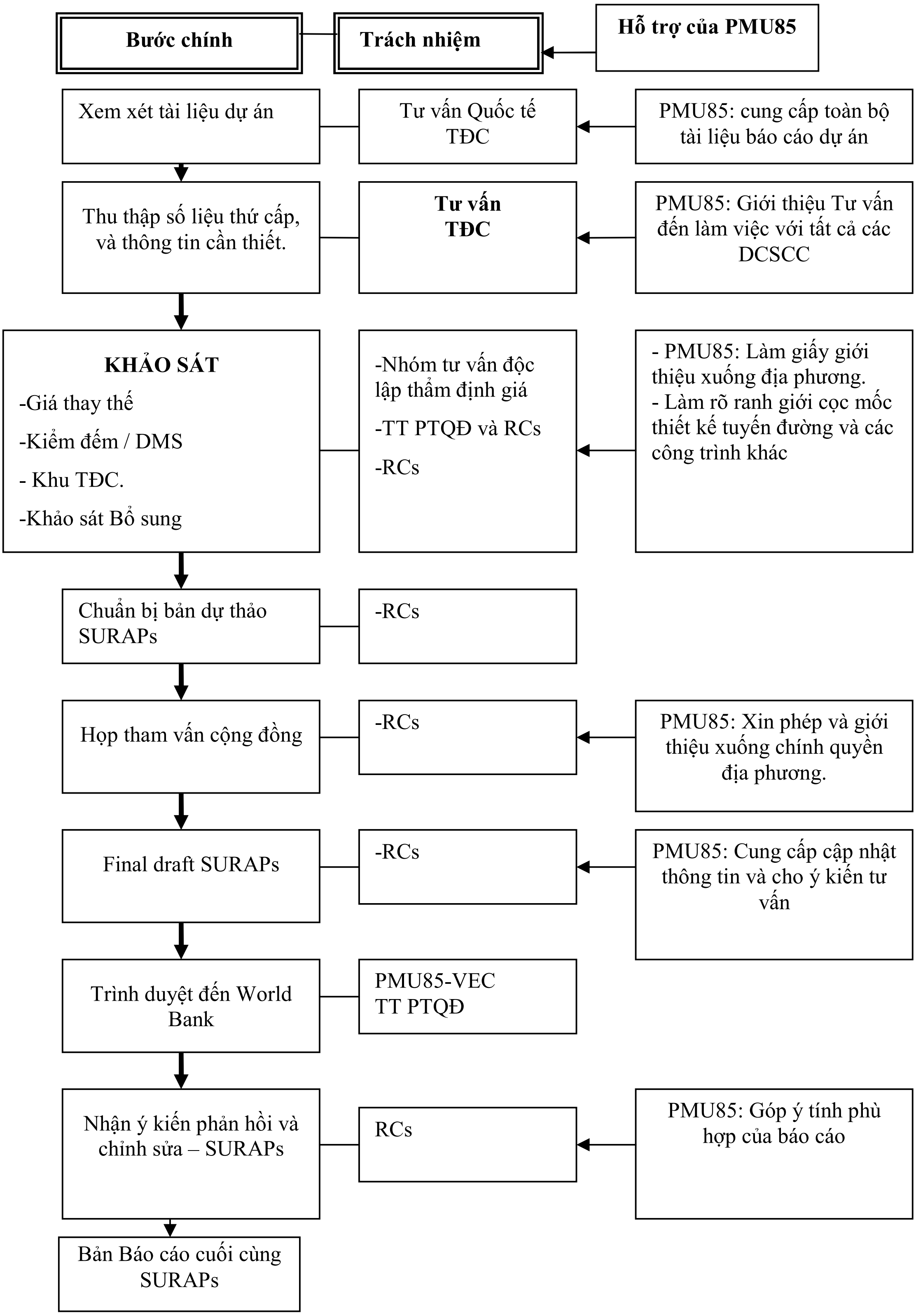
Bảng 4.1: Tóm tắt những nghiệm vụ chính và phương pháp thực hiện

