

*Socialist Republic Of Vietnam
Ministry of Transport and
National Traffic Safety Committee*

E1047. *New Zealand Agency for International Development*
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TDSI

Preparation of Vietnam Road Safety Project – Phase 1

ENVIRONMENTAL MANAGEMENT PLAN FOR ENGINEERING WORKS

Final Report

Opus International Consultants
in partnership with the
Transport Development and Strategy Institute



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Final Report

Prepared By: Kevin Rolfe
Environmental
Impact Specialist
Opus

Hoang Trung Thanh
Environmental
Impact Specialist
TDSI

Opus International Consultants Limited

in partnership with the

Transport Development and Strategy Institute

Released By: Chris Harrison
Project Director
Opus

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EXECUTIVE SUMMARY

This is an Environmental Management Plan (EMP) for the Vietnam Road Safety Project (VRSP). It is based on the principle of wherever possible avoiding environmental impacts, rather than amelioration of their adverse consequences. The EMP provides a framework of appropriate actions within the VRSP to prevent or mitigate potential environmental impacts. It also provides a monitoring plan to ensure compliance with the EMP.

The VRSP is a multi-component, multi-phase project. Phase 1, proposed to run for 4 years, consists of the following nine linked components:

1. strengthen the management and technical capacity of the NTSC and prepare a national roll-out program for phase 2 of the road safety strategy;
2. demonstrate comprehensive, integrated safety programmes in three high risk corridors and develop the programmes for nationwide application - the designated "safe highway" corridors are:
 - National Highway 1 (km 172 – km 463) Hanoi to Vinh
 - National Road 51 (km 0 – km 75) Bien Hoa to Vung Tau
 - National Highway 1 (km 1915 – km 2068) Ho Chi Minh City to Can Tho;
3. develop nationwide traffic accident monitoring and analysis tools;
4. enhance the application of road safety audit;
5. enhance the identification of and response to accident blackspots;
6. improve driver training, testing and licensing, and vehicle testing;
7. improve traffic safety enforcement and coordinated road user education and awareness campaigns;
8. improve pre-school and school-based road safety education; and
9. improve the state of readiness, awareness and co-ordinated response of emergency services.

Of those nine components only component 5: Blackspot Improvement involves engineering work. The report of the Environment Assessment for the VRSP addresses the potential environmental impacts of those engineering works, and in particular it has a screening analysis of 15 proposed blackspot improvements. The screening analysis suggests that maybe seven of the proposals can be considered to be environmentally slightly negative. They are:

- Improvement 1: National Highway 1, km 267+500: Major Intersection Improvement
- Improvement 4: National Highway 1, km 387 to km 388: Carriageway Widening and Realignment

- Improvement 5: National Highway 1, km 419+500: Alignment Problem
- Improvement 8: National Road 51, km 5+250 to km 5+700: Major Intersection Improvement
- Improvement 9: National Road 51, km 6+700: Major Intersection Improvement
- Improvement 10: National Road 51, km 10+500: Major Intersection Improvement
- Improvement 11: National Road 51, km 65: Major Intersection Improvement.

Information on those seven Blackspot improvements is given in the Annex to this report. The main potential impacts relate to air quality, water quality and noise, and the impacts can be compared with Vietnamese standards for those environmental parameters.

Whilst it is considered unlikely that either the direct or indirect impacts of the engineering works proposed under Phase 1 of the VRSP will result in environmental conditions any worse than the currently prevailing situation, any environmental impact that is not prevented can be mitigated. An Environmental Mitigation Plan is given for engineering work covering the following five technical areas:

- Materials supply (indirect impacts)
- Soils
- Hydrology
- Air Quality
- Noise

Although the intention is that the Environmental Mitigation Plan will initially apply to the engineering works associated with proposed blackspot improvements in Phase 1 of the VRSP, the measures should equally apply to any significant engineering work associated with the VRSP.

The independent monitoring agency for the VRSP should include an environmental impact specialist. If it becomes necessary to carry out environmental quality measurements, this document provides an Air Quality Monitoring Plan, Water Quality Monitoring Plan and an Environmental Noise Monitoring Plan for that purpose. There does not appear to be any specific requirements for capacity development and training on the environmental aspects of the VRSP.

Cost estimates are given. Because the mitigation measures either all represent good engineering design practice or are negligible, no mitigation costs should be involved. Monitoring by the environmental impact specialist is estimated to cost no more than US\$5,000 per year, or US\$20,000 for the four years of the VRSP – Phase 1. Just in case environmental quality measurements are required, a provision of US\$5,000 over the four years is suggested. No provision for capacity development and training is needed.

A. BACKGROUND

This document is an Environmental Management Plan (EMP) for the Vietnam Road Safety Project (VRSP). The VRSP is a multi-component, multi-phase project. Phase 1, proposed to run for 4 years, consists of the following nine linked components:

1. strengthen the management and technical capacity of the NTSC and prepare a national roll-out program for phase 2 of the road safety strategy;
2. demonstrate comprehensive, integrated safety programmes in three high risk corridors and develop the programmes for nationwide application - the designated "safe highway" corridors are:
 - National Highway 1 (km 172 – km 463) Hanoi to Vinh
 - National Road 51 (km 0 – km 75) Bien Hoa to Vung Tau
 - National Highway 1 (km 1915 – km 2068) Ho Chi Minh City to Can Tho;
3. develop nationwide traffic accident monitoring and analysis tools;
4. enhance the application of road safety audit;
5. enhance the identification of and response to accident blackspots;
6. improve driver training, testing and licensing, and vehicle testing;
7. improve traffic safety enforcement and coordinated road user education and awareness campaigns;
8. improve pre-school and school-based road safety education; and
9. improve the state of readiness, awareness and co-ordinated response of emergency services.

It is important to note that this EMP is based on the avoidance of environmental impacts, rather than amelioration of their adverse consequences. The environmental requirements of the Government of Vietnam are based on the application of preventive measures, including mitigating and managing any potential adverse environmental impact through good project design. The World Bank also favours preventive measures over mitigatory or compensatory measures, whenever feasible.

This EMP provides a framework of appropriate actions within the VRSP to prevent or mitigate potential environmental impacts. It also provides a monitoring plan to ensure compliance with the EMP. Other sections of the EMP cover the other standard World Bank topics of Capacity Development and Training, Cost Estimates, and Integration of the EMP within Project.

B. SCREENING ANALYSES

Of the nine components of Phase 1 of the Vietnam Road Safety Project (VRSP) only component 5: Blackspot Improvement involves engineering work. The report of the Environment Assessment (EA) for the VRSP addresses the potential environmental impacts of those engineering works, and in particular it has a screening analysis of 15 proposed blackspot improvements. The screening analysis suggests that maybe seven of the proposals can be considered to be environmentally slightly negative. They are:

- Improvement 1: National Highway 1, km 267+500: Major Intersection Improvement
- Improvement 4: National Highway 1, km 387 to km 388: Carriageway Widening and Realignment
- Improvement 5: National Highway 1, km 419+500: Alignment Problem
- Improvement 8: National Road 51, km 5+250 to km 5+700: Major Intersection Improvement
- Improvement 9: National Road 51, km 6+700: Major Intersection Improvement
- Improvement 10: National Road 51, km 10+500: Major Intersection Improvement
- Improvement 11: National Road 51, km 65: Major Intersection Improvement.

Information on those seven Blackspot improvements is given in the Annex to this report. The main potential impacts relate to air quality, water quality and noise, and the impacts can be compared with Vietnamese standards for those environmental parameters.

The screening analysis in the EA considers short-term potential impacts. That means, they include potentially negative environmental impacts during the construction phase. It is unlikely that any indirect impacts (i.e., impacts prompted by the engineering works, such as quarrying activities) will be any more adverse than the current situation.

