

Environmental Monitoring Report

**Forth Semi-Annual Report
January – June 2015**

Loan 2789-VIE: Transport Connections in Northern Mountainous Provinces

Prepared by the Project Coordination Consultant (CDM-Smith Inc. in association with Phu Thai Consultancy Joint Stock Company and Southern Environmental Protection and Technology J.S.C.) for the Joint Coordination Committee and the Asian Development Bank (ADB).

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ABBREVIATIONS

ADB	–	Asian Development Bank
BOD5	–	Biological oxygen demand, 5-day
CSC	–	Construction Supervision Consultant
DARD	–	Department of Agriculture and Rural Development
DCI	–	Department of Culture and Information
DDC	–	Detailed design consultant
DO	–	Dissolved oxygen
DONRE	–	Department of Natural Resources and Environment
EA	–	Executing agency
EMP	–	Environmental management plan
ES		Environmental Specialist
ESO	–	Environment and safety officer
FPD	–	Provincial Forest Protection Department
GRC	–	Grievance redress committee
GOV	–	Government of Vietnam
HIV-AIDS	–	Human immunodeficiency virus- acquired immune deficiency syndrome
IEE	–	Initial environmental examination
JCC	–	Joint Coordination Committee
MONRE	–	Ministry of Natural Resources and Environment
MOT	–	Ministry of Transport
NGO	–	Non-governmental organization
PCC	–	Project coordinating consultant
PDOT	–	Provincial Department of Transport
PPMU	–	Provincial project management unit
PPC	–	Provincial Peoples' Committee
PPE	–	Personal protective equipment
ROW	–	Right-of-way
RP	–	Resettlement plan
SC	–	Steering Committee
SEMP	–	Specific Environmental Management Plan
SPS	–	ADB Safeguard Policy Statement (2009)
SR	–	Sensitive receiver
TA	–	Technical assistance
TCNMP	–	Transport Connections in Northern Mountainous Provinces
TCVN	–	National Technical Standards of Vietnam
QCVN		Vietnam National Environmental Standards
TOR	–	Terms of reference
TRP	–	Tree-cutting and replanting plan
TSS	–	Total suspended solids
TSP	–	Total suspended particulates
uEMP	–	Updated Environmental Management Plan
UXO	–	Unexploded ordnance

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I. INTRODUCTION OF THE PROJECT

1. The Government of Vietnam, in pursuit of its poverty reduction and road improvement programs, is implementing the Transport Connections in Northern Mountainous Provinces (TCNMP) Project (The Project). The Project covers the six northern mountainous provinces of Bac Kan, Cao Bang, Ha Giang, Tuyen Quang, Yen Bai and Lao Cai. The Project will rehabilitate/improve twelve provincial road sections with a total of 284 kms in the six provinces. It is jointly financed by the Asian Development Bank (ADB) and the Government of Vietnam at an estimated cost of US\$106.6 million.
2. The Project incorporates flexible design guidelines to reduce life-cycle costs and to improve the sustainability of the roads. Resiliency to disasters and adaptability to climate change impacts have been considered in the design.
3. The twelve high priority provincial road sections selected for improvement are listed in Table 1. The roads have been divided into 23 contract packages. The locations of the roads and contract packages are shown on the map in Figure 1.

Table 1. List of Project Roads

Province	Road Section	Road Length (km)	Proposed Road Upgrading	Starting point	Ending point
Bac Kan	PR 255	23.58	Class IV and V	Junction with PR 254 (Ngoc Phai Commune; km 0+000)	Junction with PR 87 (Yen Thinh Commune; km 24+981)
Cao Bang	PR 202	30.6	Class V	Junction with NH-34 (Ca Thanh Commune, Nguyen Binh District; km 0)	Huy Giap Commune, Bao Lac District, km 30+600
Ha Giang	PR 176A	29.2	Class VI	Du Gia Commune, Yen Minh District; km 38+000	Junction with PR 176 at Mau Due Commune; km 73+000
	PR 183	35.55	Class IV	Vinh Tuy, Bac Quang District; km 0+747	Xuan Giang Commune, Quang Binh District, km 36+300
Tuyen Quang	PR 187	12.87	Class V	Junction with PR 176, at Dai Thi Bridge, Yen Lap Commune, Chiem Hoa District; km 0+000	Keo Mac Pass (border with Bac Kan Province), Yen Lap Commune, Chiem Hoa Province; km 12+870
	PR 189	54.4	Class V	Junction with PR 176 at Bo Village, Binh Xa, Ha Yem District; km 0+000	Trung Son, Yen Thuan, Ham Yen; km 54+400
Yen Bai	PR 163	40.59	Class IV	Junction Nam Cuong, Nguyen Thai Hoc ward, Yen Bai City; km 4+303.16	Dong Cuong Village, Van Yen District, Yen Bai Province, km 49+000
Lao Cai	PR-151	8.9	Class V	Junction with NH 279	Near Khe Hong, Provincial border with Yen Bai, km 4+960
	PR-151B	15.0	Class V	Junction with PR 151, Lao Vao	NH-279, Hoa Mac Commune
	PR-154	13.0	Class V	Junction with NH 4-D, Muong Khong town	Nam Chay Commune; km 14+940
	PR-156	12.6	Class V	Junction with NH 4-E, Tan Stream (Hop Thanh)	Bac Cuong Commune
	PR-160	7.2	Class V	Junction with NH 279 (at Pho Rang Bridge)	Xuan Hoa Commune
Project Total		283.5			

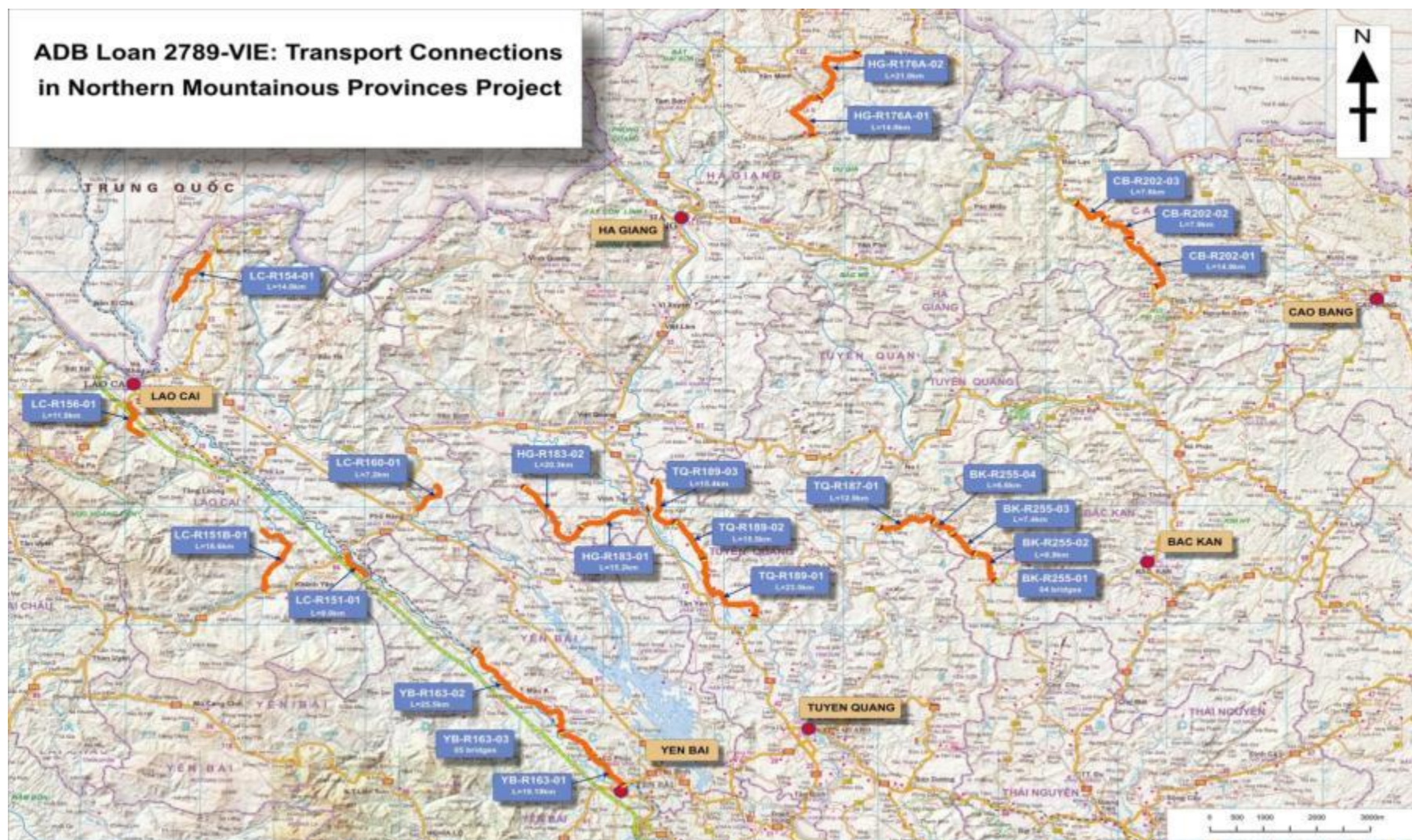


Figure 1. Location of the TCNMP Project Roads

II. Purpose and Scope of Report

4. This report has been prepared in line with the Terms of Reference for the Project Coordination Consultant (PCC). It documents the implementation of the updated Environmental Management Plan (uEMP) and the results of the Environmental Quality Monitoring for all the ongoing civil works of the road contract packages under the TCNMP Project. This report presents the results of the environmental management and monitoring activities from January to June 2015. The report covers:

- Environmental capacity building activities conducted during the period;
- Status of compliance with ADB environmental loan covenants and with the environmental requirements of the Government of Vietnam during the report period;
- Status of implementation of the environmental mitigation measures during the report period based on the IEE and updated EMPs and SEMP, including documentation of complaints received and corresponding action/resolution; and
- Results of the environmental monitoring of air quality (TSP and noise) and surface water quality covering the baseline and two quarterly monitoring (Quarterly I and II, 2015).

2.1 On-going Construction Activities

5. All the 23 civil works contract packages are ongoing as of 30 June 2015. Some contracts finished since February, March and April 2015 were extended contract validity, such as: package No. YB-R163-01: Construction of Yen Bai – Khe Sang Road, Yen Bai – Trai Hut Section (Km 4+303.14-Km 23+500) constructed by Joint venture of Hiep Phu – Thanh Hung – Dong Tien; package No. LC-R151-01: Improvement of Tan An – Khe Sang Road (section Km 0+000 – Km 4+051; Km 5+506 – Km 6+000 and Km 7+660 – Km 8+000) constructed by Phuc Binh Co.Ltd.; and package No. LC-R154-01: Improvement of PR154 from Km 0+000 – Km 13+000 constructed by Joint venture of Dong Hai – Hoang Son have been extended contract validity. The detail is shown in the table below:

Table 2. On-going Civil Works as of 30 June 2015

Province	Road Section	Contract Package	Scope	Contractor	Start Date	Completion Date
Bac Kan	PR 255	BK-R255-01	Const. of 2 section from km 0+00-km 1 +00 and bridges: Cau Na Tum (Km 0+ 747; Ban Bay (Km 9+974; Na Ca (Km13+388; Ban Cau (Km18+120); Ban Vay (Km 22+309)	Joint Venture of Toan Phat Investment and Construction JSC – Me Linh Construction and House Development Company	03/01/2014	24/01/16
		BK-R255-02	Const. of Section Km 1+000 – Km 8+000	Joint Venture Thai Bac Ha	04/10/2013	24/09/15
		BK-R255-03	Const. of Section Km 8+000 – Km 18+120	Joint Venture of Tan Thanh JSC – Bac Kan Investment and Construction JSC	25/12/2013	24/09/15
		BK-R255-04	Const. of Section Km 18+120 – Km 24+981	Joint Venture of Me Linh Construction and House Development Company and An Thinh JSC	24/09/2013	24/09/15
Cao Bang	PR 202	CB-R202-01	Rehab. of Ca Thanh – Lung Pan – Ban Rien Km 0+000 – Km 15+000	Joint Venture of Dong Do JSC Corporation and Cao Bang Construction JSC No. 1	15/11/2013	01/11/15
		CB-R202-02	Rehab. of Ca Thanh	Joint Venture of Construction	15/11/2013	01/11/15

Province	Road Section	Contract Package	Scope	Contractor	Start Date	Completion Date
			– Lung Pan – Ban Rien Km 15+000 – Km 23+000	Jsc No. 568 and Construction JSC No. 703		
		CB-R202-03	Rehab. of Ca Thanh – Lung Pan – Ban Rien Km 23+000 – Km 30+618.43	Joint Venture of Thang Long Construction Jsc and Quang Trung Co. Ltd.	15/11/2013	01/11/15
Ha Giang	PR176A	HG-R176A-01	Rehab of road section Minh Ngoc – Mau Due; km 38+000 – Km 52+000	Joint Venture of Cao Nguyen VN Company – Toan Phat- Dong Bac	01/04/2014	30/03/16
		HG-R176A-02	Improvement of section Minh Ngoc – Mau Due (Km 52+00 – Km 73+00)	Joint Venture of TRAENCO JSC – Dong Bac One Member Co.	14/05/2014	13/05/16
	PR 183	HG-R183-01	Improvement of PR 183, section Km 0+747– Km 16+00	Joint Venture of Hiep Phu co. Ltd and TADICO Investment and Construction JSC	15/04/2014	14/04/16
		HG-R183-02	Improvement of PR 183, section Km 16+00– Km 6+28	Joint Venture of Tan Thanh JSC – 559 JSC –Bien Dong Const – No. 568 JSC	15/04/2014	14/04/16 (extended the contract validity: 31/12/2015)
Tuyen Quang	PR 187	TQ-R187-01	Rehab of road section Km 0+000 – Km 12+953	Joint Venture of Hung Thinh Co. Ltd – Toan Phat Industry Construction Co. Ltd. – Quoc Khanh	20/02/2014	20/02/2016 (extended the contract validity: 30/9/2015) ¹
	PR 189	TQ-R189-01	Rehab of road section Km 2+500 – Km 26+000	Joint Venture of Trung Thanh Investment and Construction Co. Ltd. – Thanh Giang Construction and Commercial Co. Ltd. – 27-7 Co. Ltd.	28/02/2014	28/02/16 (extended the contract validity: 30/9/2015)
		TQ-R189-02	Rehab of road section Km 26+000 – Km 41+500	Joint Venture of Thinh Hung Co., Ltd. – Vinh Binh One Member Co., Ltd and Minh Phuong Tuyen Quang Co., Ltd.	28/02/2014	27/02/16
		TQ-R189-03	Rehab of road section Km 41+500 – Km 56+914	Thanh Hung Investment and Construction Co. Ltd.	01/10/14	01/10/2016
Yen Bai	PR 163	YB-R163-01	Const. of Yen Bai – Khe Sang Road, Section Yen Bai – Trai Hut Km 4+303.14-Km 23+500	Joint Venture of Hiep Phu - Thanh Hung - Dong Tien	17/05/2013	17/05/15
		YB-R163-02	Const. of Yen Bai – Khe Sang Road, Section Yen Bai – Trai Hut Km 23+500 – Km 49+000	Joint Venture of Thi Son – Truong Tho – GT Yen Bai	01/08/2013	01/08/15
		YB-R163-03	Yen Bai – Khe Sang Road Section Yen Bai – Trai Hut Construction of 5 bridges	Joint Venture of Bien Dong City – 568 City	10/09/2013	10/09/15
Lao Cai	PR 151	LC-R151-01	Rehab of Tan An – Khe Sang Km 0+000 – Km 4+051 Km 5+506 – Km 6+000 Km 7+660 – Km 8+000	Phuc Binh Co. Ltd.	01/09/2013	15/03/15
	PR 151B	LC-R151B-01	Rehab of Vo Lao – Nam Rang – Hoa Mac Km 0+000 – Km 4+000 and Km 7+000 – Km 15+200	Joint Venture of Hoang Son Const. Co. Ltd and Lao Cai Construction Bridge JSC	01/09/2013	17/02/17 (extended the contract validity 30/6/2015)