STT	Nội dung chính	Mục đích	Phương pháp tiến hành	Hỗ trợ từ PMU85	Hỗ trợ từ ban GPMB-TĐC Huyện	Hỗ trợ từ các cơ quan khác
1	Xem xét những báo cáo và chính sách hiện có	Tìm ra những điểm khác biệt về chính sách giữa WB và Việt Nam	Phân tích điểm khác biệt	Tài liệu của dự án	Báo cáo hiện trạng kinh tế xã hội của huyện, tỉnh	-
2	Thu thập dữ liệu và thông tin thứ cấp	Cập nhật tiến độ bồi thường, TĐC và hoạt động sinh kế. Nghiên cứu những lựa chọn sinh kế trong khu vực dự án. Thu thập những quyết định hiện có, những văn bản pháp lý về vấn đề TĐC của dự án.	Thảo luận TTPTQD và PMU Phỏng vấn những người chủ chốt dựa trên danh sách các thông tin cần thiết	Bố trí người đại diện của PMU-85 giữ liên hệ và điều phối các hoạt động của hợp phần tái định cư. Giới thiệu Nhóm TĐC làm việc lâu dài với UBND Huyện và TT PTQĐ	UBND Huyện Cung cấp thông tin, số liệu những hộ bị ảnh hưởng, bao gồm cả khu tái định cư và việc di chuyển cập nhật tiến độ bồi thường giải phòng mặt bằng.	Báo cáo hàng năm về kinh tế xã hội khu vực dự án kể cả kế hoạch TĐC và giải phóng mặt bằng.
3	Họp tham vấn cộng đồng.	Họp cộng đồng: (i) Thông báo những người bị ảnh hưởng (APs) về tiến độ của dự án, quá trình bồi thường và chương trình TĐC, và những chính sách của dự án; (ii) Người bị ảnh hưởng nêu yêu cầu về TĐC và hỗ trợ phục hồi thu nhập	Thảo luận nhóm tập trung: tham vấn riêng theo từng chủ đề và đối tượng bị ảnh hưởng	PMU -85 Xin phép tổ chức hội thảo để giới thiệu dự án và công khai những tác động của dự án.	Ban GPMB-TĐC phối hợp cùng UBND điều khiển cuộc họp giải thích những thắc mắc của người dân về chính sách bồi thường và kế hoạch TĐC.	UBND Huyện và Tỉnh cho phép triển khai hội thảo họp dân.
		Họp các bên liên quan: để tham vấn về bản thảo của kế hoạch TĐC	Hỗ trợ kỹ thuật. chuẩn bị biên bản họp và ghi nhận những ý kiến của các đại biểu.	Đồng chủ trì cuộc họp với DPC, hoặc CPC. Chuẩn bị thư mời đến đại biểu.		

STT	Nội dung chính	Mục đích	Phương pháp tiến hành	Hỗ trợ từ PMU85	Hỗ trợ từ ban GPMB-TĐC Huyện	Hỗ trợ từ các cơ quan khác
4	Điều tra giá thay thế	Xác định giá thay thế trong khu vực dự án	Làm việc với các thẩm định viên ở ngoài	Tham gia điều phối các cuộc họp để thỏa thuận và thống nhất kết quả khảo sát giá thay thế với UBND Tỉnh/ huyện.	TTPTQĐ tham gia thảo luận hỗ trợ cho việc khảo sát tại địa phương.	
5	Kiểm đếm chi tiết-DMS (kết hợp với DMS của DCSCC)	- Thu thập cơ sở dữ liệu đầy đủ về người bị ảnh hưởng và những tổn thất của họ để chuẩn bị cho việc bồi thường. - Đánh giá thu nhập, xác định những hoạt động sản xuất, những nhóm đối trượng và kế hoạch phục hồi thu nhập. - Phát triển những lựa chọn TĐC và giai đoạn chuẩn bị xã hội cho những nhóm dễ bị tổn thương.	Giám sát DMS Tiến hành phỏng vấn bổ sung sử dụng bảng phỏng vấn hộ gia đình	Giới thiệu tư vấn TĐC với Ban GPMB và chính quyền địa phương.	DCSCC cung cấp toàn bộ số liệu DMS cho tư vấn và phần mềm xử lý	Nhóm tư vấn thiết kế chi tiết cung cấp thông tin về tuyến và ranh giới cột mốc
6	Điều tra xã hội bổ sung	Xác định bổ sung hiện trạng kinh tế - xã hội của những người bị ảnh hưởng, vấn đề giới, dân tộc và loại tác động (vd: mất đất ở và nhà, mất đất nông nghiệp, mất thu nhập hoặc nghề nghiệp, -Khảo sát bổ sung những hộ bị ảnh hưởng không nằm trong danh sách hoặc cần	Thu thập báo cáo kinh tế - xã hội hàng năm của UBND xã Phỏng vấn sử dụng bảng câu hỏi Quan sát	Xin phép chính quyền địa phương cho tư vấn khảo sát	DCSCC cung cấp đầy đủ danh sách hộ bị ảnh hưởng địa điểm và thời gian khảo sát.	Cung cấp giấy phép triển khai khảo sát nếu cần thiết