The report of the EA for the VRSP also provides an environmental assessment of the other eight components of Phase 1 of the Vietnam Road Safety Project (VRSP). These eight components amount to, in monetary terms, about 90% of Phase 1 of the VRSP.

Of those eight components, four (Component 1: Strengthen the National Traffic Safety Committee and Prepare a National Roll-out Program; Component 2: "Safe Highway" Demonstration Corridors; Component 3: National Traffic Accident Database and Analysis System; and Component 9: Emergency Medical Services) are assessed as being environmentally neutral, and the other four (Component 4: Road Safety Audit; Component 6: Driver Training, Testing and Licensing Vehicle Testing; Component 7: Traffic Safety Enforcement and Road User Education and Awareness; and Component 8: School Road Safety Education) are assessed as being environmentally slightly positive.

With all of components 1 to 4 and 6 to 9 either environmentally neutral or slightly positive, and with a majority of the proposals (nine out of fifteen) for Component 5: Blackspot Improvement also either environmentally neutral or slightly positive, it can be concluded that the need for engineering work covered by this EMP is less than 5%, in monetary terms,

of Phase 1 of the VRSP. Notwithstanding that, the provisions of the EMP should not be limited to just this initial application, and they should be applicable to any significant engineering work associated with the VRSP.

C. ENVIRONMENTAL MITIGATION PLAN

Whilst it is considered unlikely that either the direct or indirect impacts of the engineering works proposed under Phase 1 of the Vietnam Road Safety Project (VRSP) will result in environmental conditions any worse than the currently prevailing situation, any environmental impact that is not prevented can be mitigated.

The next three pages give an Environmental Mitigation Plan for engineering work for the VRSP in the following five technical areas:

- Materials supply (indirect impacts)
- Soils
- Hydrology
- Air Quality
- Noise

Although the intention is that the Environmental Mitigation Plan will initially apply to the engineering works associated with proposed blackspot improvements in Phase 1 of the VRSP, the measures should equally apply to any significant engineering work associated with the VRSP.

The following section of this EMP provides a Monitoring Plan, to ensure compliance with the Environmental Mitigation Plan.

RESPONSIBILITY FOR ENVIRONMENTAL MANAGEMENT

Name	Responsibilities	Remarks
PMU of NTSC	<p>* With technical support of hired external environmental specialist is responsible for overall environmental management.</p> <p>* Ensure to include environmental requirement and mitigation included in design and contract documents.</p>	1 full time staff working in pair with project hired environmental specialist
External Environmental Specialist	Provide technical support to PMU for overall environmental management as specified in details in PART D	The TOR of consultant contract should be technically reviewed for any additional advise from Bank staff.
Design Consultant	Incorporating environmental requirement and mitigation into designs	
Supervision Consultant	<p>* Participate into environmental training organized by PMU-NTSC.</p> <p>* Supervise day to day environmental compliance of contractors onsite, record implementation and proposed any addition mitigations.</p> <p>* Prepare monthly report included environmental compliance submitted to PMU-NTSC</p>	Supervision engineer need to be provided clear TOR of environmental supervision duty. The staff in charge should have knowledge related to environmental management.
Contractor	<p>* Incorporate environmental requirement in their bids, and implement all mitigation outlined.</p> <p>* Participate in training organized by PMU-NTSC.</p> <p>* Record environmental implementation in their progress report.</p>	Contractor's site foreman and workers need to be trained on project environmental management before construction.

ENVIRONMENTAL MITIGATION FOR ENGINEERING WORKS

Issue	Mitigation	Responsibility	Cost
MATERIALS SUPPLY (INDIRECT IMPACTS)			
Borrow pit excavations	Contract documents should specify the use of only existing authorized borrow pits.	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Negligible incremental cost.
Quarry operations	Contract documents should specify the use of only existing licensed quarries.	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Negligible incremental cost.
Hot-mix asphalt plants	Contract documents should specify the use of only existing licensed hot-mix asphalt plants, with appropriate air pollution control equipment, and located well separated from sensitive land-users (schools, etc).	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Negligible incremental cost.
SOILS			
Loss of soil for agricultural production	Contract documents should specify the use of good engineering practice during construction, including adequate supervision, to ensure minimal loss of soil for agricultural production.	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Represents good engineering design practice, so should be part of estimated project costs.
Erosion	<p>Bid and contract documents will include requirements to ensure:</p> <ul style="list-style-type: none"> • angle of side slopes to be limited to what is appropriate to topographic conditions; • use of less erodeable materials; • lined down-drains to prevent erosion; • stabilization of embankment slopes by revegetation; • trenching where necessary to ensure successful revegetation; and 	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Represents good engineering design practice, so should be part of estimated project costs.

Issue	Mitigation	Responsibility	Cost
	<ul style="list-style-type: none"> • seeding with rapid growing seed mix. 		
HYDROLOGY			
Alteration of surface drainage	Bid and contract documents will include requirements to ensure: <ul style="list-style-type: none"> • adoption of appropriate hydrological impacts; • installation of adequately sized drainage channels; • stabilization of slopes to avoid erosion; and • NTSC's PMU liaison with local land-use planning authorities. 	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Represents good engineering design practice, so should be part of estimated project costs.
Water Quality degradation	Engineering design to ensure road drainage does not alter current state of water bodies. Contract documents should specify the use of good engineering practice during construction, including adequate supervision, to avoid adverse water quality impacts. If circumstances suggest it is necessary, provision should be made for water quality monitoring in accordance with the requirements of the Water Quality Monitoring Plan (see next section).	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Represents good engineering design practice, so should be part of estimated project costs.
AIR QUALITY			
Air Quality -	Bid and contract documents will include requirements to	Contract enforcement by NTSC's	Represents good

Issue	Mitigation	Responsibility	Cost
Construction Phase (in addition to indirect impacts associated with materials supply)	ensure: <ul style="list-style-type: none"> • adequate watering for dust control; • prohibition of open burning; • authorization of Supervising Engineer to discontinue construction under unfavorable conditions; and • NTSC's PMU liaison with local environmental management authorities. If circumstances suggest it is necessary, provision should be made for air quality monitoring in accordance with the requirements of the Air Quality Monitoring Plan (see next section).	PMU and the independent monitoring agency.	engineering design practice, so should be part of estimated project costs.
Air Quality - Operational Phase	No significant adverse impacts on air quality during operational phase are anticipated.	Not applicable	Not applicable
NOISE			
Noise Impacts - Construction Phase	Bid and contract documents will include requirements to ensure: <ul style="list-style-type: none"> • use of equipment with adequate noise suppression; • equipment be placed as far away as practicable 	Contract enforcement by NTSC's PMU and the independent monitoring agency.	Represents good engineering design practice, so should be part of estimated project costs.

Issue	Mitigation	Responsibility	Cost
	<p>from sensitive land users;</p> <ul style="list-style-type: none"> • if circumstances require it, site-specific time constraints on activities be established and specified; • authorization of Supervising Engineer to discontinue construction under unfavorable conditions; and • NTSC's PMU liaison with local environmental management authorities. <p>If circumstances suggest it is necessary, provision should be made for noise monitoring in accordance with the requirements of the Environmental Noise Monitoring Plan (see next section).</p>		
Noise Impacts - Operational Phase	No significant adverse impacts due to operational noise levels are anticipated.	Not applicable	Not applicable

D. ENVIRONMENTAL MONITORING PLAN

The World Bank has proposed that an independent monitoring agency be used to monitor compliance with contract provisions, etc during the implementation of the Vietnam Road Safety Project (VRSP). It is appropriate that agency also monitor compliance with the Environmental Monitoring Plan.