¹ Construction progress has been shortened: from 20/2/2016 to 30/9/2015

Province	Road Section	Contract Package	Scope	Contractor	Start Date	Completion Date
	PR 154	LC-R154-01	Rehab of Km 0+000 – Km 13+000	Joint Venture of Dong Hai – Hoang Son	21/8/2013	30/06/15
	PR 156	LC-R156-01	Rehab of Bac Cuong – Ta Phoi – Hop Thanh Km 0+000 – Km 3+175 and Km 6+000 – Km 12+647	Joint Venture of Construction Company No. VI and Hoang Lien Thanh Company	18/10/2013	18/10/15
	PR 160	LC-R160-01	Km 0+000 – Km 7+200	COTABIG Co. Ltd	01/09/2013	04/08/15

Source: Transport Connections in Northern Mountainous Provinces Project, Monthly Report June 2015, PCC

6. The fourteen contract packages that were awarded in 2013 have varying accomplishments during the period covered by this report. As of December 2014, construction activities focus on the following:

No.	Contract package	Construction Activities, January – June 2015
1	BK-R255-01	Na Tum bridge (Km 0+ 747): under beam launching and construction of culvert, bridge approaches. Ban Bay bridge (Km 9+974): Finish bridge pier; preparation for girder launching. Na Ca bridge (Km13+388): Finish bridge pier; preparation for longitudinal girder launching. Ban Cau Bridge (Km18+120): Have been approved new construction, contractor is under construction of bridge foundation and piers. Ban Vay Bridge (Km 22+309): foundation and pier and superstructure completed and under construction of bridge approaches.
	BK-R255-02	As of reporting, contractors have finished the lowering of slope, enlarging of embankment, under construction of bases and surface layers, retaining wall, culvert and ditches...
	BK-R255-03	Under construction of surface and drainage system.
	BK-R255-04	Under construction of surface, ditches, guide post, signs, slope reinforcement...
2	CB-R202-01	Construction of roadbed, ditches and drainage system
	CB-R202-02	Contractors are under construction of aggregate base course and surface and ditches
	CB-R202-03	Under construction of carriageway, aggregate base, ditches
3	HG-R176A-01	Under construction of embankment, culverts and ditches, subbase courses and gathering of aggregate material for base courses. Construction work as of reporting reaches VND 16.962 billion, equivalent to 47.44%.
	HG-R176A-02	Contractors are under construction of embankment, culverts, ditches and aggregate bases courses. Dong Bac Company is under construction of bitumen surface. Construction work as of reporting reaches VND 19.113 billion, equivalent to 45.46%.
	HG-R183-01	Contractors are under construction of embankment, culverts, ditches, slope, retaining wall and aggregate bases courses. Hiep Phu Company is under construction of bitumen surface. Construction work as of reporting reaches VND 34.846 billion, equivalent to 51.17%.
	HG-R183-02	Construction plan updated, contractors adjusted the completion date on 31/12/2015. The contractors is under construction of embankment, culvert and ditches, aggregate base courses. Bien Dong Company and Company No.559

No.	Contract package	Construction Activities, January – June 2015
		are under construction of bitumen surface. Construction work as of reporting reaches VND 39.556, equivalent to 53.74%.
4	TQ-R187-01	Adjusted Construction Plan, completion date is 30/9/2015. Now, embankment, culvert, Keo Mac bridge are basically finished; contractors are under construction of aggregate base courses, bitumen surface, ditches, guide post, signs. Hung Thinh Company and Quoc Khanh Company have finished bitumen surface. Construction work as of reporting reaches VND 42.552 billion, equivalent to 90.49 %.
	TQ-R189-1/3	Construction plan updated, the completion date after adjusted by contractors is 30/9/2015. Contractors, basically, completed embankment, culverts; under construction of aggregate base courses, ditch reinforcement and bitumen surface. Construction work as of reporting reaches VND 45.697 billion, equivalent to 80.85 %.
	TQ-R189-2/3	The completion date after adjusted by contractors is 30/9/2015. Contractors, basically, completed bitumen surface. Construction work as of reporting reaches VND 59.244 billion, equivalent to 94.78 %.
	TQ-R189-3/3	The completion date after adjusted by contractors is 31/12/2015. Now, contractors are under construction of embankment, culverts, subbase course. Construction work as of reporting reaches VND 20.566 billion, equivalent to 42.1%.
5	YB-R163-01	Under construction of ditches and corrugated iron railing.
	YB-R163-02	Complete ditches and corrugated iron railing; under construction of common items, such as: bridge, road, ditch and slope protection
	YB-R163-03	Package No.YB-R163B-03: rehabilitation and improvement of PR163, Yen Bai – Trai Hut Section, construction progress has elapsed 21/24 month, equivalent to 87.5% against the contract. Actual construction work completed as in the original contract. The Bridges, Nga Quan, Nghia Phuong, Viet Thanh and Yen Hung have been finished. Now, the included item of Ngoi Hop Bridge Km24+874.33- PR163 is under construction
6	LC-R156-01	Pavement, drainage system, signs of Suoi Chan Bridge are nearly finished
	LC-R154-01	Package No.LC-R154-01 rehabilitation and improvement of PR154, Muong Khuong – Nam Chay Section, construction progress has elapsed 22 months, equivalent to 91,67% against the contract. Actual construction work reaches 97,2%, equivalence to VND 51.2 billion. Contractors, basically, completed the construction of embankment, prime coat, bitumen treatment and under finalization of traffic safety as guide post, signs, drainage system...
	LC-R151B01	Construction Contract of the package has expired since February 2015 and has extended to 30/6/2015. As of 30/6/ 2015, contractors have finished the bitumen surface treatment and nearly completed the auxiliary items (ditch, signs, corrugated iron...), workload reaches 95% against the completion value of VND 55.1 billion..
	LC-R151-01	The package has been completed in May 2015 and is undertaking procedures for putting in operation
	LC-R160-01	As of 20/06/2015, contractors have been constructing for 18.5 months, account for 95.7%, total workload reaches 92,58%, with the amount of VND 49.2 billion. Item of Pho Rang Bridge, basically, has been completed, is under construction of subbase and base courses of carriageway.

2.2 Construction Activities during the Previous Reporting Period

7. Construction activities during the past months covered by the third semi-annual monitoring (June to December 2014) included the finalization of construction of bridge piers, abutment, beam, base courses; some packages were under bitumen surface treatment, construction of culverts, slope cut, realignment, slope protection and ditches, corrugated iron railing.

2.3 Planned Construction Activities for the Next Reporting Period

8. In next six months, the construction will focus on finalizing beam launching, casting bridge deck, bridge approaches, embankment widening, subbase and base courses, bitumen surface, drainage system, traffic safety system (corrugated iron, signs...); finalizing the additional items under Climate change adaptation component, clearing river, stream flow, cleaning construction sites and preparing operation management plans for the packages finished construction and handed over for the operation.

III. ENVIRONMENTAL MANAGEMENT AND MONITORING FRAMEWORK

9. The following environmental policies, laws, decrees, standards and technical regulations guided the implementation of the environmental management measures and environmental monitoring activities during the construction of the roads. Whenever newer versions become effective, the latest version shall be used as reference.

3.1 Applicable Policies, Laws, Decrees, Regulations and Standards

(i) Laws:

- No: 52/2005/QH11: Law on Environmental Protection (29 Nov 2005). This Law was replaced with Law in Environment Protection No. 55/2014/QH13 dated 23/06/2014 which has been come into effective since 1/1/2015 ;

(ii) Decrees and Circulars:

- Decree No.29/2011/NĐ-CP, dated 18/04/2011 of the Government providing Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment. This Decree was replaced with Decree No. 18/2015/NĐ-CP dated 14/2/2015 which has come into effective since 1/4/2015 of the Government prescribing environmental protection master plan, strategic environmental assessment, environmental impact assessment and environmental protection plan;
- Circular No. 26/2011/TT-BTNMT of MONRE detailing a number of articles of the Government's Decree No. No.29/2011/NĐ-CP, dated 18/04/2011 on Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment;
- Circular No.36/2015/TT-BTNMT dated 30/6/2015 coming into effective 1/9/2015 promulgating hazardous waste management;
- Circular No.09/2010/TT-BGTVT dated 06/04/2010 on Environmental Protection in the Development of Transport Infrastructure.

(iii) Standards and Technical Regulations:

Water Quality:

- QCVN 08: 2008/BTNMT – NTR: Surface water

- QCVN 14: 2008/BTNMT- NTR: Domestic wastewater
- QCVN 40:2011/BTNMT - NTR: Industrial wastewater

Air Quality:

- QCVN 05:2013/BTNMT- NTR: Ambient Air

Solid waste:

- Decision No. 27/2004/QĐ - BXD dated 9 Nov.2004 of Minister of Construction promulgating Vietnam Construction Standard TCXDVN 320:2004 "Dumping ground of toxic wastes – Design standard.

Soil:

- QCVN 03:2008/BTNMT- NTR: Maximum concentrations of heavy metals in soil

Noise and Vibration:

- QCVN 26:2010/BTNMT: NTR: Noise
- QCVN 27:2010/BTNMT: NTR: Vibration

Sanitation:

- Decision No. 3733/2002/QĐ-BYT (10 Oct 2002) issued by Health Care Department on application of 21 standards on labour sanitation

Construction:

- TCVN 5308-1991, TCVN 4086-1995 & TCVN 4244-1986: Safety in construction
- QĐ 955/1998/QĐ-BLĐTBXH: Labour safety.

3.2 ADB Safeguard Policy and Environmental Safeguards

ADB Safeguard Policy Statement (2009) and environmental safeguards requirements

3.3 Responsibilities of Parties in Environmental Monitoring

10. The organizational structure for the implementation of environmental monitoring is presented in Figure 2.

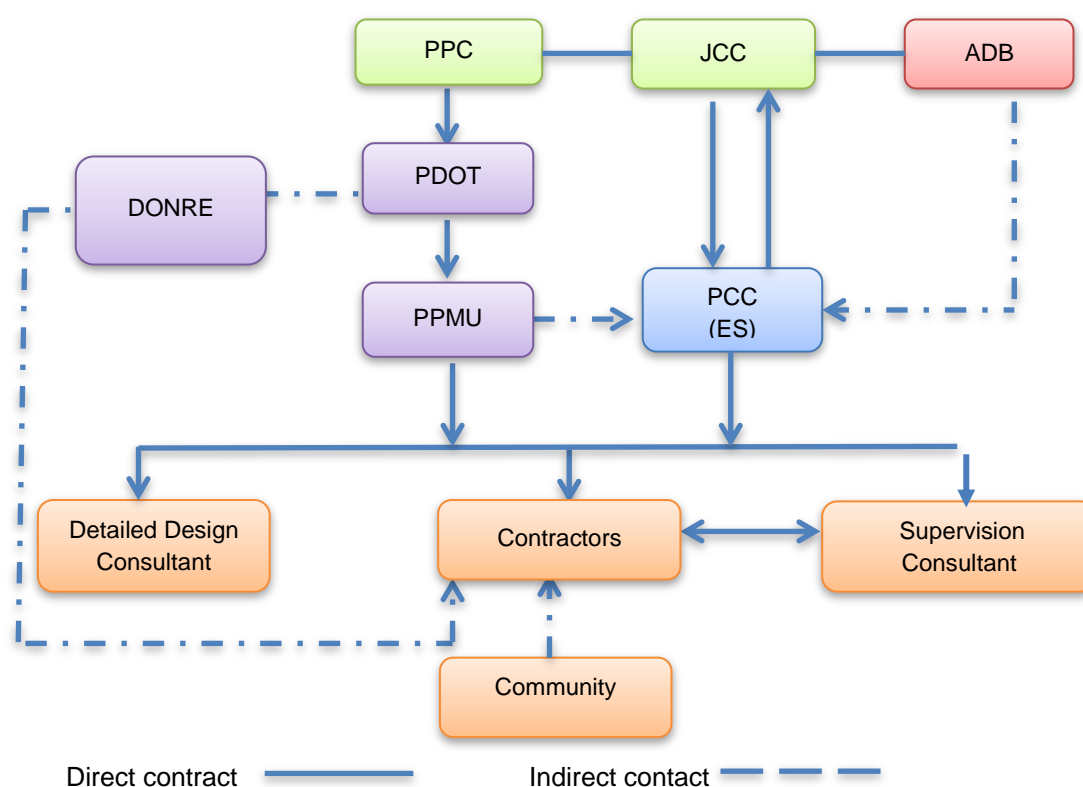


Figure 2. Organizational Structure for Environmental Monitoring

3.4 Roles and Responsibilities in EMP Implementation and Monitoring

11. The roles and responsibilities of the different institutions in EMP implementation and monitoring are described in Table 3.

Table 3. Roles and Responsibilities in EMP Implementation and Monitoring

Agency	Roles/Responsibilities
Provincial People's Committee (PPC)	<ul style="list-style-type: none"> – Executing agency with overall responsibility for project construction and operation – Ensure that sufficient funds are available to properly implement the EMP – Ensure that the Project, regardless of financing source, complies with the provisions of the EMP and ADB Safeguard Policy Statement 2009 (SPS) – Ensure that Project implementation complies with Vietnam environmental policies and regulations – Ensure that tender and contract documents include Project EMP and SEMP
Provincial Project Management Unit (PPMU under PDOT)	<ul style="list-style-type: none"> – Ensure that EMP provisions are strictly implemented during various project phases (design/pre-construction, construction and operation) to mitigate environmental impacts to acceptable levels – Undertake monitoring of the implementation of the EMP (mitigation and monitoring measures) with assistance from PSC and PCC. – Ensure that Project implementation complies with ADB environmental policy and safeguards policy statement (SPS 2009)

Agency	Roles/Responsibilities
	<p>principles & requirements</p> <ul style="list-style-type: none"> – For project duration, commit and retain a dedicated staff within PPMU as environment and safety officer (ESO) to oversee EMP implementation – Ensure that environmental protection and mitigation measures in the EMP are incorporated in the detailed design – Obtain necessary environmental approval(s) from DONRE prior to award of civil works contracts – Include the Project EMP and SEMP in the bid and contract documents for civil works; – Establish an environmental grievance redress mechanism, as described in the IEE, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance – With assistance from PCC, prepare semi-annual environmental monitoring reports for submission to ADB – Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan as necessary for submission to ADB
JCC	<ul style="list-style-type: none"> – Engage environment specialists under the PCC to ensure proper implementation and monitoring of EMP provisions
Project Coordination Consultant (PCC)	<ul style="list-style-type: none"> – Ensure that DDC incorporates into the project design the environmental protection and impact mitigation measures identified in the EMP for the design stage – Assist PPMU to ensure that all environmental requirements and mitigation measures from the IEE are incorporated in the bidding documents and contracts – During detailed design phase carry out baseline data collection on air quality, noise and surface water quality (as specified in the EMP) – During detailed design phase, prepare method statement/SEMPs (Erosion Control Plan, Waste Management and Spoils Disposal Plan, Noise and Dust Control Plan, etc.) described in the IEE/EMP – Implement all mitigation and monitoring measures (via contractors) for various project phases specified as PCC's tasks in the EMP – Work with JCC and PPMU to execute any additional environmental assessment prior to project construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not in the scope of the IEE prepared during loan processing, etc) – Undertake environmental management capacity building activities for PPMU as described in the IEE and EMP – Engage international and national environmental specialists to ensure proper implementation of EMP provisions. Through these specialists, the PCC shall: i) ensure proper and timely implementation of PCC's tasks specified in the EMP, ii) conduct environmental training as specified in the IEE/EMP for PPMU, iii) conduct worker's orientation on EMP provisions, iv) conduct field measurements (via contractors) for surface water quality dust and noise as required in the EMP, and v) prepare environmental baseline report and environmental semi-annual environmental

Agency	Roles/Responsibilities
	monitoring reports, as specified in the EMP, for submission to ADB.
Detailed Design Consultant (DDC)	<ul style="list-style-type: none"> – Incorporate into the project design the environmental protection and mitigation measures identified in the EMP for the design stage; – During detailed design phase provide all necessary information to the PCC to facilitate preparation of SEMP (Erosion Control Plan, Waste Management and Spoils Disposal Plan, Noise and Dust Control Plan, etc.) described in the IEE/EMP. – During detailed design phase notify PCC and JCC of any change in alignment or project design/components and provide all necessary information to the PCC to facilitate preparation of any additional environmental assessment prior to project construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not within the scope of the IEE prepared during loan processing, etc.) – During detailed design phase provide all necessary information to the PPMU and SC and JCC to facilitate obtaining environmental approvals from DONRE prior to award of civil works contracts.
Construction Supervision Consultant (CSC)	<ul style="list-style-type: none"> – Continuous compliance monitoring of Construction Contractor – Collect information to monitor contractor implementation of the EMP and SEMPs – Assess environmental impacts resulting from site works and facilities – Undertake day to day project supervision to ensure that the EMP and SEMPs are properly implemented by contractors, – Orient workers on EMP and SEMP implementation, health and safety – Document and report to PPMU on occupational accidents, diseases and incidents – As part of regular progress report submission to PPMU, prepare reports on the status of contractor implementation of the EMP, health and safety – Engage a national environment specialist to ensure proper implementation of the above tasks.
Contractors	<ul style="list-style-type: none"> – Recruit qualified environmental officer to ensure compliance with environmental statutory and contractual obligations and proper – Provide sufficient funding and human resources for proper and timely implementation of required mitigation measures in the EMP – Implement additional environmental mitigation measures, as necessary
Provincial Department of Transport (PDOT)	<ul style="list-style-type: none"> – Responsible for operation and maintenance of Project road – Implement EMP monitoring during operation
Department of Natural resources and environment (DONRE)	<ul style="list-style-type: none"> – Review and approve environmental assessment reports required by the Government. – Undertake monitoring of the project's environmental performance based on their mandate
Local communities	<ul style="list-style-type: none"> – Undertake monitoring contractors' construction activities.