STT	Nội dung chính	Mục đích	Phương pháp tiến hành	Hỗ trợ từ PMU85	Hỗ trợ từ ban GPMB-TĐC Huyện	Hỗ trợ từ các cơ quan khác
		phải bổ sung thông tin. Tìm kiếm những giải pháp và cơ hội lựa chọn sinh kế hộ phát triển				
7	Khảo sát khu TĐC	Tiến hành nghiên cứu khả thi về khu vực TĐC; xác định những nguồn tài nguyên có sẵn, tiện ích và những yêu cầu phát triển khu TĐC.	Họp với những đơn vị liên quan, những công ty thiết kế và xây dựng. Phỏng vấn những người chủ chốt theo bảng câu hỏi Quan sát	Bảo đảm giấy giới thiệu cho phép triển khai và làm việc với địa phương.	UBND Huyện và DCSCC cung cấp bản đồ quy hoạch và bố trí dân cư kế hoạch TĐC.	Cung cấp giấy giới thiệu và cho phép triển khai trong trường hợp cần thiết
8	Sơ thảo kế hoạch TĐC cập nhật	Tổng hợp và phân tích dự liệu, thông tin, kết quả khảo sát thực địa để chuẩn bị bản cập nhât kế hoạch TĐC, bao gồm chương trình phục hồi sinh kế	Cho ý kiến về quy hoạch và bố trí khu dân cư phù hợp với yêu cầu của chủ đầu tư và nhà tài trợ	Góp ý và hướng dẫn xây dựng khu TĐC phù hợp	Đưa ra những giải pháp làm cho khu TĐC phù hợp với yêu cầu	
9	Hoàn thành bản kế hoạch TĐC cập nhật	Hoàn thành bản kế hoạch TĐC cập nhật theo những góp ý trong cuộc họp các bên liên quan	Làm việc trong văn phòng	Góp ý phê duyệt và chuyển cho nhà tài trợ		

Sơ đồ 4.2: Diễn giải mô hình làm việc và kết hợp hài hòa giữa các bên có liên quan



4. Kế hoạch hoàn thành các báo cáo Kế hoạch Hành động Tái định cư cập nhật

Để đảm bảo tiến độ dự án, bản kế hoạch hành động TĐC cập nhật sẽ được tiến hành ở cấp huyện vì tất cả hoạt động TĐC và thu hồi đất đều được tiến hành bởi các Ban Bồi thường huyện. Vì vậy, tất cả dữ liệu và thông tin (nhất là dữ liệu DMS) sẽ được thu thập theo từng huyện. Mỗi bản kế hoạch TĐC sẽ bao gồm một hoặc vài huyện nên sẽ gồm nhiều gói khác nhau. Những gói ưu tiên sẽ được đưa vào báo cáo chỉ một huyện.