The independent monitoring agency should include an environmental impact specialist. That person should be responsible for:

- checking the performance of contractors against the enforceable contract provisions related to the environmental aspects of the engineering works;
- carrying out any required ongoing consultation with groups potentially affected by the engineering works;
- ensuring the findings of those consultations are recorded, incorporated into relevant documents, and taken into account in subsequent implementation;
- engaging any additional environmental assistance (especially in the area of environmental quality measurements), for which an appropriate budget needs to be provided; and
- disclosing the results of that testing to potentially affected groups and other relevant stakeholders.

If circumstances suggest it is necessary to carry out environmental quality measurements, the following monitoring plans give details of the requirements. As with other aspects of the EMP, although the monitoring plans could initially be applied to the engineering works associated with proposed blackspot improvements in Phase 1 of the VRSP, the provisions should equally apply to any significant engineering work associated with the VRSP.

Air Quality Monitoring Plan

(results to be compared with the Vietnamese Air Quality Standards TCVN 5937-1995)

Parameter	Frequency	Approximate Cost (USD)	Responsibility
Total Suspended Particulate	If required at all, not less than once during the construction period.	\$500	Contractor to independent monitoring agency, who should report results to NTSC's PMU, potentially affected groups and other stakeholders.

Water Quality Monitoring Plan

(results to be compared with the Vietnamese Water Quality Standards TCVN 5942-1995)

Parameters	Frequency	Approximate Cost (USD)	Responsibility
Suspended Solids, Biochemical Oxygen Demand, Dissolved Oxygen, Oil and Grease	If required at all, not less than once during the construction period.	\$800	Contractor to independent monitoring agency, who should report results to NTSC's PMU, potentially affected groups and other stakeholders.

Environmental Noise Monitoring Plan

(results to be compared with the Vietnamese Noise Standards TCVN 5948-1995)

Parameters	Frequency	Approximate Cost (USD)	Responsibility
Leq	If required at all, not less than once during the construction period.	\$500	Contractor to independent monitoring agency, who should report results to PMU-1, potentially affected groups and other stakeholders.

E. CAPACITY DEVELOPMENT AND TRAINING

It is a standard requirement in the preparation of an Environmental Management Plan for a World Bank project to include a section on capacity development and training. This section is to satisfy that requirement.

The Vietnam Road Safety Project (VRSP) is a project of the NTSC The National Traffic Safety Committee, and its management entity PMU is responsible for the implementation of the VRSP. It has been agreed that NTSC will employ a local environmental specialist to monitor compliance during implementation.

Neither NTSC nor PMU have pre- experience working in the Bank funded project, and not familiar with Bank safeguard procedures, especially environmental management during preparation and construction, so the solution of hiring external consultant to help project is feasible and appropriate. This position need to be hired after project affectiveness.

In the job description attached to hiring contract, besides the major environmental operation as stated above, this local environmental consultant is required to provide in house environmental training to PMU-NTSC, Supervision Consultant and Contractors.

Moreover, during the course of project implementation, the PMU-NTSC, Supervision Consultants, Contractors will attend formal and informal training organized by professional intitutions contracted by PMU-NTSC. The total training costs estimated for the whole project is 15,000 USD.

The specific topic of training needed will be reviewed and specified by NTSC-PMU and their hired local environmental consultant during implementation phase.

F. COST ESTIMATES

There are three potential types of environmental costs associated with the implementation of the Vietnam Road Safety Project (VRSP). They are:

- mitigation costs;
- monitoring costs; and
- capacity development and training costs.

As outlined in section C of this Environmental Management Plan (EMP), the mitigation measures related to potential direct environmental impacts of the VRSP all represent good engineering design practice. Hence the mitigation costs are part of the estimated project costs. The three mitigation measures related to potential indirect environmental impacts associated with materials supply for the VRSP are all negligible.

The current budget provisions within VRSP are as follows:

- Consultant services for environmental monitoring/implementation support to NTSC/NTSC \$50,000
- Training cost : \$ 15,000.
- Consultant services for independent safeguards monitoring \$50,000
- NTSC equipment to support implementation \$70,000 – this includes office equipment and equipment for air and water quality testing and for noise measurement.

G. INTEGRATION OF THE EMP WITHIN PROJECT

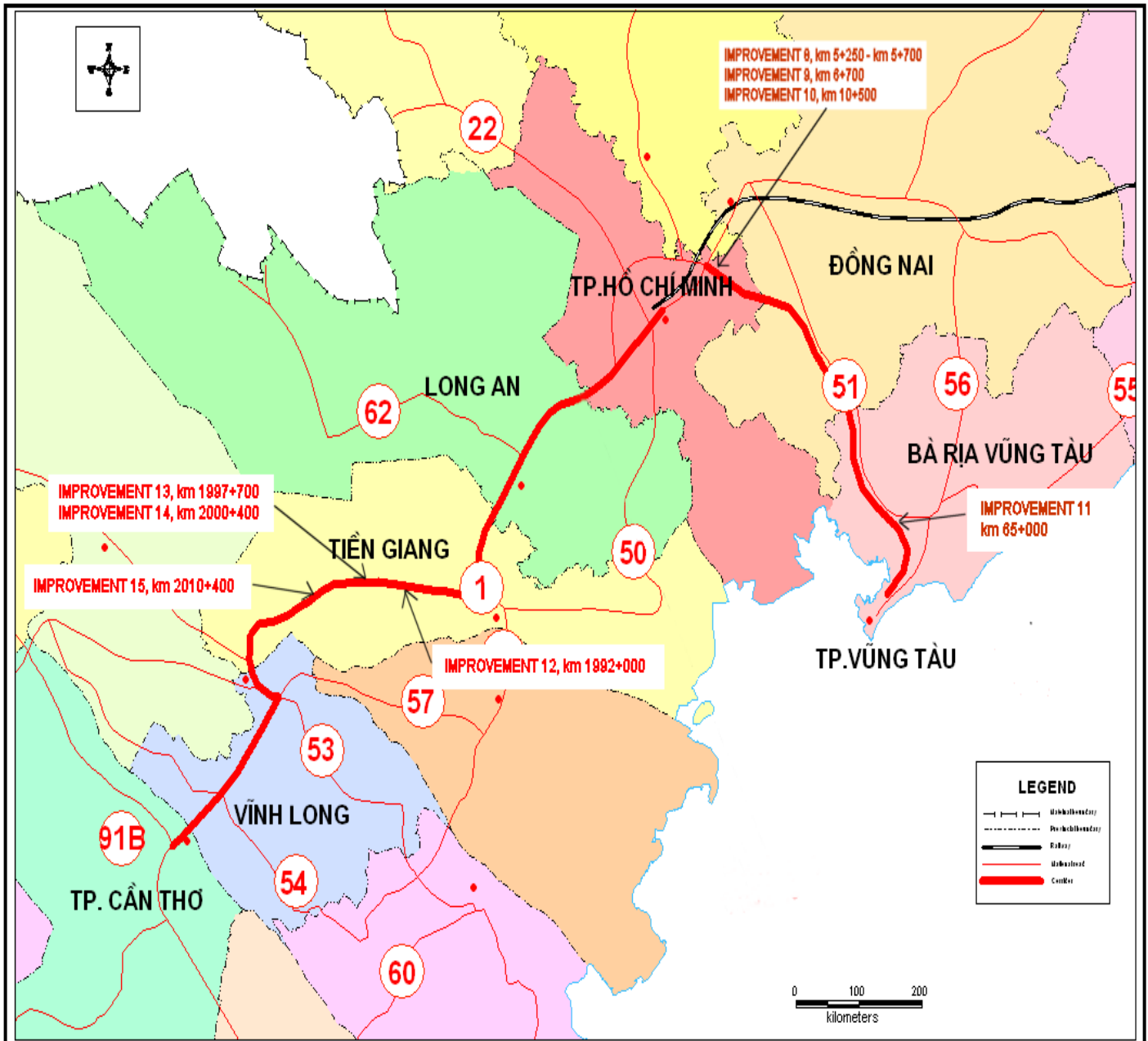
A primary purpose of the Environmental Management Plan (EMP) is to integrate environmental considerations into all aspects of the project design and implementation. It is a responsibility of Project Management Unit under National Traffic Safety Committee to ensure that is done, because any environmental transgression is likely to come to the attention of local environmental agencies (local Departments of Science, Technology and Environment, or their equivalent), and/or to the attention of the National Environmental Agency.