Agency	Roles/Responsibilities
	<ul style="list-style-type: none">– Based on Grievance Redress Mechanism, timely inform to local government and PPMU on the action which do not comply with environmental management measures

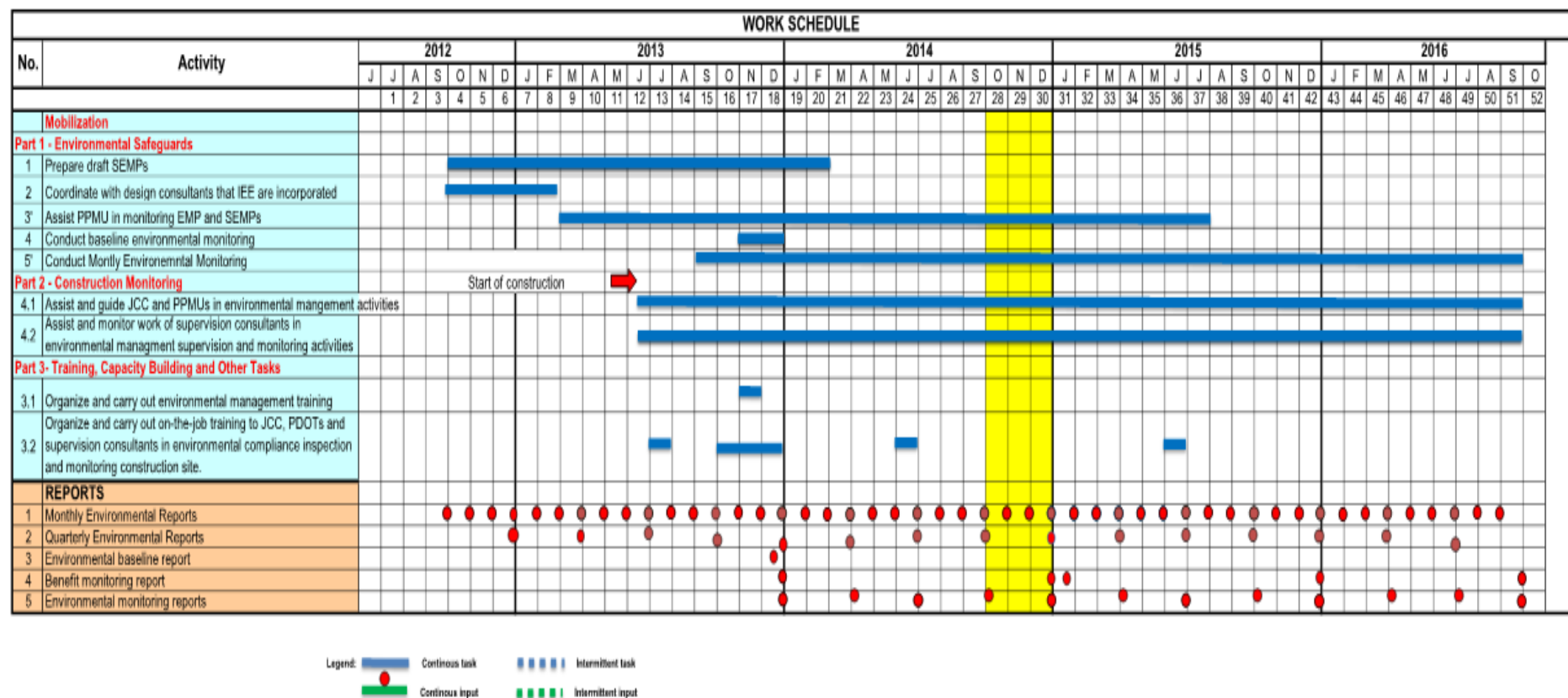
3.5. Schedule of uEMP Implementation and Environmental Monitoring

12. The schedule of activities relating to uEMP implementation and environmental monitoring is shown in Table 4 while the work schedule of the Environmental Specialists of the PCC is shown in Table 5.

Table 4. Schedule of uEMP Implementation and Environmental Monitoring Activities

No	Activity/Task	2012		2013				2014				2015				2016			
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
I	Understanding the Project and Setting the Framework																		
I.1	Field visit																		
I.2	Review IEEs and TOR																		
I.3	Prepare initial EMP as master outline																		
I.4	Input to inception Report																		
I.5	Prepare SEMP outline																		
I.6	Prepare line maps																		
II	Preparing EMP, SEMP Documents																		
II.1	EMP YB																		
II.2	EMP LC, BK																		
II.3	EMP CB, TQ, HG,																		
II.4	SEMP YB and LC																		
II.5	SEMP BK, TQ, CB, HG																		
III	Environmental Management Training and Environmental Instrument Monitoring																		
III.1	Prepare environment training materials and questionnaires																		
III.2	Prepare and conduct environment training needs assessment																		
III.3	Deliver and Assess Initial Environment Training																		
III.4	Arrange for Baseline Instrument Monitoring																		
IV	Environmental Monitoring of Construction Impacts																		
IV.1	Conduct Baseline instrument monitoring																		
IV.2	Periodic instrument monitoring 3 month/6 month																		
IV.3	Works with contractors to complete SEMP																		
IV.4	Visual monitoring and inspection of contractors' environment management																		
IV.5	Periodic report																		

Table 5. Work Schedule of the Environmental Specialists of the PCC



IV. METHODOLOGY OF ENVIRONMENTAL MONITORING

4.1 Monitoring of Compliance with the EMP

13. Monitoring of compliance by the contractors with the EMP is done on a daily basis by the CSC and weekly by the PCC through visual inspection. Monitoring is aided by the monitoring checklist prepared by the PCC and approved by the ADB and the DOT/PPMU. The effectiveness of a contractor's environmental management of a particular impact item is evaluated subjectively using the following rating criteria:

- 1- Very good: all required measures conducted
- 2 - Good: main measures conducted
- 3 - Medium: some measures conducted
- 4 - Weak: few measures conducted
- 5 - Very weak: very few measures conducted

14. Follow-up actions or remedial measures are recommended by the monitoring team for environmental management measures that were not satisfactorily met.

4.2 Ambient Environmental Quality Monitoring

15. For the TCNMP Project, the EMP recommended quarterly monitoring of ambient air and surface water quality. The objective of this monitoring is to gauge if the project construction activities are contributing to degradation of ambient air and surface water quality or to gauge whether the maximum allowed concentration of pollutants are not exceeded due to the project.

4.2.1 Air Quality Monitoring

16. The parameters for ambient air quality monitoring are total suspended solids (TSP or dust) and noise level (LAeq). The selected sampling points are the same for the air and noise monitoring. The recommended frequency are as follows:

- Air (TSP Air (TSP) : 1 hourly sample every 2 hours from 0600 hours to 2200 hours, 8 samples per day x 32 sampling points (8 routes)
- Noise : each sampling point measured for one hour every 2 hours from 0600 hours to 2200 hours, 8 measurements/day/sampling point x 32 sampling points

17. TSP measurements were conducted using soap bubble while noise levels were measured using a sound level meter RION-NL04 and RION NL21. The reference standards for sampling and analysis of results are TCVN 5067:1995 (QCVN 05:2013/BTNMT) for TSP and TCVN 7878-1:2010 (ISO 1996-1:2003) and TCVN 7878-2:2003 (QCVN 26:2010/BTNMT) for noise.

4.2.2 Surface Water Quality Monitoring

18. Fifty-three (53) sampling sites within eight (8) routes were selected for monitoring. For each sampling site, two samples, (one 50 m upstream and one 50 m downstream) from the road or bridge construction site were collected. For each sampling point, ten parameters were recommended for analysis, namely: temperature, pH, turbidity, TSS, DO, BOD₅, COD, Oil and Grease, Total Coliform and Fecal coliform. Temperature, pH, turbidity and DO were measured on site using a calibrated hand-held multi-parameter meter. Samples for TSS, BOD₅, COD, Oil and Grease, Coliform and Fecal coliform were collected employing sampling techniques and preservation appropriate for each parameter. The samples were sent and

analysed in the laboratory of C.O.M.P.O Vietnam Joint Stock Company. Table 6 shows the analytical method used for each water quality parameter analyzed in the laboratory.

Table 6. Water Quality Analytical Method and Reference Standard

No	Parameter	Analytical Method	Reference Standard
1	TSS	Filtration through glass fiber filters and weighing	TCVN 6625:2000 (ISO 11923-1997)
2	Oil and Grease	Quantitative (weighing) method	TCVN 5070: 1995
3	COD	Closed reflux and colorimetric method	SMEWW 5220D:2012
3	BOD ₅	Dilution and seeding method with allylthiourea addition for samples having BOD ₅ ≥ 3 mg/L	TCVN 6001-1:2008; ISO 5815-1:2003)
		Method for undiluted sample (for samples having BOD ₅ in the range 0.5mg/L to 6mg/L oxygen)	TCVN 6001-2:2008; ISO 5815-2:2003)
4	Coliform	Multiple Tube Fermentation technique, most probable number method	TCVN 6187 – 1- 1996
6	Fecal Coliform		TCVN 6187 – 2 - 1996

The methodology of environmental monitoring, data analysis and reporting is illustrated in Figure 3.

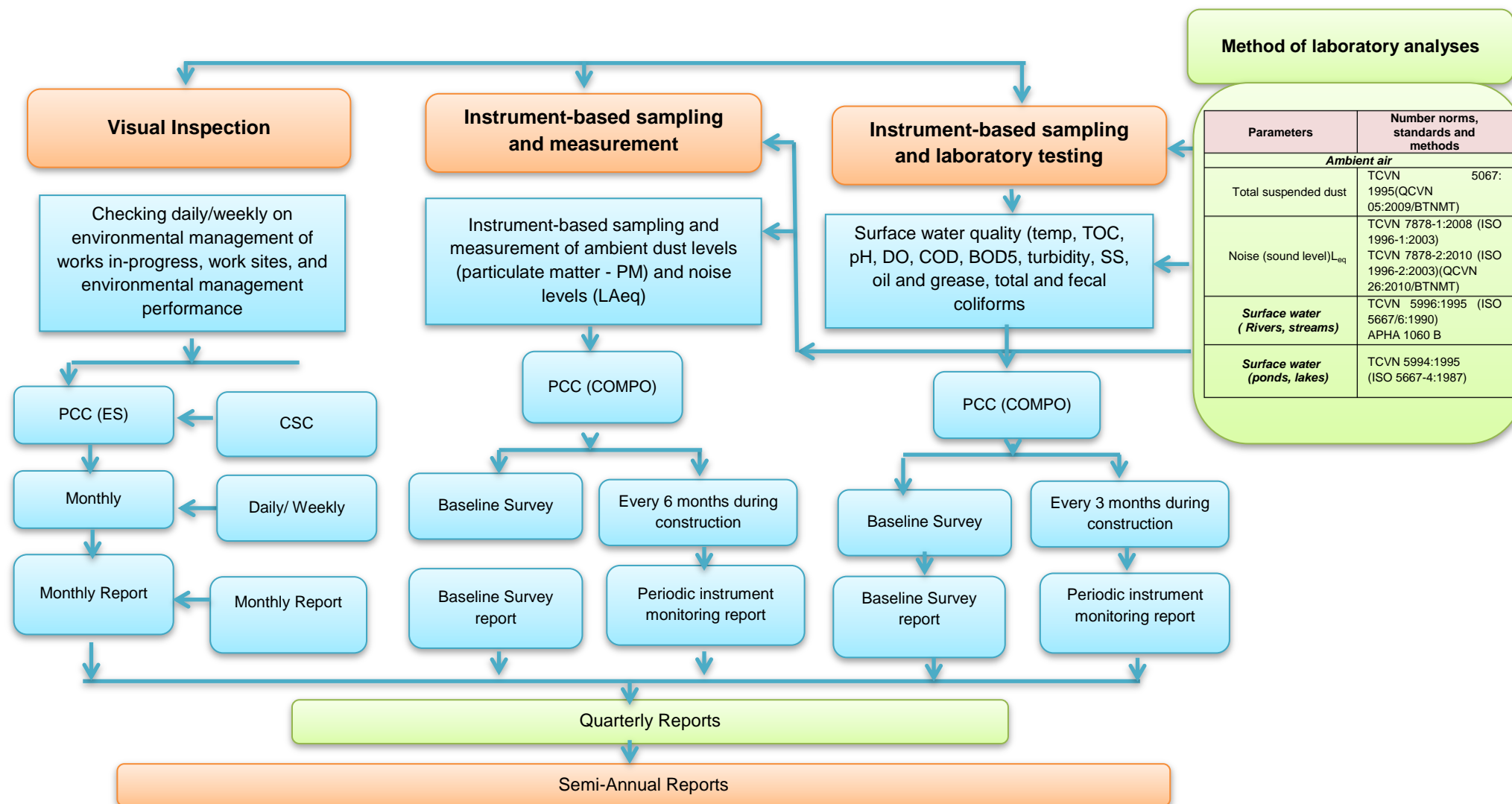


Figure 3. Environment Monitoring Methodology

V. STATUS OF EMP IMPLEMENTATION

5.1 Capacity Building and Training

19. All formal trainings to foster awareness on ADB's safeguard policies and environmental regulations of Vietnam, and to enhance the capacity of the PPMU, the CSC and the contractors in environmental management have been conducted in CY 2013. During this report period, guidance and training on EMP implementation and monitoring were provided by the PCC to the CSC and the contractors during coordination meetings in the course of the PCC's monitoring activities. Table 7 lists the completed capacity building and training activities up to the end of this report period.

Table 7. Completed Capacity Building and Training

Training Topic	Participants	Training Period
ADB and Vietnam Government's environmental policies	PPMU & PDOT Staff	26-27 Nov 2013
Requirement on preparing and implementing uEMP		
Requirement on preparing and implementing SEMP		
Inspecting and monitoring environmental compliance of the project		
SEMP preparation and use of environmental monitoring form	Contractors/CSC	
	Bac Kan	10 Oct 2013
	Yen Bai	22 Oct 2013
	Cao Bang	14 Nov 2013
	Lao Cai	27-30 Oct 2013
		07-10 Dec 2013
	Tuyen Quang	12 Dec 2013
	Ha Giang	30 Dec 2013
On-the-job training and instructions to Contractors and Supervision Consultants and monitoring of compliance to environment protection measures during the construction. Remind and instruct in carrying out environmental impact mitigation measures during the construction. Instructions in filling out form of environment monitoring of Supervision Consultant, Contractors.	All contractors/CSC	Jul-Dec 2014 (During site visits/monthly compliance monitoring)

5.2 Compliance with ADB Loan Covenants

Table 8 shows the status of compliance with ADB's loan covenants during this report period.