Bảng 4.2: Bảng phân chia các báo cáo Kế hoạch Hành động Tái định cư cập nhật

<table>
<tr><th>Gói thầu xây dựng</th><th>Tỉnh</th><th>Huyện</th><th>Số báo cáo SURAP</th><th>Thời gian hoàn thành dự kiến</th></tr>
<tr><td rowspan="2">1</td><td>Đà Nẵng</td><td>Hòa Vang</td><td>1</td><td>12/2012</td></tr>
<tr><td rowspan="16">Quảng Nam</td><td rowspan="4">Điện Bàn</td><td rowspan="4">2</td><td rowspan="4">11/2012</td></tr>
<tr><td>2</td></tr>
<tr><td>3A</td></tr>
<tr><td rowspan="2">3B</td></tr>
<tr><td rowspan="2">Duy Xuyên</td><td rowspan="2">3</td><td rowspan="2">12/2012</td></tr>
<tr><td rowspan="2">4</td></tr>
<tr><td rowspan="2">Quế Sơn</td><td rowspan="2">4</td><td rowspan="2">12/2012</td></tr>
<tr><td rowspan="2">5</td></tr>
<tr><td rowspan="3">Thăng Bình</td><td rowspan="3">5</td><td rowspan="3">01/2013</td></tr>
<tr><td>6</td></tr>
<tr><td rowspan="2">7</td></tr>
<tr><td rowspan="2">Phú Ninh</td><td rowspan="2">6</td><td rowspan="2">01/2013</td></tr>
<tr><td rowspan="3">A1</td></tr>
<tr><td>Tam Kỳ</td><td>7</td><td>12/2012</td></tr>
<tr><td rowspan="2">Núi Thành</td><td rowspan="2">8</td><td rowspan="2">12/2012</td></tr>
<tr><td rowspan="2">A2</td></tr>
<tr><td rowspan="8">Quảng Ngãi</td><td rowspan="3">Bình Sơn</td><td rowspan="3">9</td><td rowspan="3">11/2012</td></tr>
<tr><td>A3</td></tr>
<tr><td rowspan="2">A4</td></tr>
<tr><td rowspan="2">Sơn Tịnh</td><td rowspan="2">10</td><td rowspan="2">11/2012</td></tr>
<tr><td rowspan="4">A5</td></tr>
<tr><td>Tư Nghĩa</td><td>11</td><td>12/2012</td></tr>
<tr><td>Tp. Quảng Ngãi</td><td>12</td><td>01/2013</td></tr>
<tr><td>Nghĩa Hành</td><td>13</td><td>01/2013</td></tr>
</table>

5. Những công việc quan trọng cần chú ý

5.1 Tái định cư

- Xem xét đến mọi khả năng tốt nhất và cho phép lựa chọn khi tham vấn cộng đồng.
- Chọn khu TĐC và nghiên cứu rất cẩn thận ban đầu.
- Thúc đẩy sự tham gia của cộng đồng, nhóm APs trong việc lựa chọn khu TĐC.
- Tham vấn ý kiến của phụ nữ và nhóm nghèo đói cần sự hỗ trợ đặc biệt.
- Thiết lập chương trình TĐC tham vấn ý kiến về kế hoạch di dời.

- Bảo đảm rằng khu TĐC có đầy đủ tiện nghị an toàn trước khi di dời dân.
- Phát triển chương trình TĐC rằng đem lại lợi ích cho cả người di chuyển và người tiếp nhận.

5.2 Chương trình phục hồi thu nhập

- Triển khai nghiên cứu và đưa ra nhiều sự lựa chọn sinh kế cho cộng đồng bị ảnh hưởng nặng. Dựa trên việc đánh giá những hình thức sinh kế hiện tại.
- Thiết kế chương trình hỗ trợ đặc biệt phục hồi sinh kế cho những ai không thuận lợi trong khi phải di chuyển.
- Tham vấn ý kiến của Hội phụ nữ, hội nông dân và thiết kế chương trình sinh kế đặc biệt dành cho phụ nữ tham gia vào phục hồi sinh kế.
- Xem xét cả 2 khía cạnh, chiến lược lâu dài và bền vững cho chiến lược phát triển của chương trình thu nhập phục hồi sinh kế.
- Huy động sự tham gia của các đoàn thể quần chúng trongviệc triển khai chương trình sinh kế và thực hiện giám sát.