The framework developed in this EMP, especially in the areas of environmental mitigation and monitoring, should help facilitate integration between the environmental aspects and project decision-making. It should also satisfy the environmental requirements of the Government of Vietnam and the World Bank. Both sets of requirements are based on the application of preventive measures, including the mitigation and/or management of any potential adverse environmental impact through good project design.

Map of Demonstration Corridor 1: National Highway 1 (km 172 – km 463) Hanoi to Vinh



Map of Demonstration Corridors 2 and 3: National Road 51 (km 0 – km 75) Bien Hoa to Vung Tau; and National Highway 1 (km 1915 – km 2068) Ho Chi Minh City to Can Tho

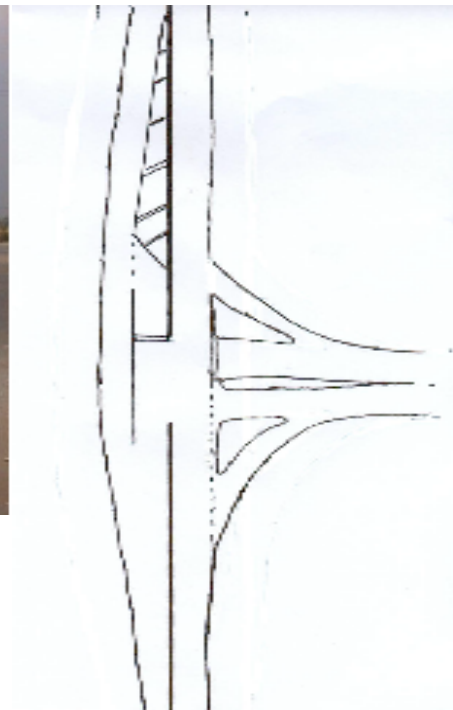


H. ANNEX: BLACKSPOT IMPROVEMENTS INVOLVING ENGINEERING WORKS

Improvement 1: National Highway 1, km 267+500: Major Intersection Improvement [Not included under Year 1 of VRSP Phase 1]

This Y shaped intersection, which joins the old highway to the new southern approach to Vinh Binh, is the most significant blackspot in all of the three corridors with 83 accidents resulting in 45 deaths and 81 persons injured between 2000 and 2002. The Y shape allows vehicles on all approaches to enter the intersection at speed and use the wide open pavement area to attempting to weave across the approaching traffic flow.

When visited, the intersection was being modified by replacing the existing roundabout with a smaller one some 20m further south. In our professional opinion these improvements will have only limited success and it is expected that this intersection will require a major upgrade. The proposal is to realign the old road and to form a T-junction with the old road intersection the highway perpendicularly. However, in order to monitor this situation these works should be scheduled in year 2 or 3.



Blackspot 2: National Road 1A - km 340+00 (Thanh Hoa province)

This site at present is characterized by a short horizontal curve separating two relatively long straights. The raised formation provides little backdrop to the curve and a school access is located on the apex. There have been 4 accidents resulting in 2 deaths and 4 persons injured since 2000.

The treatment proposed involves some realignment of the corner to achieve a larger radius horizontal curve, the installation of guardrail on the outside of the curve, and improved lane markings including reflectorized edgelines raised pavement markers. Rumble strips and improved signage are also being provided to increase safety at the school location. Encroachment of the corridor to the inside of the curve has been addressed in the public consultation field work in March 2004.



Blackspot 3 (A and B): National Road 1A - km 370+900 (Thanh Hoa province)

At this location there is a small market village on a relatively high-speed section of straight flat highway. The unsealed shoulders encourage people to walk on the carriageway. In the center of the village there is an almost indistinguishable intersection with a long straight access road that carries heavy vehicles. Since 2000 there have been 9 accidents involving 10 deaths and 14 persons injured.

The proposed solution involves widening of shoulders (non structural) through the village to encourage local traffic not to travel on the main carriageway, paving the access roads for around 50m either side of the intersection. Raised islands are to be constructed on the secondary road to highlight the location of the intersection and to protect sight lines. Limit lines will be painted to indicate where approaching vehicles should stop. Other measures will include rumble strips and additional signage on both roads and it is also proposed that a gateway style treatment be applied at the southern end of the village (km 371+20) to highlight the changing nature of the road environment and the need for additional care. Such features are not commonly used in Viet Nam and their effectiveness needs to be tested. It is proposed that this village be one test site.

There is expected to be no disturbance to market stalls at the intersection, as a consequence of the measures proposed.



Improvement 4: National Highway 1, km 387+390: Carriageway Widening and Realignment [Not included under Year 1 of VRSP Phase 1]

Traveling south, the highway passes through a series of curves before a short downhill grade of 5-6%, further curves and then enters a village. For local traffic traveling north out of the village, the uphill grade impacts on the performance of low powered heavily laden vehicles, such as Cong Nong, which slow to almost walking speed. Faster traffic overtakes these slow moving vehicles but there is insufficient sight distance to do so safely. Since 2000 there have been 11 accidents resulting in 15 deaths and 14 persons injured.

The proposed solution involves improving the readability of the approach alignment with reflectorized road markings and delineation using guide posts and cats-eyes. Chevron

boards will be installed for southbound traffic and rumble strips will be installed on the approaches. The shoulder for northbound traffic will be widened to allow the slow moving vehicles to travel outside the main traffic lanes as much as possible.

A further option of localized realignment to ease the curves and improve the sight distances will also be considered depending on the results of the site survey, which should extend from the southbound approach straight through the reverse curves to the village.



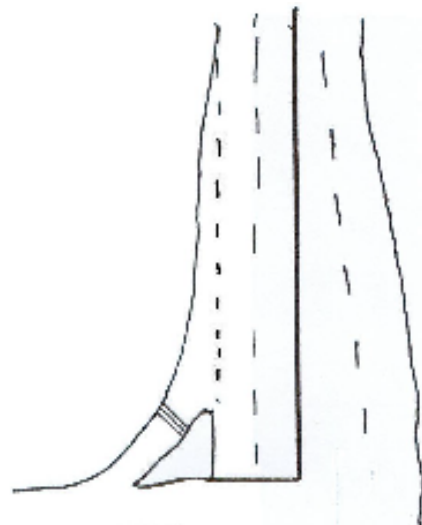
Improvement 5: National Highway 1, km 419+500: Alignment Problem

Although this location was not on the list of blackspots supplied, a small temple had been erected at the site to acknowledge those who have been killed at this location. Local advice was that 14 deaths had occurred since 2000. The site is located on a series of curves with light industrial development, a truck park to one side and fields to the other. The key issues appear to be encroachment of the trucks and associated activities onto the carriageway, which reduces sight distance. This forces passing vehicles out, which squeezes traffic in the opposing direction and those using the narrow shoulders. The traffic speed and alignment compound these problems.

Although the accident claims still require investigation, the site, which involves a series of shallow curves, is likely to be a suitable candidate for widening of the carriageway and additional curve warning signs, chevron boards and improved markings and delineation.