Table 8. Status of Compliance with ADB Loan Covenants

Loan Covenant	Complied?			Explanation
	Y	N	P	
The Borrower shall ensure that:				
(i) the Project is implemented in accordance with the Borrower's laws and regulations on environment, as well as ADB's Safeguard Policy 2009 (ADB's SPS), and that there is no significant damage to the natural environment as a result of the design, construction, operation and maintenance of the Project facilities;	√			No significant damage to the environment has been reported during the reporting period (1/2015-6/2015)
(ii) if there is any discrepancy between the Borrower's laws and	√			No identified discrepancy

Loan Covenant	Complied?			Explanation
	Y	N	P	
regulations, and ADB's SPS, then ADB's policy shall apply;				between Vietnam laws and regulations and SPS 2009.
(iii) ADB's environmental policy and requirements are applied and implemented for all project components regardless of financing source;	√			ADB and Project's Policies have been complied and applied for all components of the project
(iv) the Works contracts under the Project include specific measures to mitigate negative environmental impacts caused by the construction activities in accordance with the requirements of the EMP prepared for the Project, and the EMP shall be included in the bidding and contract documents requiring contractors to comply with all applicable provisions;	√			EMP conditions were incorporated in the bidding and contract documents
(v) adequate budget and staff resources are allocated for the EMP implementation;	√			Budget for SEMP implementation are included in the respective contract cost. PMU, PCC and CSC have assigned staff to regularly monitor the contractors' implementation of the SEMP.
(vi) the contractors engaged under the Works contracts are in strict compliance with the EMP requirements;			√	According to EMP requirements and PCC's instructions, contractors have finished SEMP. Every month, CSC, PCC and PPMU supervise, evaluate and remind contractors of complying with the requirements in EMP and SEMP. Some contractors still need to improve on their compliance (See Section 4.8)
(vii) environmental approvals required by the Borrower are obtained in a timely manner and copies of such approvals shall be submitted to ADB upon issuance;	√			See table 4-3.
(viii) the Borrower shall cause Ha Giang province to ensure that the Dong Van Karst Plateau Global Geo-park Management Board is consulted during detailed design phase for Project road 176A and that a requisite Project report is compiled to obtain UNESCO's concurrence;	√			UNESCO Permission obtained on 26 July 2013. (See Table 4-3)
(ix) construction works carried out by contractors are adequately supervised and monitored to ensure compliance with the EMP;	√			Supervision continuously being carried out by the ES of CSC
(x) new or supplementary environmental assessment report shall be prepared in compliance with ADB's SPS if there are any additional components or changes in the Project such as specific location and design, among others, that will result to adverse environmental impacts and are not within the Scope of the environmental assessment report cleared by ADB; such documents shall be submitted to ADB for clearance prior to implementation of additional components or major changes and corresponding approval from the Borrower's (approving authority) shall be obtained in a timely manner;	√			EMPs have been updated prior to construction stage. Some packages have additional items, such as: PR255 – changed from improvement to new construction of Ban Cau Bridge; However, the impacts from these changes and the mitigation measures were stated in EMP, thus, it is not necessary to update for these packages;

Loan Covenant	Complied?			Explanation
	Y	N	P	
				No significant change in alignment during the construction stage that warrant new updating of EMP.
(xi) if any unanticipated environmental impacts become apparent during project implementation, prepare a corrective action plan and submit this to ADB for clearance and ensure implementation of the corrective action plan;	√			No unanticipated environmental impacts occurred during the period covered by this report.
(xii) establish an environmental grievance redress mechanism, acceptable to ADB, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance; and	√			GRM has been established and approved by ADB.
(xiii) semi-annual reports on implementation of the EMP are submitted to ADB.	√			Being complied regularly.

References: TCNMP Project Administration Manual, 12 May 2012 and Loan Agreement Special Operations, Schedule 5. Legend: Y-Yes N-No P-Partial I

5.3 Compliance with Government Environmental Requirements

5.3.1 Environmental Protection Commitment (EPC)

20. EPCs have been obtained for all the provincial roads as of August 2013. For Ha Giang where a section of PR 176A passes through the Dong Van Karst Plateau Global Geo-park which is a declared UNESCO heritage site, permission from the UNESCO National Committee of Vietnam was also obtained. The complete list of EPCs may be found in the second semi-annual report (January to June 2014).

5.3.2 Quarry/Aggregate Sources, Borrow Pits and Disposal Site Permits

21. The required permits for identified quarry/aggregates sources, borrow pits and disposal sites for each of the provincial road projects were mostly obtained by the PPMU during the detailed design stage. The status of permits for the sources of quarry/aggregates, borrow pits and disposal sites can be found in Appendix 1 of the second semi-annual report.

22. During the construction stage, utilization of quarry/aggregate sources, borrow pits and disposal sites are regularly monitored. During this report period, it had been noted that some of the disposal sites being used by some contractors do not have permits. The contractors have been advised to use only quarry/aggregate sources, borrow pits and disposal sites that have been given permit. The non-complying contractors were advised to immediately clean up and rehabilitate pits and disposal sites that were not approved for use.

5.4 Status of Updating of EMP and Preparation of SEMP

23. Updating of the EMP for all the twelve road sections in the six provinces were undertaken in 2013. All the updated EMPs have been approved by ADB also in 2013. As of this reporting period, the SEMPs for all the 23 contract packages have been approved by the respective PPMUs.

24. It is required that the SEMPs be updated during the construction stage whenever there are adjustments in design or revision in construction methodology to ensure that the mitigation measures are appropriate for the potential impacts.

25. As of reporting period, just SEMP for package No. LC-R160 has been updated with changes in construction method of Pho Rang bridge and approved by PPMU. For package No. BK-PR 255-01, Ban Cau bridge will be re-constructed instead of the improvement as mentioned in uEMP of PR255, after reviewing, the impacts caused by the construction of Ban Cau bridge and management measures, mitigation measures as stated in EMP for the item of Ban Cau Bridge (excluding impacts from land acquisition which will be mentioned in another report), thus, PCC did not request contractors to update SEMP for this package. Table 9 shows detail of the approved SEMP and current status.

Table 9. Status of SEMP Approval

Province	Road Section	Contract Package	Approval Reference No.	Approving Authority	Date Approved	Revision Status
Bac Kan	PR 255	BK-R255-01	47a/CV-QLDA	Bac Kan PPMU	11/02/2014	No revision
		BK-R255-02	46a/CV-QLDA	Bac Kan PPMU	10/02/2014	No revision
		BK-R255-03	133a/CV-QLDA	Bac Kan PPMU	18/03/2014	No revision
		BK-R255-04	48a/CV-QLDA	Bac Kan PPMU	11/02/2014	No revision
Cao Bang	PR 202	CB-R202-01	122/BQKDA1	Cao Bang PPMU	24/03/2014	No revision
		CB-R202-02	122/BQKDA1	Cao Bang PPMU	24/03/2014	No revision
		CB-R202-03	122/BQKDA1	Cao Bang PPMU	24/03/2014	No revision
Ha Giang	PR176A	HG-R176A-01	52 /PPMU-CV	Ha Giang PPMU	5/05/2014	No revision
		HG-R176A-02	70/PPMU-CV	Ha Giang PPMU	12/06/2014	No revision
	PR 183	HG-R183-01	317/SGTVT_CV	Ha Giang PPMU	22/05/2014	No revision
		HG-R183-02	317/SGTVT_CV	Ha Giang PPMU	22/05/2014	No revision
Tuyen Quang	PR 187	TQ-R187-01	371/QLDA	Tuyen Quang PPMU	09/12/2013	No revision
	PR 189	TQ-R189-1/3	373/QLDA	Tuyen Quang PPMU	10/12/2013	No revision
		TQ-R189-2/3	374/QLDA	Tuyen Quang PPMU	10/12/2013	No revision
		TQ-R189-3/3	375/QLDA	Tuyen Quang PPMU	10/12/2013	No revision
Yen Bai	PR 163	YB-R163-01	883a/SGTVT-QLDXTD	Yen Bai PPMU	19/08/2013	No revision
		YB-R163-02	1107/SGTVT-QLDXTD	Yen Bai PPMU	02/10/2013	No revision
		YB-R163-03	1186/SGTVT-QLDXTD	Yen Bai PPMU	17/10/2013	No revision
Lao Cai	PR 151	LC-R151-01	338/BDA-DA2	PPMU Lao Cai	20/09/2013	No revision
	PR 151B	LC-R151B-01	801/BDA-DA2	PPMU Lao Cai	12/09/2013	No revision
	PR 154	LC-R154-01	793/BDA-DA2	PPMU Lao Cai	09/09/2013	No revision
	PR 156	LC-R156-01	918/BDA-DA2	Lao Cai PPMU	15/10/2013	No revision
	PR 160	LC-R160-01	792/BDA-DA2	Lao Cai PPMU	09/09/2013	Updated in May 2014 due to change in construction method of Pho Rang bridge from the approved bored pile to material-filling method and from aggregate surfacing to Macadam pavement at Km6. Updated SEMP has been approved by the Lao Cai PPMU.

5.5 Staff Resources for EMP Implementation

26. During the report period, the contractors have endeavoured to supplement the staff in charge of environment and safety to ensure implementation of the SEMP. Some of the assigned personnel however still have not spent sufficient time for environmental management activities or have not regularly stayed on site. While the awareness by the contractors' environmental staff, site managers and workers on environmental management and monitoring is improving, environmental management measures are not regularly implemented. The PCC continually gives out instructions and provides advices to

the contractors to ensure compliance with the environmental requirements of the ADB and the Government of Vietnam.

27. The CSCs are continually providing support to the PCC through close inspection of implementation of the environmental management measures and daily compliance at site. The CSC regularly submits reports to PPMU and PCC on monitoring of EMP implementation and compliance of Contractors, which serve as the bases for PPC to provide close guidance at site. The direct monitoring by CSC as requirements in EMP and SEMP will impact on contractors' awareness in complying with environmental protection requirements.

28. Aside from assigning technicians for each package, the PPMUs have also assigned staff to monitor the EMP implementation for the whole Project. The PPMU leaders and staff in charge of each package, have been aware of responsibilities of the implementation of environmental impacts mitigation measures of each package. The PPMU staffs are in close coordination with the PCC, thus compliance to the uEMP is gradually improving.

5.6 Information Dissemination

29. Information relevant to the road contract packages are disseminated through (i) community consultations in communes, and (ii) through the public speaker system. During the previous reporting period, information dissemination has been conducted for five out of the 23 contract packages, namely: BK R255-01, BK R255-02, BK R255-03, BK R255-04 and LC R160-01. During the last quarter of 2014, the staffs in charge of environment in Bac Quang and Quang Binh Districts along HG-R183 were interviewed and it was found that they have not been informed about the SEMP. It is recommended that the Ha Giang PPMU - PDoT disseminate information about the SEMP of each contractor to the district staffs. Information dissemination for the remaining packages shall be scheduled in the succeeding months.

30. During the quick interview of some households living in the area of packages No. HG-PR183-02; HG- PR176A-01 and CB-PR202-02 in June 2015, the interviewers said that they were informed EMP information from contractors through public meetings. PCC also requested contractors to disclose SEMP at commune People's Committee and have confirmation in these communes.

5.7 Compliance with the uEMP during the Pre-construction Stage

31. As discussed in the second semi-annual report (Jan-Jun 2014), for all provincial roads, the requirements specified in the EMP with respect to: (i) design measures and public disclosure; (ii) project boundaries/location change; (iii) environmentally responsible procurement; (iv) environmental capacity development; (v) unexploded ordnances; (vi) updating of EMP, (vi) preparation of SEMP, and (vii) securing permits have all been complied with as of the end of June 2015.

5.8 Status of Compliance with the uEMP during the Construction Stage

32. Through continual monitoring, instructions and guidance provided by the PCC, the implementation of environmental impact mitigation measures by the construction contractors is gradually improving. There are still shortcomings however, thus compliance will be continuously monitored and improved.

5.8.1 Bac Kan Provincial Road, PR 255

33. As of June 2015, ongoing activities are mainly construction of beams, completing bridge deck and approaches of Contract No. BK-PR255-01 while activities for Contract

No. BK-R255-02, 03 and 04 are focused on constructing base and sub-base courses, paving asphalt layer, constructing side ditches, culverts and slope protection.

34. In comparison with previous reporting period, the spoil disposal in the contracts has been improved up on reminder of Bac Kan PPMU and CSCs, the Contractors have stopped disposing in locations without permits. Erosion has not happened in spoil disposal sites as it is the beginning of rainy season; however, some spoil sites in location Km7+600 of Contract No. BK-PR255-02, Km9+648, Km11+320 and Km12+700 of Contract No. BK-PR255-02 with high steep slope is prone to landside during the upcoming rainy season. In the monitoring patches, PCC has advised the Contractors to dispose spoil layer by layer, construct temporary drainage system to prevent landslide in raining season. For locations achieved designed waste spoil volume or too steep, the Contractors are requested to inform PPMU to coordinate with local authorities for broadening these spoil sites or obtaining permits for new ones.

35. The Contractors have improve their drainage, erosion control and runoff pollution management, and fully equipped health care devices, PPE as required. Traffic assurance has been also improved because road bed extension has been completed by most Contractors; however, it still lacks warning signs, barriers in some locations such as Na Tum Bridge (Km 0+800), Ban Vay Bridge (Km 22+900) of Contract No. BK-PR255-01 (in February and March 2015), Km 7+500 of Contract No. BK-PR255-02, Km 18+200 of Contract No. BK-PR255-03 (April 2015).

36. Dust and exhausted gas management have been performed well by most of the Contractors, though poor dust management has been recorded in some sections of Contracts No. BK-R255-02 and BK-PR255-03 in April 2015. Material storage of the Contractors has not met requirements; oil petroleum is mainly stored in work camp and directly on soil surface without cover shield.

37. Table 10 summarizes the environmental measures that were implemented by the contractors and the environmental issues that were noted along PR 255 from January to June 2015. The assessment of effectiveness of the environmental management measures being implemented by the contractors of PR255 based on degree of compliance with the environmental management measures in the uEMP is shown in Appendix 1.1. Photos 1-12 reflect the environmental conditions in various construction sites during the reporting period.

Table 10. Assessment on Compliance with Mitigation Measures, PR255, January–June 2015

Environmental Aspects	Assessment on Compliance with uEMP/Environmental Issue			
<i>(Recommended mitigation measures from EMP & SEMP)</i>	BK-PR255-01	BK-PR255-02	BK-PR255-03	BK-PR255-04
1) Spoil disposal	Partially Complying. Waste Management Plan has not been submitted. The spoil sites do not meet environmental requirements. Although retaining wall was constructed, waste soil and rock slide down into stream. Whenever it rains, waste soil mixes with the runoff and is washed down	Partially complying. Waste Management Plan not submitted. Some waste sites were eroded after the rains in September, especially at km 1+200 - km1+400	Partially Complying. Waste Management Plan has not been submitted.	Partially complying. Waste Management Plan not submitted. The sites became muddy and slippery after the rains in September 2014.