ỦY BAN NHÂN DÂN XÃ BÌNH CHÁNH	TỔNG CÔNG TY ĐẦU TƯ PHÁT TRIỂN ĐƯỜNG CAO TỐC VIỆT NAM

BIÊN BẢN CUỘC HỌP
THAM VẤN CỘNG ĐỒNG
DỰ ÁN ĐƯỜNG CAO TỐC ĐÀ NẴNG – QUẢNG NGÃI

Địa điểm	Hội trường UBND Xã Bình Chánh, Huyện Bình Sơn, Tỉnh Quảng Ngãi
Thời gian	Từ 08:00 đến 11:00 ngày 07/11/2012
Chủ trì	Ông Trần Quang Tâm, Chủ tịch UBND xã
Thành phần tham dự	1/ Đại diện chủ đầu tư: - Ông Trần Hùng Thái – PMU1 2/ Đại diện tư vấn dự án: - TS Vũ Ngọc Long, Trưởng nhóm tư vấn tái định cư - Ông Ngô Thế Hùng, Tư vấn Môi trường 3/ Đại diện Ban bồi thường, giải phóng mặt bằng - Ông Huỳnh Trọng Thọ, Phó Giám đốc Trung tâm Phát triển Quỹ đất huyện. 4/ 15 cán bộ xã, thôn và 35 người dân đại diện cho những người bị ảnh hưởng theo các hình thức và mức độ khác nhau

PHẦN 1: KHAI MẠC

I. Phát biểu của UBND xã

Chủ tịch UBND xã đại diện chính quyền địa phương đọc diễn văn khai mạc, giới thiệu mục đích hội thảo, nội dung chương trình, thành phần đại biểu và nêu ý nghĩa quan trọng của hội thảo. Ý kiến của người dân cũng như sự hiểu biết, cảm thông và hỗ trợ nhau trong quá trình làm việc đóng vai trò rất quan trọng tạo nên sự thành công của dự án.

II. Phát biểu của đại diện chủ đầu tư

1. Giới thiệu sơ lược về dự án

Dự án đường cao tốc Đà Nẵng – Quảng Ngãi được Thủ tướng Chính phủ cho phép triển khai nghiên cứu khả thi từ những năm 2000, nhưng đến năm 2011 mới có kinh phí để triển khai đầu tư xây dựng. Toàn bộ tuyến có chiều dài 139,52 km, trong đó tuyến cao tốc có chiều dài khoảng 131,5km. Điểm đầu: Km0+000 thuộc địa phận xã Hoà Nhơn, huyện Hoà Vang, thành phố Đà Nẵng. Điểm cuối: Km131+500 thuộc địa phận xã Nghĩa Kỳ, huyện Tư Nghĩa, tỉnh Quảng Ngãi.

Đường cao tốc sẽ rút ngắn khoảng cách và thời gian đi lại giữa các khu kinh tế trọng điểm, các khu công nghiệp của 3 tỉnh/Tp và có ý nghĩa rất lớn cho sự phát triển kinh tế, văn hóa – xã hội và an ninh quốc phòng của khu vực miền Trung. Tuyến đường cũng giúp phát triển thông thương quốc tế.

2. Nguồn vốn và đơn vị thực hiện

Ngày 10/9/2010, Bộ Giao thông Vận tải có Quyết định số 2656/QĐ-BGTVT phê duyệt Dự án đầu tư với tổng mức đầu tư là 1,472 tỷ USD (tương đương 28.000 tỷ đồng Việt Nam) từ nguồn vốn vay của Ngân hàng Thế giới (WB), cơ quan Hợp tác Quốc tế Nhật Bản (JICA) và vốn đối ứng của Chính phủ Việt Nam.

Thời gian thực hiện dự án: giai đoạn I từ 2011 đến 2016.

Chủ đầu tư: Tổng công ty Đầu tư Phát triển Đường cao tốc Việt Nam (VEC)

Đơn vị quản lý điều hành dự án: Ban quản lý dự án 85 – Bộ Giao thông Vận tải quản lý đoạn KM0 - KM65. Ban quản lý dự án 1 – Bộ Giao thông Vận tải quản lý đoạn KM65- KM131.