Improvement 8: National Road 51, km 5+250 to km 5+700: Major Intersection





Improvement [Not included under Year 1 of VRSP Phase 1]

Improvement 9: National Road 51, km 6+700: Major Intersection Improvement, [Not included under Year 1 of VRSP Phase 1] and

Improvement 10: National Road 51, km 10+500: Major Intersection Improvement. [Not included under Year 1 of VRSP Phase 1]

Since 2000 there have been 22 accidents resulting in 8 deaths and 10 persons injured between km 5+250 and km 5+700, and although the team have not yet obtained accident data for sites 6+700 and 10+500, the sites are such that a coordinated approach should be adopted (although probably undertaken in successive years).

In each case a non-priority road, which services schools, industrial or other high activity areas joins the main highway at an intersection surrounded by market activity. There are high volumes of traffic on the four lane median divided main road and significant turning volumes as well as random cross traffic. The narrow median provides little protection for turning vehicles, which must wait in the center of the intersection.

The solution for these sites is to widen the intersection to form dedicated left turn bays and install traffic signals. Traffic signals are preferred over a roundabout due to the restricted corridor width at the site and its proximity to other intersections at which there are already traffic signals.

Improvement 11: National Road 51 km 65: Major Intersection Improvement [Not included under Year 1 of VRSP Phase 1]

This site is the intersection of NR 51 and NR55 as well as servicing the Baria Commercial Center. The relatively new intersection is characterized by wide areas of pavement that allow vehicles to cross at random. As a result, drivers must be searching all possible

approach paths to detect conflicting vehicles. With only 5 accidents resulting in 5 persons being injured in the past two years this intersection is not one of the most serious blackspots on the route, although traffic volumes are still relatively low. There is relatively little adjacent activity and improvements made now could be undertaken with minimal disruption. The intersection is typical of many along the route and would be a particularly good demonstration site. The proposed solution is a larger diameter roundabout.



Blackspot 6: National Road 1A - km 452 to km 454 (Nghe An province)

Traveling north out of Vinh, the highway runs parallel to the railway on a raised formation with narrow (approximately 1.5m shoulders) that provide little protection for non-motorized users. Although not identified as a blackspot by RRMU 4, it is understood that the accident rate on this section is high. The primary measures proposed at this location will be the use of vibrational paint edgeline marking, bidirectional raised reflectorized markers on the centerline and the use of reflectorized guide posts. (Plastic posts have been recommended by the preparation consultants. The design also includes some sections of widening, the scope of which was addressed during the public consultation fieldwork in March 2004.



Blackspot 7: National Road 1A - Km 456+300 (Nghe An province)

Having been traveling on a relatively long flat straight section of rural road, vehicles traveling southbound to Vinh enter a series of reverse curves with a railway crossing located beyond the second curve. Traffic speeds are higher than desirable and forward sight distance through the curves to the railway crossing and to any associated traffic queues is often limited by the opposing traffic stream. In order to cross the railway on the level, the super elevation on the second curve is minimal, which results in loss of control accidents. There have been 9 accidents involving 13 deaths and 14 persons injured at the site since 2000.

The proposed treatment involves improved lane delineation, rumble strips at both ends of the rail crossing approach, improved signage and guardrail to protect southbound traffic taking a left hand bend just prior to the rail crossing. A gateway treatment is proposed at the Hanoi end and its exact location is to be agreed. Some widening is proposed to the immediate north of the rail crossing and this was discussed during public consultation fieldwork. The addition of this widening constitutes engineering works involving activities with greater impact than the signage, rumble strips or lane delineation and hence potentially minor negative impact in the short term.



Blackspot 13: National Road 1A - km 1997+700 (Tien Giang province)

This site involves a narrow bridge with insufficient carriageway to accommodate non-motorized vehicles and slow motorized vehicles. The vertical profile of the hump-backed bridge severely limits the available sight distance. The downstream alignment contains some unexpected feature that is hidden from view by the bridge. Guardrails on both side of the bridge are to be extended and this necessitates the extension of two existing local tracks to a point where they can intersect with the highway. No change is proposed with the road profile but improvements will include guide signage, the addition of raised reflectorized markers on the centerline and removal of steps at the bridge edge which presently cause problems for pedestrians and cycles.



Blackspot 14: National Road 1A - km 2000+400 (Tien Giang province)

The nature of this site is similar to Blackspot 13. Warning signs will be erected and guardrails extended. Rumble strips at each approach are also proposed and any steps at the edge of the bridge will be remedied. The guardrail extension will also require the extension of a local track which intersects with the road on the bridge approach from Can Tho.



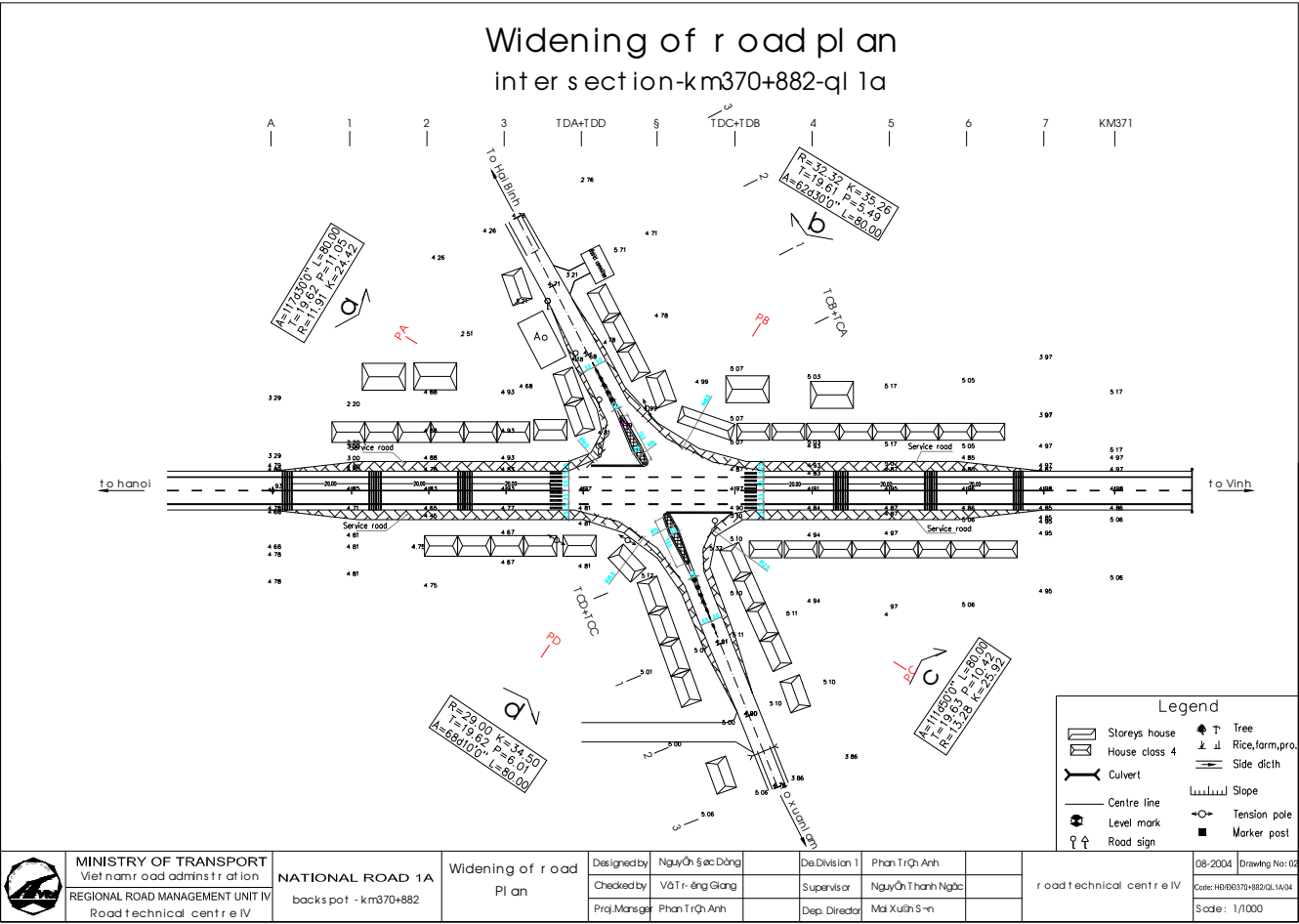
Blackspot 15: National Road 1A - km 2010+400 (Tien Giang province)

The situation at this site and the treatments proposed are similar to Blackspot 14. Measures to be provided include guardrail extension, signage, rumble strips and centerline and edge marking.