Environmental Aspects	Assessment on Compliance with uEMP/Environmental Issue			
<i>(Recommended mitigation measures from EMP & SEMP)</i>	BK-PR255-01	BK-PR255-02	BK-PR255-03	BK-PR255-04
	into stream and pond around the waste sites. Disposal of spoil in unapproved disposal site			
2) Solid waste management and disposal (domestic waste and construction waste)	Complying. Classifying solid wastes into organic and inorganic.	Complying. Waste bins have been installed for classifying organic and inorganic wastes.	Complying. Waste bins have been installed for classifying organic and inorganic wastes.	Complying. Waste bins have been installed for classifying organic and inorganic wastes.
3) Hazardous Waste /Material Management	Not complying. Fuel has been stored in areas without cover, warning sign/NO FIRE signs; there are uncollected and improperly stored waste oil drums at sites; no record of hazardous wastes; waste oil is collected for re-cycling or selling.	Partially complying. Fuel storage areas for oil, gasoline and bitumen have been provided inc. fire extinguisher and fire warning sign; no record of hazardous wastes; waste oil is collected for re-cycling or selling.	Not complying. Fuel has been stored in areas without cover, warning sign/fire hazard signs; there are uncollected and improperly stored waste oil drums at sites; no record of hazardous wastes; waste oil is collected for re-cycling or selling.	Partially complying. Fuel is stored in areas with cover, cover, AUTHORIZED PERSONNEL ONLY sign/NO FIRE signs; no record of hazardous wastes; waste oil is collected for re-cycling or selling.
4) Bitumen and Asphalt concrete	No environmental issue recorded during this period	No environmental issue recorded during this period	No environmental issue recorded during this period	No environmental issue recorded during this period
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	Not complying. Temporary drainage or settlement ponds have not been installed, especially near the bridge construction sites. Poor site management leads to erosion at some sections. Temporary ditches were not provided during roadway construction causing stagnation of water on the road way when it rains, affecting the travel of road users.	Not complying. Waste soil piles wash out into the streams or ponds around the sites whenever it rains, potentially affecting agricultural production of local farmers. Equipment and construction vehicles maintenance yard has not been provided.	Not complying. Poor site management leads to blocking of pond with soil from project site. Equipment and construction vehicles maintenance yard has not been provided.	
6) Materials Management: Manage the material piles,	Partially complying. Materials stored far from river and stream. However,	Partially complying. Materials stored far from river and stream. However,	Partially complying. Materials stored far from river and stream. However,	Partially complying. Materials stored far from river and stream. However,

Environmental Aspects	Assessment on Compliance with uEMP/Environmental Issue			
(Recommended mitigation measures from EMP & SEMP)	BK-PR255-01	BK-PR255-02	BK-PR255-03	BK-PR255-04
spoil waste piles and surface runoff from construction sites and buildings	there was no embankment or cover to prevent from dust and erosion.	there was no embankment or cover to prevent from dust and erosion.	there was no embankment or cover to prevent from dust and erosion.	there was no embankment or cover to prevent from dust and erosion.
7) Pollution of surface water: a) Waste water discharging	Partially complying Existing septic toilet of Thanh Phat Company is near the stream Waste bentonite from bored piling activity was not properly collected and affected the quality of the stream near the construction area. Lack of wastewater containers.	Partially complying No environmental issue recorded during this period	Partially complying Latrines do not meet sanitation and environmental requirements Installing work camp, vehicle and equipment yard at least 50m away from water bodies	Partially complying Latrines do not meet sanitation and environmental requirements
b) Maintenance of vehicles and equipment	No equipment and construction vehicles maintenance yard	Vehicle and equipment yard at least 50m away from water bodies	Vehicle and equipment yard at least 50m away from water bodies	Vehicle and equipment yard at least 50m away from water bodies
8) Noise and vibration: Site preparation, construction management, and materials transport	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, no muffles are necessary to be installed.	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, no muffles are necessary to be installed.	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, no muffles are necessary to be installed.	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, no muffles are necessary to be installed.
9) Dust and exhaust: site preparation, construction management, and materials transport	Not complying. Trucks transporting spoils and aggregates are not covered appropriately; water has not been sprayed on barren areas and earth pavements.	Complying. Watering around demolition, excavation and work sites to suppress dust as required;	Not complying. Trucks transporting spoils and aggregates are not covered appropriately; water has not been sprayed on barren areas and earth pavements.	Not complying. Trucks transporting spoils and aggregates are not covered appropriately; water has not been sprayed on barren areas and earth pavements.
10) Health and safety: Public and workplace	Partially complying PPE were provided to workers	Not complying. Workers have not been provided with	Partially complying. Not all workers have been provided with	Partially complying. Not all workers have been provided with

Environmental Aspects	Assessment on Compliance with uEMP/Environmental Issue			
(Recommended mitigation measures from EMP & SEMP)	BK-PR255-01	BK-PR255-02	BK-PR255-03	BK-PR255-04
	Fire extinguishers, first aid kits and stretcher had been provided at workers' camps.	PPE. Sufficient fire extinguisher, medicine cabinet, and waste bins for segregation of organic and inorganic garbage are not provided	PPE (helmet, boots, gloves, dust mask) during the construction. Worker's camps have been provided with first aid tools and fire extinguishers.	PPE (helmet, boots, gloves, dust mask) during the construction. Worker's camps have been provided with first aid tools and fire extinguishers.
11) Traffic Management	Partially complying. There is no traffic management plan; Lack of warning signs and traffic signs. It is necessary to provide flagman to ensure traffic safety at construction site of embankment and culvert, provide danger warning signs in the areas prone to landslide, clear side ditch when it rains, and maintain road surface to avoid water stagnation on pavement causing impacts on traffic.	Partially complying. There is no traffic management plan; Lack of warning signs and barrier in locations prone to landslide. It is necessary to install warning signs in the areas prone to landslide, clear side ditch when it rains, and maintain road surface to avoid water stagnation on pavement causing impacts on traffic.	Partially complying. There is no traffic management plan; Lack of warning signs and traffic signs. It is necessary to provide flagman to ensure traffic safety at construction site of embankment and culvert, provide danger warning signs in the areas prone to landslide, clear side ditch when it rains, and maintain road surface to avoid water stagnation on pavement causing impacts on traffic.	Partially complying. There is no traffic management plan; Lack of warning signs and traffic signs. It is necessary to provide flagman to ensure traffic safety at construction site of embankment and culvert, provide danger warning signs in the areas prone to landslide, clear side ditch when it rains, and maintain road surface to avoid water stagnation on pavement causing impacts on traffic.
12) Loss of biodiversity	No environmental issue recorded during this period	No environmental issue recorded during this period	No environmental issue recorded during this period	No environmental issue recorded during this period
13) Usage and storage of dynamite	No environmental issue recorded during this period	No environmental issue recorded during this period	No environmental issue recorded during this period	No environmental issue recorded during this period



Photo 1. Barrier in Na Tum Bridge of Contract No. BK-R255-01; April 2015



Photo 2. Fuel and material stored outdoor, right beside the stream where Na Tum Bridge is under construction, April 2015



Photo 3. Temporary workers' camp along the road in Km 7+400 (Contract No. BK-PR255-02, April 2015)



Photo 4. Construction site sign in Km 13+500 (Contract No. BK-PR255-03, April 2015)



Photo 5. Spoil site on embankment slope in Km17+200 (Contract No. BK-PR255-04, April 2015)



Photo 6. Dust when vehicles cross by in Km 20+500 (Contract No. BK-PR255-04, April 2015)



Photo 7. Lack of warning sign in construction site of Ban Vay Bridge (Km 22+300) Contract No. BK-PR255-01 May 2015



Photo 8. Materials gathered along the road generating dust (Km 0+250) Contract No. BK-PR255-01, May 2015



Photo 9. Spoil site with temporary drainage ditch (Km 1+400) Contract No. BK-PR255-02 in May 2015



Photo 10. Materials gathered along the road (Km23) Contract No. BK-PR255-04 May 2015



Photo 11. A spoil site disposing out of its scope, the Contractor has stopped disposing and it has been covered by wild weeds have cover (Km 24+100) Contract No. BK-PR255-04 June 2015



Photo 12. Erosion rill appeared after rains in section Km 4, Contract No. BK-PR255-02, June 2015

5.8.2 Cao Bang Provincial Road, PR 202

38. From January to June 2015, the contractors' activities focused on embankment, rock fill, culvert casting, spreading of sub-base and base course, installation of culverts, construction of drainage and slope protection.

39. As in the previous report, EMP and SEMP compliance level of the Contractors of the 03 contracts of PR202, Cao Bang Province has not met requirements, only some mitigation measures related to spoil treatment, hazardous waste management, public health care management, labour safety and traffic assurance have been carried out by the Contractors.

40. In the first Quarter of 2015, the Contractor of contract No. CB-R202-02 has been assessed poorly regarding materials and fuel, waste rock disposal while other Contractors of Contracts No. CB-R202-01 and CB-R202-03 have been poorly assessed regarding dynamite usage and management (See Appendix 1). In Quarter II 2015, traffic assurance along the road of Contract No. CB-R202-02 and CB-R202-03 have been improved slightly, but it is still insufficient sign of work site in many locations. As the Contractor representative and CSCs' ideas in meetings at sites, most of installed warning signs have been stolen, the Contractors need to have methods to protect or replace these signs by materials available in local in order to avoid being stolen.

41. Although there are 12 spoil sites obtained permits along the road and evenly distributed in these contracts, some new spoil sites without permits have been appeared. According to local people's complaints, waste spoil of Contract No. CB-R202-02 in section Km20+100 has spilled to their agricultural land. Materials storage (except for igniter) has not met requirements, most of fuels have been stored on ground without cover. The Contractors have installed camps for their workers and adequately provided domestic water and latrines.

42. Throughout this monitoring period, the Contractors maintained good performance with respect to noise and vibration management and control of biodiversity. The contractors also maintained relatively good performance with respect to dust and exhaust management.

43. Table 11 is a summary of the assessment of the PR202 Contractors' compliance with the mitigation measures recommended in the uEMP during the period January to June 2015. The assessment of effectiveness of the environmental management measures being implemented by the contractors of PR202 based on degree of compliance with the environmental management measures in the uEMP is shown in Appendix 1.2. Photos 13-

24 show the environmental conditions at the various construction sites of CB-PR 202 from January to June 2015.

Table 11. Assessment of Compliance with Mitigation Measures, CB-PR202, January to June 2015

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue		
<i>(Recommended mitigation measures from EMP & SEMP)</i>	CB-R202-01	CB-R202-02	CB-R202-03
1) Spoil disposal	Partially complying. Mitigation measures of environmental pollution has not been implemented in the disposal site; permits for new waste sites have not been obtained.	Partially complying. Spoil sites in location Km11+45, Km14+600 and Km 16+100 have obtained permits	Partially complying. Spoil sites in location Km23+230, Km 24+600 and Km 27+100 have obtained permits
2) Solid waste management and disposal (domestic waste and construction waste)	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.
3) Hazardous Waste Management	Not complying. Poor management of fuel and oil containers; no proper storage area for fuel.	Not complying. Poor management of fuel and oil containers; no proper storage area for fuel.	Not complying. Poor management of fuel and oil containers; no proper storage area for fuel.
4) Bitumen and Asphalt concrete	No environmental issue has been recorded during this period	No environmental issue has been recorded during this period	No environmental issue has been recorded during this period
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	Partially complying Poor erosion control/sediment control	Partially complying Poor erosion control/sediment control	Not complying No erosion prevention measures
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	Partially complying. Materials have been stored separately and far from river and stream but without embankment or cover to prevent from dust and erosion	Partially complying. Materials have been stored separately and far from river and stream but without embankment or cover to prevent from dust and erosion	Partially complying. Materials have been stored separately and far from river and stream but without embankment or cover to prevent from dust and erosion
7) Pollution of surface water:			
a) Waste water discharging	Complying	Complying	Complying
b) Maintenance of vehicles and equipment	Complying	Partially complying. Contractors have no maintenance areas for construction vehicles and equipment.	Partially complying. Contractors have no maintenance areas for construction vehicles and equipment.
8) Noise and vibration: Site preparation, construction management, and materials transport	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard.	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard.	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard.
9) Dust and exhaust: site	Partially complying.	Partially complying.	Partially complying.

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue		
<i>(Recommended mitigation measures from EMP & SEMP)</i>	CB-R202-01	CB-R202-02	CB-R202-03
preparation, construction management, and materials transport	Trucks and heavy equipment meet emission standards; trucks transporting spoils without cover; do not spray water on roadways and stockpiles.	Trucks and heavy equipment meet emission standards; trucks transporting spoils without cover; do not spray water on roadways and stockpiles.	Trucks and heavy equipment meet emission standards; trucks transporting spoils without cover; do not spray water on roadways and stockpiles.
10) Health and safety: Public and workplace	Partially complying. Some workers do not have PPE; lack of warning signs at locations prone to landslide; complies with requirement on sanitary latrines.	Partially complying. Some workers do not have PPE; lack of warning signs at locations prone to landslide; complies with requirement on sanitary latrines.	Partially complying. Some workers do not have PPE; lack of warning signs at locations prone to landslide; complies with requirement on sanitary latrines.
11) Traffic Management	Partially complying. No Traffic Management Plan; lack of fences and flagmen in construction sites and locations prone to landslide.	Partially complying. No Traffic Management Plan; lack of fences and flagmen in construction sites and locations prone to landslide.	Partially complying. No Traffic Management Plan; lack of fences and flagmen in construction sites and locations prone to landslide.
12) Loss of biodiversity	No environmental issue has been recorded during this period	No environmental issue has been recorded during this period	No environmental issue has been recorded during this period
13) Usage and storage of dynamite	No environmental issue has been recorded during this period	No environmental issue has been recorded during this period	No environmental issue has been recorded during this period



Photo 13. Dust when vehicles cross by work site of Contract No. CB-R202-01, May 2015



Photo 14. The Contractor performed watering on work site of Contract No. CB-R202-02, May 2015



Photo 15. Fuels have been gathered outdoor on ground in Contract No. CB-R202-01, May 2015

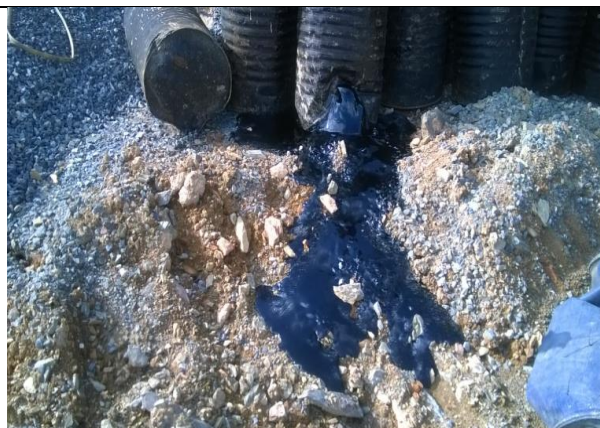


Photo 16. Bitumen has been gathered outdoor on ground in Contract No. CB-R202-02, May 2015



Photo 17. Landslide warning sign of Contract No. CB-R202-02, July 2015



Photo 18. Bitumen has been gathered along the road covered by canvas in Contract No. CB-R202-03, April 2015



Photo 19. Waste spoil disposed along the road of Contract No. CB-R202-02, May 2015



Photo 20. Disposal has not complied with regulations causing spoil spilled to agricultural land of local people in Km 6+ 700 of Contract No. CB-R202-01, June 2015

5.8.3 Ha Giang Provincial Roads, PR 176A and PR 183

44. Construction works for PR176A-01, PR 183-01 and PR 183-02 started in May 2014 while activities for PR176A-02 commenced in June. From January to June 2015, activities for these contract packages focused on excavation, earthworks and subbase preparation. These activities produced huge volume of spoils. There are 19 spoil disposal sites on PR 176 and 18 spoil disposal sites on PR. Besides, PR 176 is on high mountain terrain with heavy rain, the contractors should focus on drainage on project roads and at

disposal sites. The construction of PR 183 is through densely populated area with heavy traffic, the contractors should focus on traffic safety.

45. For the compliance of EMP, the contractors of HG-PR176-01; HG- PR176-02 have not complied with the erosion control, drainage and fuel storage, lack of warning signs and barriers for traffic safety. The contractors of HG-PR 183-01, HG-PR 183 -02 have not complied with the storage of materials such as oil, petroleum, lack of barriers, warning signs and flag man.

46. Table 12 is a summary of the assessment of compliance by the contractors of Ha Giang Provincial Roads to the mitigation measures recommended in the uEMP during the period January to June 2015. The assessment of effectiveness of the environmental management measures being implemented by the contractors of PR176A and PR183 based on degree of compliance with the environmental management measures in the uEMP is shown in Appendix 1.3. Photos 29-38 show the environmental conditions at the various construction sites of PR 176A and PR 183 between January to June 2015.