Đơn vị thiết kế kỹ thuật, hỗ trợ đấu thầu: Liên danh tư vấn thiết kế kỹ thuật gồm các Công ty tư vấn Nippon Koei, Nippon Engineering Consultants, Chodai và Thai Engineering Consultants.

Công tác giải phóng mặt bằng được tách thành 3 tiểu dự án độc lập và giao UBND thành phố Đà Nẵng, UBND tỉnh Quảng Nam và UBND tỉnh Quảng Ngãi tổ chức thực hiện. Nguồn kinh phí chi trả do Tổng công ty Đầu tư và Phát triển Đường cao tốc Việt Nam lấy từ ngân sách của Chính phủ; Ban quản lý Dự án 85 sẽ cùng Tổ tư vấn tái định cư hỗ trợ địa phương trong công tác giải phóng mặt bằng và tái định cư của dự án.

3. Mọi vấn đề xin liên hệ

- **Ban Quản lý Dự án 85:** Tổ 35, phường Hòa Cường Nam, quận Hải Châu, thành phố Đà Nẵng; Số điện thoại và số fax: 0511 364 2914
- **TS. Vũ Ngọc Long** – Trưởng nhóm tư vấn Tái định cư: Số điện thoại: 0949.011.110

III. Trình bày về sự cần thiết của tham vấn cộng đồng và Sổ tay Thông tin Dự án - TS. Vũ Ngọc Long

Các dự án phát triển lớn thường quá sức chịu đựng của cộng đồng địa phương nên gây ra nhiều tác động tiêu cực. Tham vấn cộng đồng là một quá trình rất cần thiết và quan trọng để tìm ra giải pháp giảm thiểu những tác động đó và mang lợi ích cho người dân.

Khi tham vấn cộng đồng cần quan tâm đến 3 yếu tố: môi trường, canh tác sử dụng đất và đời sống xã hội. Tham vấn **đúng** là phải đảm bảo được 3 yếu tố này và **thực sự** coi trọng ý kiến của người dân. Ngoài ra, việc tham vấn cũng cần phải chú trọng đến tính “sở hữu” của người dân.

Ý kiến của cộng đồng nhiều khi rất bất ngờ và lạ lẫm đối với những người thực hiện dự án nhưng thực tế lại thường rất hợp lý, hiệu quả và bền vững do tính đặc thù của mỗi địa phương.

Để dự án thực hiện tốt thì cần phải đến làm việc trực tiếp với cộng đồng để lắng nghe ý kiến của họ và trao đổi sâu sắc, chú trọng “lắng nghe” chứ không phải “phỏng vấn”. Nhằm phổ biến những thông tin cơ bản và chính thức về dự án cho người dân, mỗi người tham dự đều được phát một cuốn **Sổ tay Thông tin Dự án** và tài liệu hội thảo kèm theo.

PHẦN 2: TRÌNH BÀY CÁC NỘI DUNG KỸ THUẬT CỦA DỰ ÁN

I. Thiết kế chi tiết kỹ thuật của đường cao tốc

Tư vấn thiết kế kỹ thuật trình bày các **thông số chi tiết** về thiết kế của đường cao tốc, bao gồm:

- Ranh giới hành chính của tuyến đường.
- Các mặt cắt ngang điển hình của nền đường đắp (có đường gom), nền đường đào và cầu.
- Chính sách, tiêu chuẩn thiết kế và thông số chi tiết của các kết cấu ngang trên địa bàn xã:
  - Cống chui dân sinh
  - Cống thoát nước
  - Đường gom

- Hệ thống cải mương
- Cầu

Các thông tin chi tiết của mỗi kết cấu được nêu rõ trong tập "**Tài liệu hội thảo**" phát đến từng đại biểu tham dự.