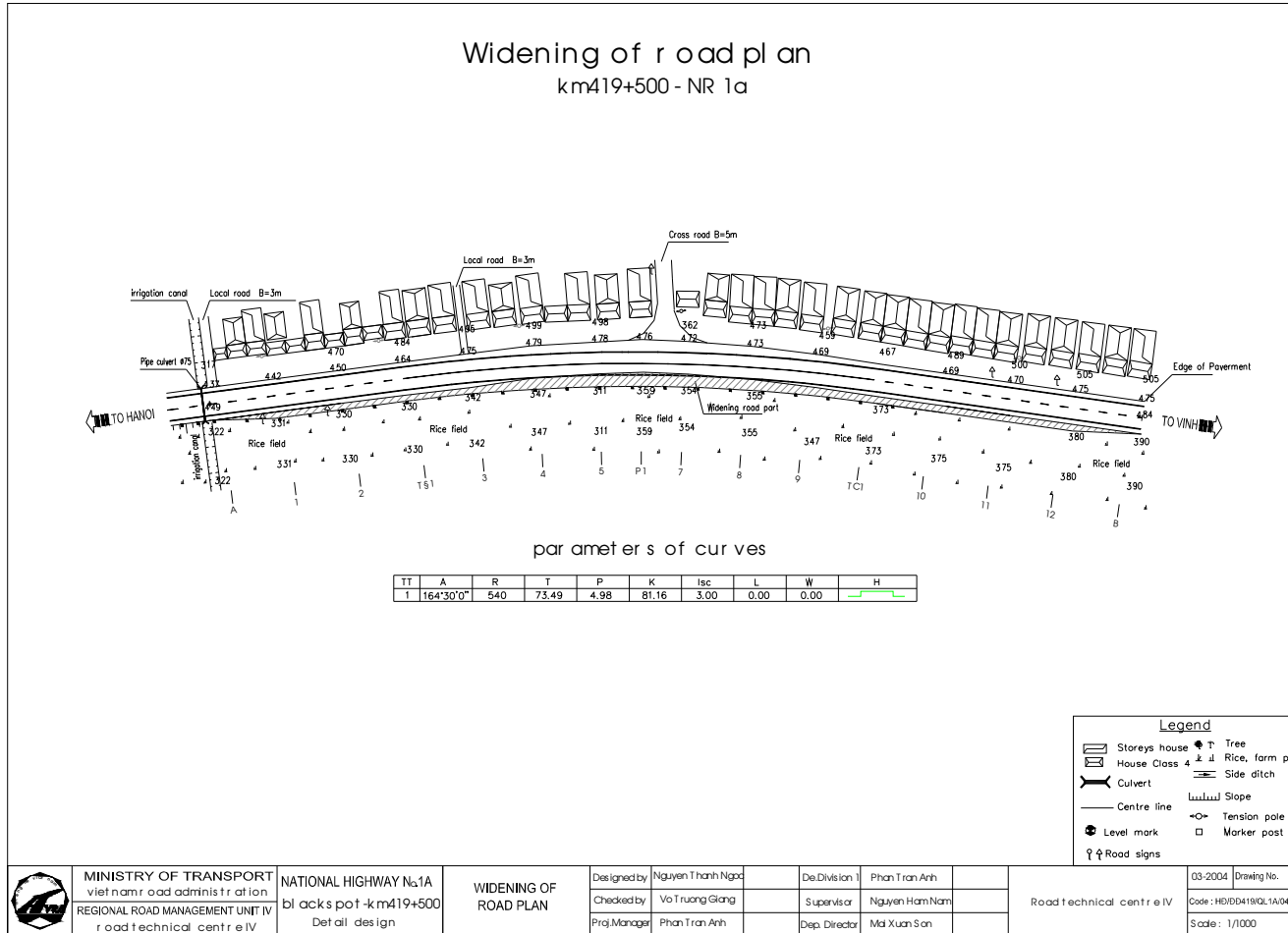


Details Plan of Blackspots, as below:

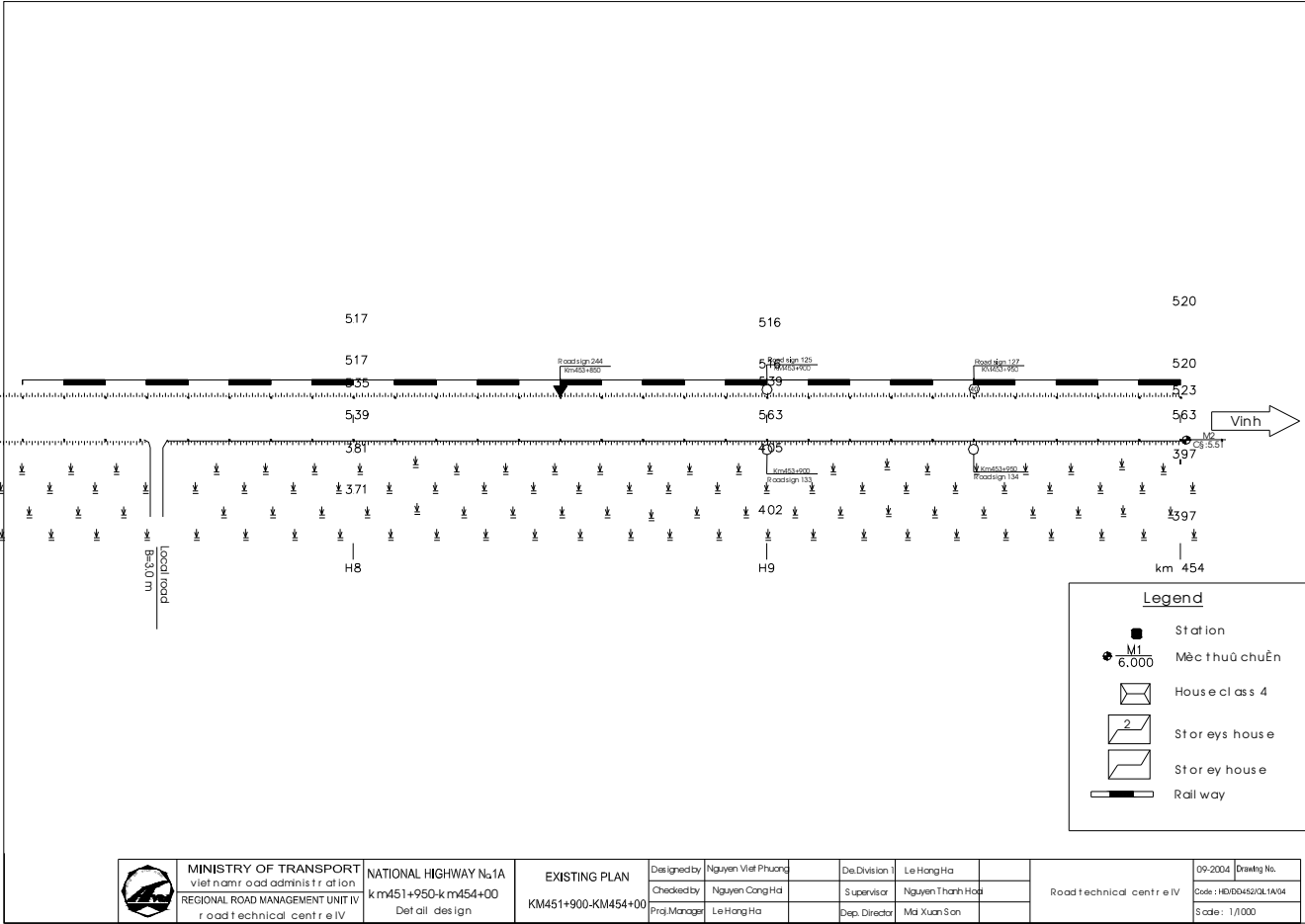
Blackspot 3: Km370+900 NR 1A



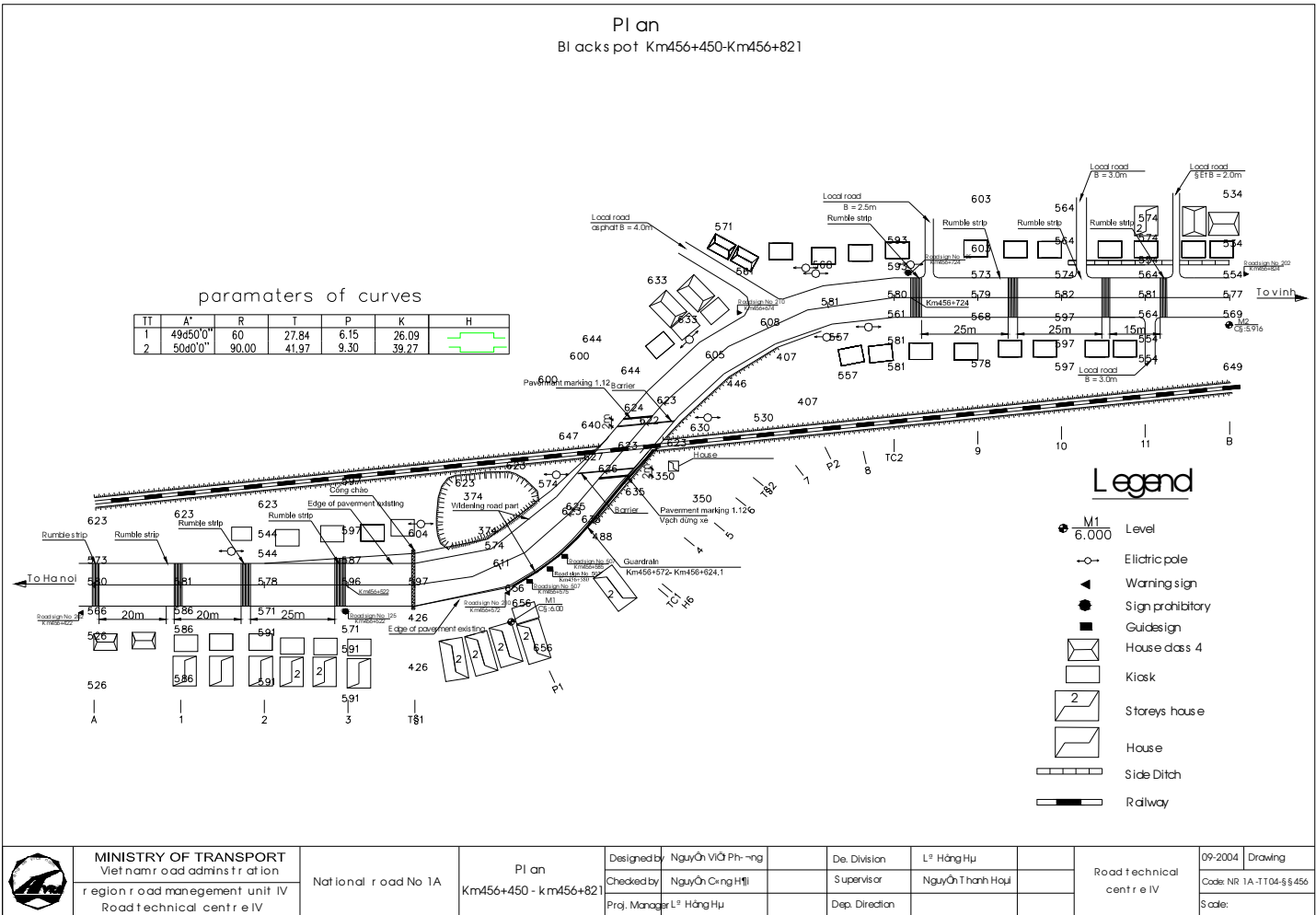
Blackspot Km419+500 NR 1A



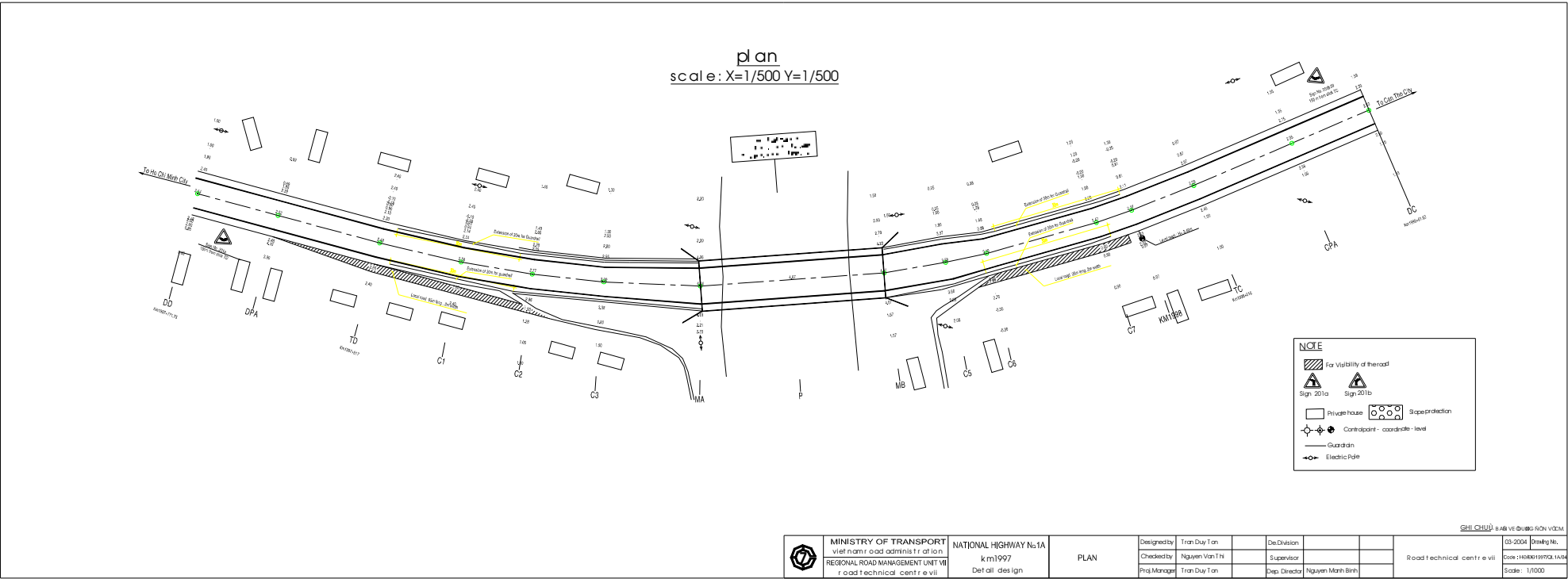
Blackspot 6: Km452-km454 NR 1A



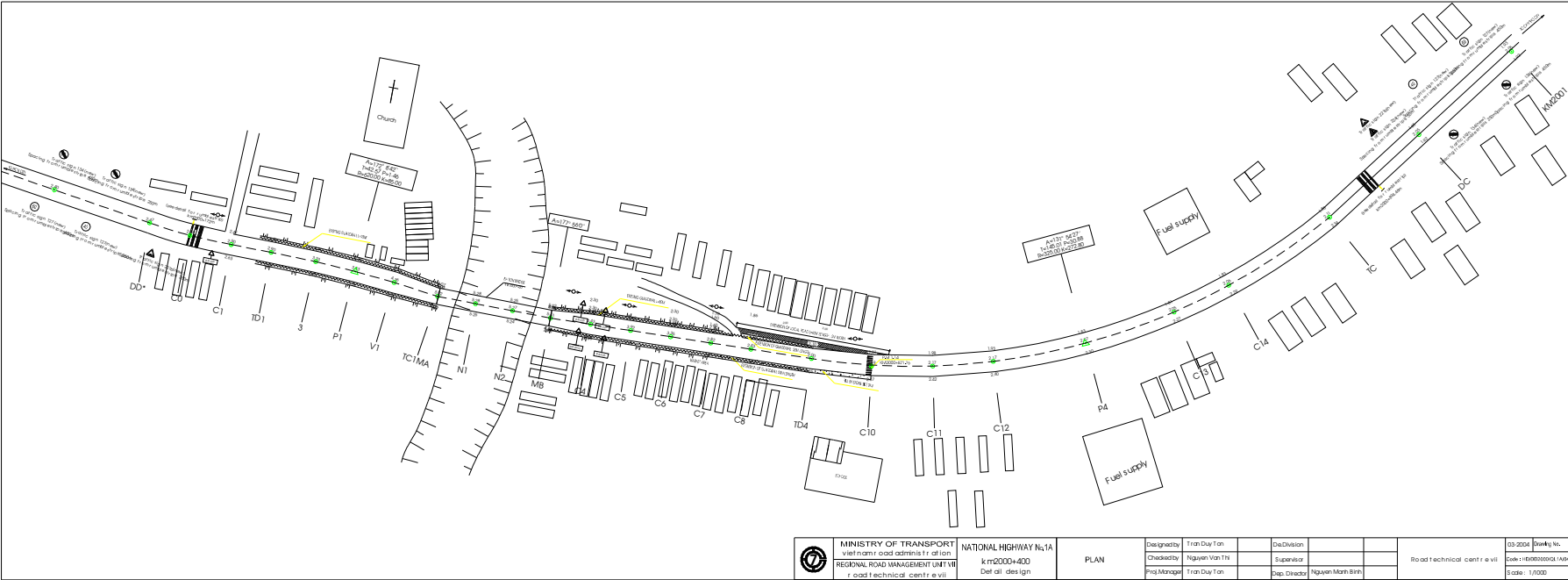
Blackspot Km456+300 NR 1A



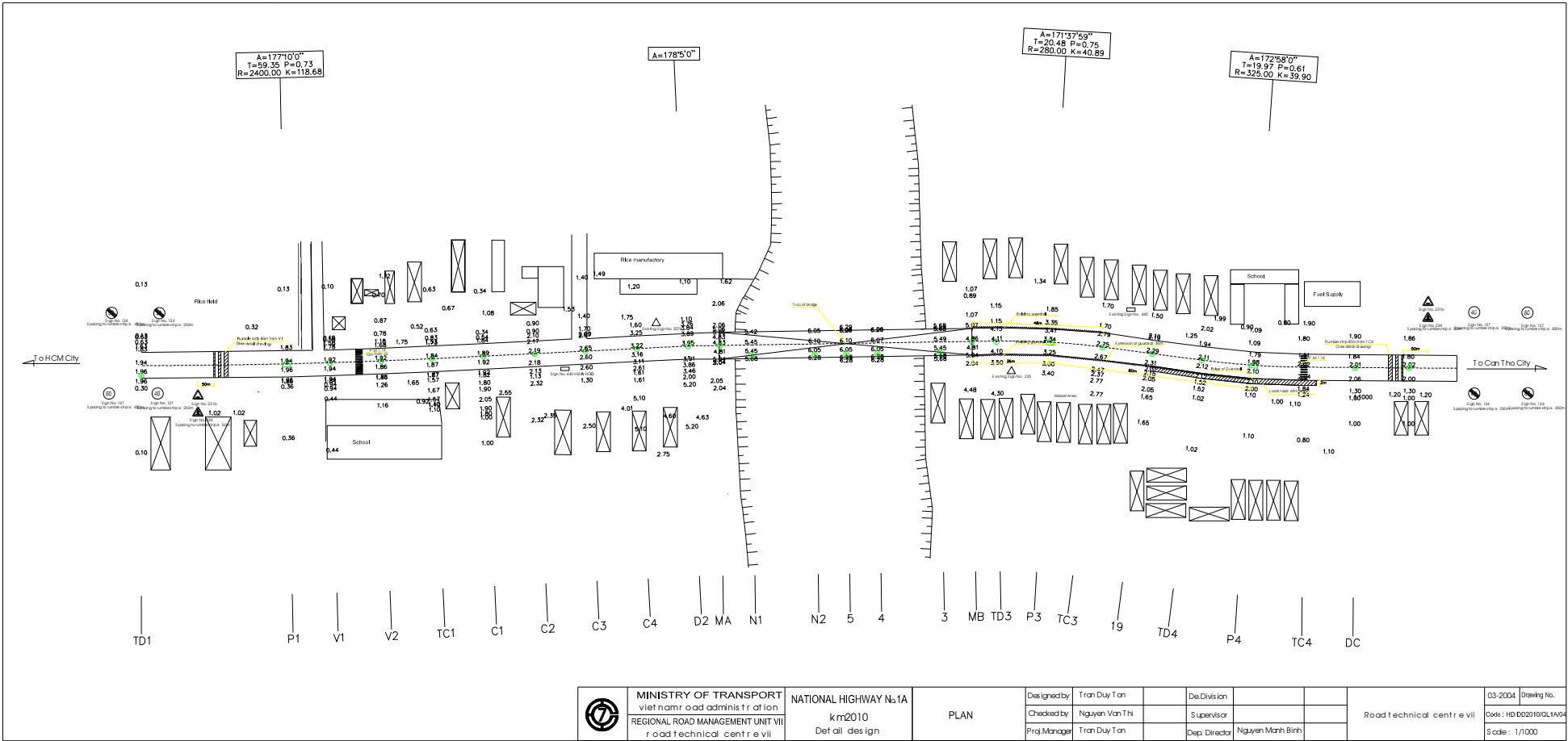
Blackspot 13: Km1997+700 NR 1A



Blackspot 14: Km2000+400 NR 1A



Blackspot 15: Km2010+400 NR 1A



	MINISTRY OF TRANSPORT viet nam road administration	NATIONAL HIGHWAY N.1A	PLAN	Designed by Tran Duy Tan	De/Division	Road technical centre v	03-2004	Drawing No.
	REGIONAL ROAD MANAGEMENT UNIT VII road technical centre v	km2010 Det all des ign		Checked by Nguyen Van Thi	Supervisor		Code: HD DD2010/011A/04	
				Proj Manager Tran Duy Tan	Dep Director Nguyen Manh Binh		Scale: 1/1000	