Table 12. Assessment of Compliance with Mitigation Measures, HG-R176A and HG-R183, January – June 2015

Environmental Aspect (Recommended mitigation measures from EMP & SEMP)	Assessment of Compliance with uEMP/Environmental Issue			
	HG-R176A-01	HG-R176A-02	HG-R183-01	HG-R183-02
1) Spoil disposal	Partially complying. Not implementing mitigation measures of environmental pollution in the disposal site; permits for new waste sites have not been secured; Contractor has not submitted a spoil management plan to the CSC for approval.	Partially complying. Not implementing mitigation measures of environmental pollution in the disposal site; permits for the 3 waste sites being used for disposal have not been secured; Contractor has not submitted a spoil management plan to the CSC for approval.	Partially complying. Not implementing mitigation measures of environmental pollution in the disposal site; permits for the waste sites being used for disposal have not been secured; Contractor has not submitted a spoil management plan to the CSC for approval.	Partially complying. Not implementing mitigation measures of environmental pollution in the disposal site; permits for the waste sites being used for disposal have not been secured; Contractor has not submitted a spoil management plan to the CSC for approval.
2) Solid waste management and disposal (domestic waste and construction waste)	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas. workers' camp	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.
3) Hazardous Waste Management	Not complying. Poor management of fuel and oil	Not complying. Poor management of fuel and oil containers;	Not complying. Poor management of fuel and oil containers;	Not complying. Poor management of fuel and oil containers;

Environmental Aspect (Recommended mitigation measures from EMP & SEMP)	Assessment of Compliance with uEMP/Environmental Issue			
	HG-R176A-01	HG-R176A-02	HG-R183-01	HG-R183-02
	containers; no proper storage area for fuel; no record of storage treatment and transport of hazardous waste.	no proper storage area for fuel; no record of storage treatment and transport of hazardous waste.	no proper storage area for fuel; no record of storage treatment and transport of hazardous waste.	no proper storage area for fuel; no record of storage treatment and transport of hazardous waste.
4) Bitumen and Asphalt concrete	No environmental issue noted during this period	No environmental issue noted during this period	No environmental issue noted during this period	No environmental issue noted during this period
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	Partially complying. Stores materials separately and far from river and stream but have not provided bunds or cover to prevent from dust and erosion	Partially complying. Stores materials separately and far from river and stream but have not provided bunds or cover to prevent from dust and erosion	Partially complying. Stores materials separately and far from river and stream but have not provided bunds or cover to prevent from dust and erosion	Partially complying. Stores materials separately and far from river and stream but have not provided bunds or cover to prevent from dust and erosion
7) Pollution of surface water:	Partially complying	Partially complying	Partially complying	Partially complying
a) Waste water discharging	Work camp, vehicle and equipment yard at least 50m away from water bodies	Work camp, vehicle and equipment yard at least 50m away from water bodies	Work camp, vehicle and equipment yard at least 50m away from water bodies	Work camp, vehicle and equipment yard at least 50m away from water bodies
b) Maintenance of vehicles and equipment	Contractors have no maintenance areas for construction vehicles and equipment	Contractors have no maintenance areas for construction vehicles and equipment	Contractors have no maintenance areas for construction vehicles and equipment	Contractors have no maintenance areas for construction vehicles and equipment
8) Noise and vibration: Site preparation, construction management, and materials transport	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of	Complying. Trucks, construction equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous

Environmental Aspect (Recommended mitigation measures from EMP & SEMP)	Assessment of Compliance with uEMP/Environmental Issue			
	HG-R176A-01	HG-R176A-02	HG-R183-01	HG-R183-02
	Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	with sparse population, therefore, no need to install muffles.	Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	areas with sparse population, therefore, no need to install muffles.
9) Dust and exhaust: site preparation, construction management, and materials transport	No issue noted during this period	No issue noted during this period	Not complying Trucks transporting materials, waste soil and rock have no cover or cover is unsuitable cover; periodic dust mitigation measures, such as water spraying, especially, not undertaken	Partially complying Contractors have not taken periodic dust mitigation measures, such as water spraying, especially, contractors under package No. HG-R183.
10) Health and safety: Public and workplace	Not complying. No warning signs at erosion/rockslide areas; No warning signs and watch-men at blasting areas; workers have no PPE during the blasting.	Not complying. No warning signs erosion/rockslide areas; No warning signs and watch-men at blasting areas; workers have no PPE during the blasting.	Partially complying. No warning signs at erosion/rockslide areas	No issue noted this period
11) Traffic Management	Partially complying. No Traffic Management Plan; lack fences and flagmen at some construction sites.	Partially complying. No Traffic Management Plan; lack fences and flagmen at some construction sites.	Partially complying. No Traffic Management Plan; lack fences and flagmen at some construction sites.	Partially complying. No Traffic Management Plan; lack fences and flagmen at some construction sites.
12) Loss of biodiversity	No environmental issue noted during this period	No environmental issue noted during this period	No environmental issue noted during this period	No environmental issue noted during this period
13) Usage and storage of dynamite	Partially complying. Approval obtained before dynamite use; complied with safety regulations on dynamite use but no watchman was assigned at blasting location.	No environmental issue noted during this period	No environmental issue noted during this period	No environmental issue noted during this period



Photo 21. New embankment at km 41, Package HG-PR176-01, April 2015



Photo 22. Rock after blasting lined along the road, no warning signs, Package HG-PR176-01, May 2015



Photo 23. Hazardous warning sign, Package HG-PR 176A-01, May 2015



Photo 24. Water stagnant makes difficult for local people, Package HG-PR 176A-02, May 2015



Photo 25. Workers do not use PPE, Package HG-PR 176A-02, June 2015



Photo 26. Local people plant corn on the slope of a disposal site, Package HG-PR 176A-02, June 2015



Photo 27. Materials gathered on the roadside , Package HG-PR 183A-01, June 2015	Photo 28. Worker is blowing dust, Package HG-PR 183A-01, June 2015
	
Photo 29. The closed disposal site at Km 33+500, , Package HG-PR 183A-01, June 2015	Photo 30. Water spraying truck , Package HG-PR 183A-02, June 2015

5.8.4 Tuyen Quang Provincial Road, TL187 và TL189

47. Construction works for three contract packages, PR187-01, PR 189-01 and PR 189-02 started in April 2014 while construction works for PR189-03 started in October 2014. From January to June 2015, by the time of reporting (June 2015), contractors of PR187 shortened construction plans (05 month) and expected to completed on 30th September 2015. Package TQ-PR189-01, 02 and 03 have basically completed on the construction of foundation and have been constructing asphalt pavement, drainage system, road safety system (guide posts, warning signs) Package TQ-PR187-01 has been completing guiderails and corrugated iron.

48. The contractors had arranged camps for workers with medical cabinet the environmental staff has been assigned at the site. The environmental documents (copies of EMP, SEMP, log-book, monthly reports) have been record. The contractors have hold project information dissemination meetings for the communes. Workers do not use PPE at the sites is very popular. There are not enough warning signs, barriers at the sites on PR 189.

49. Table 13 summarizes the environmental measures that were implemented by the contractors and the environmental issues that were noted along TQ-PR 187 and TQ-PR189 from January to June 2015. The assessment of environmental performance of the contractors based on degree of compliance with the environmental management measures in the uEMP is shown in Appendix 1.4. Photos 39-54 show the environmental conditions at the various construction sites of PR 187 and PR 189 during this report period.

Table 13. Assessment of Compliance with Mitigation Measures, PR187 and PR189, Jan-Jun 2015

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue
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<i>(Recommended mitigation measures from EMP & SEMP)</i>	TQ-PR187-01	TQ-PR189-1/3	TQ-PR189-2/3	TQ-PR189-3/3
1) Spoil disposal	Partially complying. Environmental permits for new spoil sites have not been secured	Partially complying. Environmental permits for new spoil sites have not been secured	Partially complying. Environmental permits for new spoil sites have not been secured.	No issue this period.
2) Solid waste management and disposal (domestic waste and construction waste)	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas. workers' camp.	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas. workers' camp	Partially complying. Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas. workers' camp	
3) Hazardous Waste /Material Management	Partially complying. Contractor has provided storage area for hazardous substances with cover and on impervious floor but no record of storage treatment and transport of hazardous waste.	Not complying. Poor management of fuel and oil containers; no proper storage area for fuel; no record of storage treatment and transport of hazardous waste.	Not complying. Poor management of fuel and oil containers; no proper storage area for fuel; no record of storage treatment and transport of hazardous waste.	
4) Bitumen and Asphalt concrete	No issue noted during this period	No issue noted during this period	No issue noted during this period	
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites	Not complying Temporary drainage or settlement ponds have not been installed; no equipment and vehicle maintenance sites	
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	No issue noted during this period	No issue noted during this period	No issue noted during this period	
7) Pollution of surface water:				
a) Waste water discharging	Partially complying Work camp least 50m away from water bodies	Partially complying Work camp at least 50m away from water bodies	Partially complying Work camp at least 50m away from water bodies	Work camp at least 50m away from water bodies
b) Maintenance of vehicles and equipment	Contractor has no maintenance areas for construction vehicles and equipment	Contractor has no maintenance areas for construction vehicles and equipment	Contractor has no maintenance areas for construction vehicles and equipment	
8) Noise and vibration: Site preparation, construction	Complying. Trucks, construction equipment and machines	Complying. Trucks, construction equipment and machines	Complying. Trucks, construction equipment and	Complying. Trucks, construction

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue			
<i>(Recommended mitigation measures from EMP & SEMP)</i>	TQ-PR187-01	TQ-PR189-1/3	TQ-PR189-2/3	TQ-PR189-3/3
management, and materials transport	mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.
9) Dust and exhaust: site preparation, construction management, and materials transport	Partially complying. Road Section from Km 0+000~ km 4+577: no spraying water to reduce dust	Partially complying. Trucks transporting materials have no cover	Partially complying. Dump trucks transporting spoils from the sites are not properly covered	
10) Health and safety: Public and workplace	Partially complying. Worker's camp meets the requirements of sanitation and has electricity and domestic water supply however fire extinguishers were not provided; workers do not use PPE	Partially complying. Traffic safety does not meet requirement, some sections are muddy: from km 2+500~km 26+00); safety sign boards not provided at critical areas such as location of transverse culvert; muddy & slippery roadway	Partially complying. Worker's camp meets the requirements of sanitation and has electricity and domestic water supply. Some work camps are not provided with sufficient fire extinguishers. Workers do not use PPE	Partially complying. Worker's camp meets the requirements of sanitation and has electricity and domestic water supply; roads muddy and slippery in September
11) Traffic Management	Partially complying. No Traffic Management Plan; flagmen at some construction sites.	Partially complying. No Traffic Management Plan	Partially complying. No Traffic Management Plan	No issue noted during this period
12) Loss of biodiversity	No issue noted during this period	No issue noted during this period	No issue noted during this period	No issue noted during this period
13) Usage and storage of dynamite	No issue noted during this period	No issue noted during this period	No issue noted during this period	No issue noted during this period



Photo 31. Workers use improper PPE, (Km 5+300), Package TQ-PR187-01, April 2015



Photo 32 . Workers use improper PPE, (Km 10+100), package TQ-PR187-01, April 2015



Photo 33. Lack of warning signs and barriers, PackageTQ-PR189-02, May 2015



Photo 34. Workers use improper PPE, PackageTQ-PR189-02, May 2015



Photo 35. Muddy roads make it difficult for people in traffic (Km 53), PackageTQ-PR189-03, April 2015



Photo 36 Muddy roads make it difficult for people in traffic (Km 55), PackageTQ-PR189-03, April 2015



Photo 37 Muddy roads make it difficult for people in traffic, PackageTQ-PR189-03, June 2015



Photo 38 Muddy roads make it difficult for people in traffic, PackageTQ-PR189-03, June 2015.

5.8.5 Provincial Road Yen Bai, TL 163

50. In these 6 months, Contractors under packages No. YB-R163B-01, 02 and 03, basically, have finished construction of surface layer and are under construction of railing, corrugated iron, ditches, cleaning construction sites; package No. YB-R163B-03 is focusing on construction of the reincluded item, Ngoi Hop Bridge. Generally, the construction on this road has no serious environmental issues and focuses on traffic assurance, cleaning of construction sites.

51. Table 14 summarises the environmental measures taken by contractors and environmental issues found along PR 163 from January to June 2015. The evaluation of environmental management measures taken by contractors based on the compliance of environmental management measures of uEMP is shown in Appendix 1.5. Photo 45-55 shows environmental condition at construction sites on PR163 is this report period.

Table 14. Assessment of Compliance with Mitigation Measures, PR163, Jan-Jun 2015

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue		
(Recommended mitigation measures from EMP & SEMP)	YB-R163-01	YB-R163-02	YB-R163-03
1) Spoil disposal	Partially complying Environment Permit obtained for wastes spoil sites at km 9+850 has not finalized	Partially complying Environment Permit obtained for wastes spoil sites at km 29+300 has not finalized	Partially complying Waste soil site near stream narrows the flow at position of Nga Quan Bridge
2) Solid waste management and disposal (domestic waste and construction waste)	Partially complying Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas, workers' camp.	Partially complying Waste bins have been provided at workers' camp, the Contractors have treated the solid waste by themselves by landfilling at surrounding areas, workers' camp.	Partially complying Waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas, workers' camp.
3) Hazardous Waste /Material Management	Partially complying. Contractor has provided storage area for hazardous substances with cover and on impervious floor but no record of storage treatment and transport of hazardous waste.	Partially complying. Contractor has provided storage area for hazardous substances with cover and on impervious floor but no record of storage treatment and transport of hazardous waste.	Partially complying. Contractor has provided storage area for hazardous substances with cover and on impervious floor but no record of storage treatment and transport of hazardous waste.
4) Bitumen and Asphalt concrete	Comply with requirements during the construction. Have finished bitumen treatment.	Comply with requirements during the construction. Have finished bitumen treatment.	Comply with requirements during the construction. Have finished bitumen treatment.
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	Partially complying. Temporary drainage or settlement ponds have not been provided; no equipment and vehicle maintained at	Partially complying Temporary drainage or settlement ponds have not been provided; no equipment and vehicle maintained at	Partially complying. Temporary drainage or settlement ponds have not been provided; no equipment and vehicle maintained at

Environmental Aspect (Recommended mitigation measures from EMP & SEMP)	Assessment of Compliance with uEMP/Environmental Issue		
	YB-R163-01	YB-R163-02	YB-R163-03
	construction sites.	construction sites	construction sites; water stagnant on detour;
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	No issue noted during this period	No issue noted during this period	Partially complying. IN the area of construction of bridge, material pile has not been moved. Waste spoil narrows the flow.
a) Waste water discharging	Partially complying.	Partially complying.	Partially complying.
b) Maintenance of vehicles and equipment	No issue noted during this period	No issue noted during this period	No issue noted during this period
8) Noise and vibration: Site preparation, construction management, and materials transport	Contractor has no maintenance areas for construction vehicles and equipment	Maintenance areas for construction vehicles and equipment do not meet requirements	Maintenance areas/ parking do not meet requirement
9) Dust and exhaust: site preparation, construction management, and materials transport	Comply. Truck, construction equipment mobilized are in good condition and meet requirements of Emission Standard of Vietnam.	Comply. Truck, construction equipment mobilized are in good condition and meet requirements of Emission Standard of Vietnam.	Comply. Truck, construction equipment mobilized are in good condition and meet requirements of Emission Standard of Vietnam.
10) Health and safety: Public and workplace	No issue noted during this period	No issue noted during this period	Comply. Spray water in the area of construction of bridge
11) Traffic Management	No issue noted during this period	Partially complying At some construction positions, no warning signs were provided for traffic safety	Partially complying Some detours are slipping and lack warning signs
12) Loss of biodiversity	No issue noted during this period	No issue noted during this period	No issue noted during this period
13) Usage and storage of dynamite	No issue noted during this period	No issue noted during this period	No issue noted during this period



Photo 39. Workers do not use PPE as required and lack construction warning signs, package No. YB-PR163-01, April 2015



Photo 40. The Ditch without cover, causing unsafe traffic, package No. YB-PR163-01, April 2015



Photo 41. Lack fences during construction, causing unsafe traffic, package No. YB-PR163-01, May 2015



Photo 42. Ditches with cover (Km5+), package No. YB-PR163-01, June 2015



Photo 43. Workers do not use PPE as required, package No. YB-PR163-02, April 4/2015



Photo 44. Truck with cover, package No. YB-PR163-02, April 2015



<p>Photo 45. Construction of a half of carriageway at Quach Spillway for ensuring traffic, package No. YB - PR163-02, June 2015</p>	 <p>Photo 46. Keep fuel outside on ground, package No. YB -PR163-03, April 2015</p>
 <p>Photo 47. Risk of block of flow at position of construction of Ngoi Hop Bridge (Km 28+870), package No.YB -PR163-03, May 2015</p>	 <p>Photo 48. Parking for construction equipment, package No. -PR163-03, May 2015</p>

5.8. 6 Lao Cai Provincial Roads, PR 151, PR 151B, PR 154, PR 156, PR 160.

52. During this period, contractors' activities include construction of pavement, drainage ditches, piles, warning signs, collapsing beam and Suoi Chan's bridge deck.