II. Tác động môi trường tự nhiên của dự án

Những tác động môi trường tự nhiên của dự án được tư vấn trình bày theo từng hình thức tác động cụ thể sau:

1. Các môi trường bị ảnh hưởng
   - Môi trường nước và lũ lụt
   - Môi trường không khí
   - Môi trường đất
2. Chia cắt tự nhiên
   - Chia cắt các khu dân cư và đường giao thông
   - Chia cắt các khu vực sinh thái
   - Tác động của tiếng ồn
3. Biện pháp giảm thiểu

Nội dung chi tiết của từng ảnh hưởng và các biện pháp giảm thiểu được trình bày rõ trong "Tài liệu hội thảo"

III. Tác động môi trường xã hội của dự án

Tư vấn xã hội và tái định cư dự án đã phổ biến những khái niệm chung về người bị ảnh hưởng, người dễ bị tổn thương và xác định phạm vi ảnh hưởng của dự án tại địa phương. Những tác động xã hội của dự án đã được xác định tại địa phương bao gồm:

- Nơi ở và sinh hoạt của các hộ bị di dời tái định cư, hộ tái định cư tại chỗ hoặc nhà ở sát đường cao tốc, và hộ bị cô lập nơi ở.
- Sinh kế và thu nhập: nông nghiệp, buôn bán và dịch vụ
- Đời sống tinh thần: cảnh quan thiên nhiên, mồ mả và các công trình văn hóa
- Tiếp cận xã hội và các dịch vụ công cộng
- Vấn đề giới và an ninh
- Hộ dễ bị tổn thương

(Chi tiết trong tài liệu hội thảo)

IV. Khung chính sách về bồi thường, hỗ trợ và tái định cư

Đại diện Ban BT&GPMB huyện đã phổ biến quyền lợi bồi thường của dự án đối với người bị ảnh hưởng cho từng hình thức và mức độ bị ảnh hưởng về:

1. Đất sản xuất và đất ở của những người có quyền sử dụng đất (QSDĐ) hợp pháp lâu dài, người có QSDĐ tạm thời hoặc không có QSDĐ.
2. Các khoản hỗ trợ: chuyển đổi nghề nghiệp, ổn định cuộc sống và sản xuất, đào tạo nghề và việc làm, di chuyển chỗ ở, thuê nhà ở.
3. Nhà cửa và vật kiến trúc (bao gồm mồ mả).
4. Cây cối và hoa màu.
5. Tài sản công cộng và các công trình văn hóa.
6. Các tác động tạm thời.

Người bị ảnh hưởng có thể tham khảo thêm Quyết định số 35/2010/QĐ-UBND ngày 27/12/2010 của UBND tỉnh Quảng Ngãi về việc "Ban hành quy định về bồi thường, hỗ trợ và tái định cư khi nhà nước thu hồi đất trên địa bàn tỉnh Quảng Ngãi".

PHẦN 3: QUÁ TRÌNH THAM VẤN Ý KIẾN CỘNG ĐỒNG

Các ý kiến thảo luận cụ thể như sau:

<table>
<tr><th>Họ tên</th><th>Ý kiến</th><th>Trả lời của PMU85, Ban BT&GPMB huyện và Tư vấn</th></tr>
<tr><td>Ông Nguyễn Thức</td><td>- Đập Hàm Rồng xây thủ công năm 1977-78 nên việc xây đường cao tốc có thể gây hư hại đập. Đề nghị dự án hỗ trợ kinh phí gia cố hàng năm.
- Người dân cần được phổ biến các thông tin liên quan cụ thể hơn (UBND xã cung cấp).
- Đề nghị UBND tỉnh xem xét giá bồi thường sát với thực tế. Chính sách bồi thường và hỗ trợ phải tương đồng và thích hợp giữa các khu vực gần nhau.</td><td rowspan="6">Ông Ngô Thế Hùng trả lời:
- Dự án xây cầu vượt dài 37m để nước tràn có thể chui qua. Khi thi công sẽ áp dụng các biện pháp chống rung để hạn chế ảnh hưởng đến đập. Dự án sẽ mời chính quyền địa phương tham gia giám sát việc thi công đường để tránh ảnh hưởng đến đập. Đồng thời không thi công vào mùa mưa.
- Đường cao tốc cách đập 50m nên dù có rung trong quá trình vận hành thì cũng không ảnh hưởng nhiều đến đập.
- Nước tràn chia thành 2 dòng: theo kênh tràn bên trong và chui dưới cầu. Sau khi tiếp thu ý kiến của địa phương thì dự án sẽ nghiên cứu điều chỉnh hệ thống bờ tràn (sử dụng khẩu độ lớn hơn theo đề nghị của địa phương). Nhóm tư vấn sẽ có trả lời chính thức cho địa phương.
- Phạm vi hành lang lộ giới: chưa bồi thường GPMB. Chính phủ có nghị định số 11 quy định không được xây dựng các công trình lớn, chỉ được xây nhà cấp 4 và các công trình nhỏ.