53. Currently, all contractors retain worker camps with requirements of sanitation, electricity and domestic water. At worker camps, the fire extinguishers and first aid tools were retained but limited in quantity and types of medicines (just for treating cold, high fever, stomach-ache, cotton and gauze swab), should provide more depressant, cough medicine and medical tools, such as: thermometer, hot/cold pack, blood pressure monitor.

54. Traffic safety at some road sections has been improved: detour at Khe Hong Bridge (PR 151): soil erosion has been stopped; PR 151B (Km3, Km9): sections eroded by rain have been repaired, and provided warning signs, barriers at construction positions; however, still lacked barriers, warning signs at some sections on PR, namely Km 3+500; Km 10+200 of package LC-PR151B-01; trucks transporting construction materials have not been covered and lacked PPE for workers of packages 154 and 160.

55. Table 15 summarizes the environmental measures that were implemented by contractors and environmental issues that were noted along PRs in Lao Cai from January to June 2015. The environmental performance assessment based on the compliance with the environmental management measures in the uEMP shown in Appendix 1.

56. Photos 66-70 show the environmental conditions at various section of Lao Cai during this report period.

Table 15. Assessment of Compliance with Mitigation Measures, PR151, PR151-B, PR154, PR 156 and PR160, January – June 2015

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue				
<i>(Recommended mitigation measures from EMP & SEMP)</i>	LC-R151-01	LC-R151B-01	LC-R154-01	LC-R156-01	LC-R160-01
1) Spoil disposal	Partly complying. Contractor needs to implement river clearance and disposal site, construction site levelling before hand over.	Partly complying. Waste sites still don't have permit.	Partly complying. Waste sites still don't have permit.	Partly complying. Waste sites still don't have permit.	Partly complying. Waste sites still don't have permit.
2) Solid waste management and disposal (domestic waste and construction waste)	Waste from construction site clearance and river clearance were dumped at prescribed areas.	Partly complying Solid waste management plan for construction waste and domestic waste has not been prepared; waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partly complying Solid waste management plan for construction waste and domestic waste has not been prepared; waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partly complying Solid waste management plan for construction waste and domestic waste has not been prepared; waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.	Partly complying Solid waste management plan for construction waste and domestic waste has not been prepared; waste bins have been provided at workers' camp; the Contractors have treated the solid waste by themselves by landfilling at surrounding areas.
3) Hazardous Waste /Material Management	Not complying. Fuel containers without cover; covered storage area with impervious base to prevent spillage is not provided.	Not complying. Fuel containers are placed outdoors; spills are evident; covered storage area with impervious base to prevent spillage is not provided.	Not complying. Fuel containers are placed outdoors; spills are evident; covered storage area with impervious base to prevent spillage is not provided.	Not complying. Fuel containers are placed outdoors; spills are evident; covered storage area with impervious base to prevent spillage is not provided.	Not complying. Fuel containers are placed outdoors; spills are evident; covered storage area with impervious base to prevent spillage is not provided.
4) Bitumen and Asphalt concrete	No issue in this period	No issue in this period	No issue in this period	Complying. Meets the requirements	No issue in this period

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue				
<i>(Recommended mitigation measures from EMP & SEMP)</i>	LC-R151-01	LC-R151B-01	LC-R154-01	LC-R156-01	LC-R160-01
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	Partly complying. No proper runoff and wastewater drainage at the bridge construction site and at the workers' camp; maintenance area for equipment and construction vehicles not provided; water stagnates on pavement of Khe Sang road.	Partly complying Road sections eroded by rain have been repaired, and warning signs, fence at construction positions have been installed.	Partly complying maintenance area for equipment and construction vehicles not provided.	Partly complying Embankment-slope and slope have eroded due to rain and flood, making it difficult for vehicles to pass; waste site near stream at km8+ is at risk of erosion; maintenance area for equipment and construction vehicles not provided.	Partly complying No ditches provided to drain rain-water at the construction site of Pho Rang Bridge
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	Partly complying Stores materials far from river and stream but has not provided bunds or cover to prevent from dust and erosion	Partly complying Stores materials far from river and stream but has not provided bunds or cover to prevent from dust and erosion	Partly complying Stores materials far from river and stream but has not provided bunds or cover to prevent from dust and erosion	Partly complying Stores materials far from river and stream but has not provided bunds or cover to prevent from dust and erosion	Partly complying Stores materials far from river and stream but has not provided bunds or cover to prevent from dust and erosion
7) Pollution of surface water: a) Waste water discharging	Partly complying	Partly complying Latrines are near stream bank in the construction site of Suoi Chan Bridge; lacks wastewater tanks	Partly complying Lacks waste water tanks	Partly complying Lacks waste water tanks	Partly complying Lacks waste water tanks
b) Maintenance of vehicles and equipment	No designated parking/ maintenance area	No designated parking/ maintenance area	No designated parking/ maintenance area	No designated parking/ maintenance area	Parking/ maintenance is next to river and has no measures against wash water
8) Noise and vibration: Site preparation,	Contractor has completed works on	Complying. Trucks, construction	Complying. Trucks, construction	Complying. Trucks, construction	Complying. Trucks, construction

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue				
<i>(Recommended mitigation measures from EMP & SEMP)</i>	LC-R151-01	LC-R151B-01	LC-R154-01	LC-R156-01	LC-R160-01
construction management, and materials transport	construction site.	equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.	equipment and machines mobilized at construction sites are in good condition and meet all requirements of Vietnam Emission Standard. Due to the mountainous areas with sparse population, therefore, no need to install muffles.
9) Dust and exhaust: site preparation, construction management, and materials transport	Contractor has completed works on construction site.	Not complying Lacks dust mitigation measures; trucks transporting soils and materials have no cover	Not complying Lacks dust mitigation measures; trucks transporting soils and materials have no cover	Not complying Lacks dust mitigation measures; trucks transporting soils and materials have no cover	Not complying Lacks dust mitigation measures; trucks transporting soils and materials have no cover
10) Health and safety: Public and workplace	Contractor has completed works on construction site.	Partly complying. Fire extinguishers and first aid supplies maintained at camp Workers have no PPE such as helmet, boots, gloves and mask; Lacks warning signs and barriers at the construction sites	Partly complying. Fire extinguishers and first aid supplies maintained at camp Workers have no PPE such as helmet, boots, gloves and mask; Lacks warning signs and barriers at the construction sites	Partly complying. Fire extinguishers and first aid supplies maintained at camp Workers have no PPE such as helmet, boots, gloves and mask; Lacks warning signs and barriers at the construction sites	Partly complying. Fire extinguishers and first aid supplies maintained at camp Workers have no PPE such as helmet, boots, gloves and mask; Lacks warning signs and barriers at the construction sites
11) Traffic Management	Contractor has completed works on construction site.	Complying Landslide on some road section have been repaired; warning sign and barrier is	Not complying Lack of warning sign and barrier is set out at location of constructing; lack of warning sign at locations	Not complying Lack of warning sign and barrier is set out at location of constructing;	Not complying Lack of warning sign and barrier is set out at location of constructing;

Environmental Aspect	Assessment of Compliance with uEMP/Environmental Issue				
<i>(Recommended mitigation measures from EMP & SEMP)</i>	LC-R151-01	LC-R151B-01	LC-R154-01	LC-R156-01	LC-R160-01
		set out at location of constructing; lack of warning sign at locations can affected by erosion;	can affected by erosion;	Lack of flagman to control traffic; lack of warning sign at locations can affected by erosion;	Lack of flagman to control traffic;
12) Loss of biodiversity	Contractor has completed works on construction site.	No issue in this period	No issue in this period	No issue in this period	No issue in this period
13) Usage and storage of dynamite	Contractor has completed works on construction site.	Not complying with safety measures/ regulations during blasting	Not complying with safety measures/ regulations during blasting	Not complying with safety measures/ regulations during blasting	Not complying with safety measures/ regulations during blasting



Pictures 49, 50: Workers have not used standard PPE at Km 7-Km10 of package LC-PR151B, May 2015



Picture 51.52. Overall view of Suoi Chan Bridge construction (km 10) of package LC-PR151, May 2015



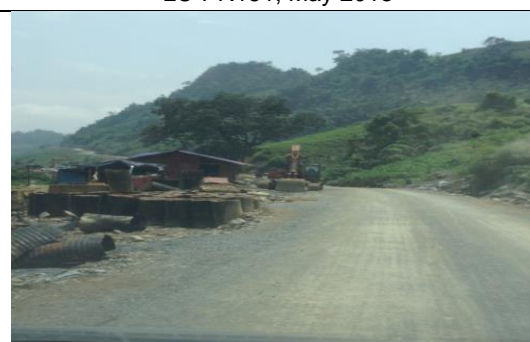
Picture 53. Need to perform rock clearance at upstream Nga Quan Bridge of package LC-PR151, May 2015



Picture 54. Need to perform rock clearance at construction site of Quan Hong Bridge of package LC-PR151, May 2015



Picture 55. Disposal site slope at Km 0+500 need to be levelled to prevent land slide, package LC-PR154, May 2015



Picture 56. Construction materials have been stored outside at package LC-PR154, May 2015



Picture 57. Lack warning signs and barriers to ensure safety at steep slope (km 0+900), package LC-PR154, June 2015



Picture 58. Lack warning sign (km 0+900), package LC-PR154, June 2015



Picture 59. Lack construction site warning sign at km 10+300, package LC –PR156, May 2015



Picture 60. Camp ground has been returned to local people (11+800), package LC –PR156, June 2015



Picture 61. Waste soil was gathered within river bed (0+400), package LC –PR160, June 2015



Picture 62. Workers have constructed at construction site of Pho Rang Bridge without PPE, package LC – PR160, May 2015

5.9 Environmental Issues and Recommendations

57. From the last semi-annual report until now, there are shortcomings in the implementation of the SEMP by the contractors that have not been fully addressed. The PPMU, PCC and the CSC are continually reminding and giving advices to the contractors on how to improve compliance. The environmental concerns raised in the previous semi-annual report, their current status and recommendations for resolution of the issues are summarized in Table 16.

Table 16. Outstanding environmental issues and recommendations

No.	Issues	Recommendations during the Previous Report	Current Status	Recommendation
1	Limited Information dissemination	<ul style="list-style-type: none"> Contractors should disseminate widely to local communities as well as local staffs on the project EMPs for their monitoring and evaluation. 	<ul style="list-style-type: none"> Contractors hold meetings on environmental compliance requirements for Contractors staffs and workers as stated in the approved uEMP 	<ul style="list-style-type: none"> Contractors should disseminate widely to local communities as well as local staffs on the project EMPs for their monitoring and

No.	Issues	Recommendations during the Previous Report	Current Status	Recommendation
		<ul style="list-style-type: none"> Conduct orientation and disseminate information regarding environmental requirements to staff and workers as required in the approved uEMP and SEMP. 	<p>and SEMP.</p> <ul style="list-style-type: none"> Contractors have not widely disseminated information to local communities as well as local staffs on the project EMPs for their monitoring and evaluation. 	<p>evaluation.</p> <ul style="list-style-type: none"> Contractors should keep EMP, SEMP at site offices
2	Contractors have not assigned qualified environmental staff for EMP implementation EMP	<ul style="list-style-type: none"> Contractors should assign staff to implement EMP. EMP supervisor may be seconded but should be on the site regularly. The staff should take full responsibility for ensuring EMP compliance and in preparing environmental compliance report; 	<p>Staffs assigned to monitor EMP have been trained on-job by PCC and CSC.</p> <p>Bac Kan, Cao Bang and Ha Giang Provinces: Construction Site manager holds this position at the same time. Up to now, after monthly meetings among PCC, CSC and PPMU, these staffs have been approved their awareness of environment management and carried put this job better as well.</p> <p>Lao Cai, Yen Bai and Tuyen Quang: staffs assigned to monitor EMP work at Company Office or Main Office, therefore, they do not work fulltime at the construction sites.</p>	<ul style="list-style-type: none"> PCC Specialists should strengthen their roles in implementing right EMP. The compliance with the plan ensures safety for workers but also minimize damages caused by wrong waste spoil disposal. Staffs assigned to monitor EMP should work fulltime at construction sites for catching closely actual situation.
3	Labor safety	<ul style="list-style-type: none"> Contractors should provide PPE and first-aid tools and facilities for workers. 	<ul style="list-style-type: none"> Not all contractors provide and require the workers to use PPE, as HG 176A; CB-R202, LC-R151B, LC-R154, YB-R163, particularly during blasting, ditch construction and, road widening. Traffic safety is not being paid attention: lack of construction signs, fence without reflective tape, no flagmen provided at construction positions where there is movement of heavy equipment. 	<ul style="list-style-type: none"> Supplement first aid supplies, provide complete PPE for workers during the construction, especially when blasting. Provide traffic support staff for traffic safety and install fence as required.
4	Improper solid waste	<ul style="list-style-type: none"> Contractors must promote waste segregation at project 	<ul style="list-style-type: none"> Have collected domestic waste at worker camps and 	<p>Keep collecting and treating solid waste;</p>

No.	Issues	Recommendations during the Previous Report	Current Status	Recommendation
	management	sites, and collect, treat and dispose of construction wastes appropriately at approved disposal site.	disposed at landfill far from the area of camps.	dispose at the approved waste spoil sites.
5	Improper hazardous waste handling and disposal	<ul style="list-style-type: none"> Contractors should maintain records of storage, handling and transport of hazardous wastes. Contractors should contract with a local environmental company to treat hazardous wastes properly to reduce environmental pollution. 	<ul style="list-style-type: none"> Due to the nature of the road construction project, the generation of hazardous waste including drums containing oil, gloves used in the maintenance and waste oil as well during the construction is minimal. Thus, up to now, the contractors have not maintained the records of hazard waste treatment and has not contracted with waste treatment company. 	<ul style="list-style-type: none"> Contractors should maintain the recording of storage, treatment and transportation of hazardous waste Contractors should sign contract with local waste treatment company suitably to minimize environment pollution.
6	Inappropriate material management and storage	<ul style="list-style-type: none"> Materials have been stored separately and far away from river and stream. However, Contractors should provide appropriate cover for the materials to prevent dust and washout. 	<ul style="list-style-type: none"> Contractors store materials away from water bodies, but do not provide bunds and cover to prevent from washout and blowing. 	<ul style="list-style-type: none"> Provide bunds and cover on materials to prevent from being blown and washed out.
7	The sites have not been levelled, graded and restored in some locations along the road	<ul style="list-style-type: none"> Contractors should level, grade and restore the site to initial status immediately after completion of construction activities. Contractors should have appropriate construction methods (successive construction method) so that leveling can be timely implemented. 	<ul style="list-style-type: none"> Some contractors have complied with regulations and returned the sites to the locality. However, some contractors have not finished the refilling of waste sites after the construction as before the project, such as on the road No. BK-255 and CB 202. 	<ul style="list-style-type: none"> At waste sites as well as construction sites, the contractors should quickly refill and return the sites as before the project.
8	Dust reduction measures have not been implemented	<ul style="list-style-type: none"> Contractors should regularly spray water during dry days to reduce effect of dust emissions to communities and road users. 	<ul style="list-style-type: none"> Contractors have spray water to minimize dust, mainly when constructing subbase as in Bac Kan, Cao Bang Province. Some contractors have not applied this measure, such as under packages: BK-R255-02, HG-R183, TQ-R187, TQ-R189, LC-R151, LC-R156, 	<ul style="list-style-type: none"> CSC to enjoin the contractors of BK-R255-02, HG-R183, TQ-R187, TQ-R189, LC-R151, LC-R156, LC-R154, LC-R160 to spray water at least twice a day during dry days

No.	Issues	Recommendations during the Previous Report	Current Status	Recommendation
			LC-R154, LC-R160	
9	Blasting	▪ Contractors should comply with safety measures/ regulations during blasting in project roads of Lao Cai, Cao Bang and Ha Giang Provinces	▪ Contractors comply with regulations on safety during the blasting under packages of Lao Cai, Cao Bang and Ha Giang.	
10	Lack of landslide warning signs	▪ Contractors should install warning signs in locations prone to landslide, particularly in PR 151B and PR 154 of Lao Cai, PR 202 of Cao Bang, PR 176 ^a and PR 183 of Ha Giang	▪ Contractors in Bac Kan, Cao Bang and Lao Cai have provided the warning signs.	▪ Contractors under package No. HG-R176A should provide construction signs and warning signs at failure positions
11	Lack of temporary drainage system	▪ Provide more temporary drainage system and side ditches.	▪ Contractors have complied with this recommendation	

5.10 Feedback from Local Communities

58. Several households in Bac Kan, Cao Bang, Ha Giang, Tuyen Quang, Yen Bai and Lao Cai were interviewed during this period to get feedbacks on the perceived impacts of the roads and construction activities on their lives and wellbeing.