Ông Huỳnh Trọng Thọ trả lời:
- Giá đất ở bồi thường theo quy định thấp so với thực tế nhưng giá này cũng được áp dụng bán cho người dân ở khu tái định cư.
- Nếu diện tích đất bị thu hồi lớn thì còn được phân phối lại (được nhận 30m^2 với mỗi 100m^2 đất ở bị thu hồi). Nếu diện tích đất ở được phân phối lại $\geq$ 100m^2 thì được nhận 1 lô.
- Giá đất nông nghiệp vẫn ổn định trong 4 năm gần đây. Tp. Đà Nẵng có giá bồi thường cao hơn tỉnh Quảng Ngãi nhưng mức hỗ trợ thì thấp hơn. Thực tế có nhiều khu vực giá thị trường thấp hơn giá bồi thường.
- Diện tích đất sản xuất còn lại nhỏ thì sẽ được xét thu hồi và bồi thường theo yêu cầu của người BAH</td></tr>
<tr><td>Ông Nguyễn Hợi</td><td>- Giá bồi thường giống hay khác nhau giữa 3 tỉnh/Tp dự án? Giá ở Quảng Ngãi thấp hơn các tỉnh khác
- Phạm vi hành lang lộ giới có được bồi thường hay xây dựng gì không?</td></tr>
<tr><td>Ông Phạm Ngọc Bổ</td><td>- Giá bồi thường cần thỏa đáng để đảm bảo ổn định di dời</td></tr>
<tr><td>Ông Trần Quang Tâm</td><td>- Đường cao tốc sẽ ảnh hưởng đê Hàm Rồng (phục vụ cho 180ha đất lúa 2 vụ)
- Hệ thống bờ tràn của Hàm Rồng chưa thấy được thể hiện trong bài trình bày. Nếu không có thì bờ sẽ bị lở và ảnh hưởng rất lớn đến sản xuất. Đề nghị làm cống hộp 2,5-3m
- Đất đào làm đường sẽ được đổ ở đâu?
- Diện tích đất sản xuất còn lại nhỏ thì cần được thu hồi luôn.</td></tr>
<tr><td>Bà</td><td>- Người dân sẽ khó ổn định cuộc sống nếu mất đất sản xuất. Đề nghị dự án giải quyết việc làm và hỗ trợ ổn định thu nhập cho người BAH.</td></tr>
<tr><td>Ông – Phó Bí thư Đảng Ủy</td><td>- Nếu thi công đường cao tốc vào mùa mưa thì đập Hàm Rồng sẽ vỡ vì tích nước rất nhiều. Đề nghị dự án phối hợp chặt chẽ với địa phương để giải quyết. Khi đó phải di dời dân thôn Đông Bình.
- Kiểm kê áp giá: cần phối hợp chặt chẽ với chính quyền địa phương để giải quyết những sai sót, phát sinh (nếu có)
- Thường khi tái định cư thì người dân bị tái nghèo. Yêu cầu dự án cần có các giải pháp cụ thể. Thực tế địa phương đã có nhiều kinh nghiệm với các dự án</td></tr>
</table>

	khác và nhiều người dân đã mất lòng tin	TS. Vũ Ngọc Long trả lời: - Dự án có giá bồi thường riêng và đang được khảo sát. - Dự án có chương trình phục hồi thu nhập, bao gồm các hoạt động: đào tạo nghề, mô hình sản xuất thí điểm,…