59. Most respondents think that the road improvement and rehabilitation has brought and will continue to bring positive impacts to local residents, particularly ease of transport and travel. However, there were temporary impacts during the construction stage. The feedbacks from the local communities are summarized below:

- Two road construction packages were completed in Yen Bai during this period and were being used starting August 2014, bringing satisfaction to road users who have selected this road instead of the existing road.
- During the past months, some roads in Lao Cai, Tuyen Quang, Bac Kan and Cao Bang and Ha Giang affected the travel of road users. Reported difficulties in travel impacting the road users mostly occurred during the rainy days and at sections under filling-cutting.
- Cutting and filling works or material transportation also impacted on the communities around the construction sites, such as in TQ-R187, HG-PR176, CB-PR202. The residents acknowledged however that these impacts are temporary and after finishing the construction, the road will be improved and rehabilitated and will make travel easier. However, lack of traffic warning signs poses danger, and could impact on road users' safety.
- Several households said that the waste spoil disposal impacts on their production, such as on PR- HG-PR176; CB-PR 202, contractors worked with local authority and took measures for recovery.

5.11 Ambient Environmental Quality Monitoring

60. The Environmental Quality Monitoring Plan for each province specifies the requirement for one-time baseline environmental monitoring for air quality and surface water quality, semi-annual monitoring for air quality and quarterly monitoring for surface water during the construction stage. The PCC undertakes the monitoring through

C.O.M.P.O Vietnam Joint-Stock Company and Center for Hydro-meteorological Environmental Station Network.

61. The baseline monitoring was conducted in December 2013. The first ambient environmental monitoring during the construction stage was conducted between January and June 2014. The second construction stage monitoring of air quality was done in December 2014 and early January 2015. The ten road sections monitored in December 2014 are BK-PR255, CB-PR202, YB-PR163, LC-PR151, LC-PR151B, LC-PR160, HG-PR176A, HG-PR183, TQ-PR187 and TQ-PR189. LC-PR154 and LC-PR156 were monitored in early January 2015. All the twelve roads monitored for air quality (TSP and noise) are covered in this report. All roads were monitored for water quality during the period 20-31 December 2014 and from 25 March to 9 April 2015.

5.11.1 Environmental Standards

62. The monitoring items for air quality are total suspended particulates (TSP) and noise (noise level equivalent, LAeq).

63. Measurements of TSP were done for one hour every two hours, from 0600h to 2200h, coinciding with the time of construction. The results were compared using Vietnam's standard for 1-hr sampling as specified in the National Technical Regulation on Ambient Air (QCVN 05:2009/BTNMT), which is $300\mu\text{g}/\text{m}^3$.

64. Measurements of noise level were also for one hour every two hours, from 0600h to 2200h. Vietnam's National Technical Regulation on Noise (QCVN 26:2010/BTNMT) was used as the reference standard. QCVN 26:2010/BTNMT specifies the following standards for noise:

No	Area	Maximum Allowable Noise, dB _A	
		From 6:00 am to 9:00 pm	From 9:00pm to 6:00 am
1	Special areas	55	45
2	Other Areas	70	55

65. The surface water quality parameters are temperature, pH, turbidity, TSS, DO, BOD₅, COD, oil and grease, coliform, and fecal coliform. Temperature, pH, turbidity and DO were measured on site using hand-held meters. The other parameters were analysed in the laboratory.

66. QCVN 08:2008/BTNMT, the National Technical Regulation on Surface Water Quality for Irrigation specifies the following limits for the parameters being monitored:

Parameter	Limit	Parameter	Limit
T, °C		BOD ₅ , mg/l	15
pH	5.5-9	COD, mg/l	30
Turbidity, NTU	-	Oil and oil product, mg/l	0.1
TSS, mg/l	50	Coliform, MPN/100ml	7500
DO, mg/l	≥4	Fecal coliform, MPN/100ml	-
Notes: no limit specified; DO limit is lower limit			

5.11.2 Sampling Site

The sampling sites for air quality (TSP and noise) are listed in Table 17.

Table 17. TSP and Noise monitoring sites

No.	Province	Location of sampling points	Reference No.	Longitude	Latitude
1	Bac Kan	Na Tum, Ngoc Phai, Cho Don	BK-R255-WS1	105°34'43"	22°10'20"
2		Pac Cop, Yen Thuong, Cho Don	BK-R255-WS2	105°34'33"	22°10'18"
3		Bay village, Yen Thuong, Cho Don	BK-R255-WS3	105°30'56"	22°10'00"
4		Don Village, Yen Thinh, Cho Don	BK-R255-WS4	105°30'35"	22°10'05"
5		Vay Village, Yen Thinh, Cho Don	BK-R255-WS5	105°29'50"	22°10'27"
6		Lung Luong, Vu Nong, Nguyen Binh	BK-R255-WS6	105°28'32"	22°12'05"
7		Cao Lu Village, Ca Thanh, Nguyen Binh	BK-R255-WS7	105°28'11"	22°12'05"
8		Luong Sung Village, Yen Lac, Nguyen Binh	BK-R255-WS8	105°27'11"	22°13'20"
9	Cao Bang	Lung Vai Village, Dinh Phung, Bao Lac	CB-R202-WS1	105°51'48"	22°42'06"
10		Lung Pan village, Huy Giap, Bao Lac	CB-R202-WS2	105°51'21"	22°43'03"
11		Na Lien, Du Gia, Yen Minh	CB-R202-WS3	105°50'42"	22°44'12"
12		Ban Cap, Lung Ho, Yen Minh	CB-R202-WS4	105°49'49"	22°44'59"
13		Lung Thang, Lung Ho, Yen Minh	CB-R202-WS5	105°49'16"	22°45'35"
14		Na Don, Mau Due, Yen Minh	CB-R202-WS6	105°48'55"	22°45'58"
15		Vinh Tuy Town, Bac Quang	CB-R202-WS7	105°48'55"	22°45'58"
16		Lang Bung, Dong Thanh, Bac Quang	CB-R202-WS8	105°47'38"	22°48'00"
17	Ha Giang	Ke Nhan, Dong Yen, Bac Quang	HG-R176A-WS1	105°13'42"	22°55'59"
18		Trung Village, Vi Thuong, Quang Binh	HG-R176A-WS2	105°14'50"	22°58'22"
19		Ngoan Village, Tien Yen, Quang Binh	HG-R176A-WS3	105°14'50"	22°58'22"
20		Xuan Chang Village, Xuan Giang, Quang Binh	HG-R176A-WS4	105°13'03"	23°00'36"
21		Bac Muoi, Yen Lap, Chiem Hoa	HG-R176A-WS5	105°12'05"	23°01'50"
22		Na Nung Village, Yen Lap, Chiem Hoa	HG-R176A-WS6	105°13'20"	23°03'37"
23	Ha Giang	Tien Keo village, Yen Lap, Chiem Hoa	HG-R183-WS1	104°53'57"	22°15'12"
24		Nam Ninh, Binh Xa, Ham Yen	HG-R183-WS2	104°53'13"	22°14'39"
25		Tan Yen, Tan Thanh, Ham Yen	HG-R183-WS3	104°50'07"	22°13'36"
26		Tho Hamlet, Phu Luu, Ham Yen	HG-R183-WS4	104°48'12"	22°13'39"
27		Minh Thai Hamlet, Bau village, Minh Khuong, Ham Yen	HG-R183-WS5	104°46'48"	22°11'56"
28		Va Hamlet, Yen Thuan, Ham Yen	HG-R183-WS6	104°44'45"	22°14'01"
29		Neighborhood 2, Co Phuc Town, Tran Yen	HG-R183-WS7	104°41'56"	22°17'14"
30		Group 1, Neighborhood 5, Mau A, Van Yen	HG-R183-WS8	104°42'29"	22°16'50"
31	Tuyen Quang	Team 2, Vai Ngoai Hamlet, Mau Dong Commune, Van Yen	TQ-R187-WS1	105°20'46"	22°13'14"
32		Ban Huong Village, Dong Cuong, Van Yen	TQ-R187-WS2	105°23'28"	22°13'56"
33		Tan Pho, Tan An commune, Van Ban	TQ-R187-WS3	105°24'03"	22°14'09"
34		Khe Hong 1 Village, Tan An Commune, Van Ban	TQ-R187-WS4	105°24'30"	22°13'54"
35		Khe Sang village, Tan An, Van Ban	TQ-R187-WS5	105°24'47"	22°14'00"
36		La Village, Vo Lao, Van Ban	TQ-R187-WS6	105°25'19"	22°14'14"
37	Tuyen Quang	Cao Tong Village, Nam Dang, Van Ban	TQ-R189-WS1	105°06'38"	22°03'54"
38		Thai Hoa Village, Hoa Mac, Van Ban	TQ-R189-WS2	105°04'51"	22°04'01"
39		6Hamlet, Thai Hoa Village, Hoa Mac, Van Ban	TQ-R189-WS3	105°02'53"	22°05'26"
40		Vang Xa, Muong Khuong Town, Muong Khuong	TQ-R189-WS4	105°01'34"	22°06'22"

No.	Province	Location of sampling points	Reference No.	Longitude	Latitude
41		Coc Ngu, Nam Chay, Muong Khuong	TQ-R189-WS5	105°01'25"	22°08'15"
42		Ta Lang, Nam Chay, Muong Khuong	TQ-R189-WS6	105°00'45"	22°10'15"
43		San Pan, Nam Chay, Muong Khuong	TQ-R189-WS7	104°58'07"	22°13'30"
44		Chinh Cuong, Bac Cuong Ward, Lao Cai City	TQ-R189-WS8	104°55'53"	22°14'30"
45		Road Mine, Nam Cuong Ward, Lao Cai City	TQ-R189-WS9	104°55'47"	22°17'04"
46	Yên Bái	Da Dinh 1, Ta Phoi, Lao Cai City	YB-R163-WS1	104°50'21"	21°44'36"
47		Phoi Village, Ta Phoi, Lao Cai City	YB-R163-WS2	104°49'15"	21°46'00"
48		Neighborhood 1, Pho Rang, Bao Yen	YB-R163-WS3	104°48'23"	21°46'52"
49		Xuan Thuong, Lang La, Xuan Hoa, Bao Yen	YB-R163-WS4	104°45'31"	21°49'16"
50		Sao Da Sat, Xuan Hoa, Bao Yen	YB-R163-WS5	104°43'56"	21°51'09"
51		Na Tum, Ngoc Phai, Cho Don	YB-R163-WS6	104°42'43"	21°51'59"
52		Pac Cop, Yen Thuong, Cho Don	YB-R163-WS7	104°40'05"	21°53'52"
53		Bay village, Yen Thuong, Cho Don	YB-R163-WS8	104°37'00"	21°56'37"
54	Lao Cai	Don Village, Yen Thinh, Cho Don	LC-151-WS1	104°22'13"	22°08'56"
55		Vay Village, Yen Thinh, Cho Don	LC-151-WS2	104°22'34"	22°08'22"
56		Lung Luong, Vu Nong, Nguyen Binh	LC-151-WS3	104°23'22"	22°08'10"
57		Cao Lu Village, Ca Thanh, Nguyen Binh	LC-151-WS4	104°23'47"	22°07'54"
58		Luong Sung Village, Yen Lac, Nguyen Binh	LC-151-WS5	104°23'53"	22°07'26"
59	Lao Cai	Lung Vai Village, Dinh Phung, Bao Lac	LC-R151B-WS1	104°12'36"	22°11'11"
60		Lung Pan village, Huy Giap, Bao Lac	LC-R151B-WS2	104°12'18"	22°10'51"
61		Na Lien, Du Gia, Yen Minh	LC-R151B-WS3	104°12'11"	22°10'05"
62		Ban Cap, Lung Ho, Yen Minh	LC-R151B-WS4	104°12'46"	22°08'46"
63		Lung Thang, Lung Ho, Yen Minh	LC-R151B-WS5	104°12'29"	22°07'23"
64		Na Don, Mau Due, Yen Minh	LC-R151B-WS6	104°12'29"	22°06'03"
65	Lao Cai	Vinh Tuy Town, Bac Quang	LC-R154-WS1	104°06'04"	22°44'54"
66		Lang Bung, Dong Thanh, Bac Quang	LC-R154-WS2	104°06'00"	22°44'52"
67		Ke Nhan, Dong Yen, Bac Quang	LC-R154-WS3	104°05'41"	22°44'12"
68		Trung Village, Vi Thuong, Quang Binh	LC-R154-WS4	104°04'14"	22°42'44"
69		Ngoan Village, Tien Yen, Quang Binh	LC-R154-WS5	104°02'50"	22°40'06"
70		Xuan Chang Village, Xuan Giang, Quang Binh	LC-R154-WS6	104°02'40"	22°38'49"
71	Lao Cai	Bac Muoi, Yen Lap, Chiem Hoa	LC-R156-WS1	103°58'21"	22°28'23"
72		Na Nung Village, Yen Lap, Chiem Hoa	LC-R156-WS2	103°58'12"	22°28'04"
73		Tien Keo village, Yen Lap, Chiem Hoa	LC-R156-WS3	103°58'01"	22°25'08"
74		Nam Ninh, Binh Xa, Ham Yen	LC-R156-WS4	103°58'02"	22°25'23"
75		Tan Yen, Tan Thanh, Ham Yen	LC-R156-WS5	103°58'01"	22°25'08"
76		Tho Hamlet, Phu Luu, Ham Yen	LC-R156-WS6	103°58'35"	22°24'06"
77	Lao Cai	Minh Thai Hamlet, Bau village, Minh Khuong, Ham Yen	LC-R160-WS1	104°28'43"	22°14'03"
78		Va Hamlet, Yen Thuan, Ham Yen	LC-R160-WS2	104°29'30"	22°14'42"
79		Neighborhood 2, Co Phuc Town, Tran Yen	LC-R160-WS3	104°29'35"	22°15'12"
80		Group 1, Neighborhood 5, Mau A, Van Yen	LC-R160-WS4	104°29'44"	22°15'18"
81		Team 2, Vai Ngoai Hamlet, Mau Dong Commune, Van Yen	LC-R160-WS5	104°30'17"	22°16'12"
82		Ban Huong Village, Dong Cuong, Van Yen	LC-R160-WS6	104°30'17"	22°16'36"

Site for surface water sampling is shown on table 18 bellow:

Table 18. Surface water sampling locations

No	Province	Location of sampling	Reference No.	Longitude	Latitude
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No	Province	Location of sampling	Reference No.	Longitude	Latitude
1	Bac Kan	Coc Thu Village, Ngoc Phai, Cho Don	BK-R255-WS1	105°34'43"	22°10'20"
2		Coc Thu Village, Ngoc Phai, Cho Don	BK-R255-WS2	105°34'33"	22°10'18"
3		Ban Bay Village, Yen Thuong, Cho Don	BK-R255-WS3	105°30'56"	22°10'00"
4		Ban Bay Village, Yen Thuong, Cho Don	BK-R255-WS4	105°30'35"	22°10'05"
5		Khuoi Diec, Na Khot, Yen Thuong, Cho Don	BK-R255-WS5	105°29'50"	22°10'27"
6		Pho Cau Village, Yen Thinh, Cho Don	BK-R255-WS6	105°28'32"	22°12'05"
7		Ban Cau Village, Yen Thinh, Cho Don	BK-R255-WS7	105°28'11"	22°12'05"
8		Vay Village, Yen Thinh, Cho Don	BK-R255-WS8	105°27'11"	22°13'20"
9	Cao Bang	Lung Luong Village, Vu Nong, Nguyen Binh	CB-R202-WS1	105°51'48"	22°42'06"
10		Cao Lu Village, Ca Thanh, Nguyen Binh	CB-R202-WS2	105°51'21"	22°43'03"
11		Luong Sung Village, Yen Lac, Bao Lac	CB-R202-WS3	105°50'42"	22°44'12"
12		Luong Sung Village, Yen Lac, Nguyen Binh	CB-R202-WS4	105°49'49"	22°44'59"
13		Nam Pap Village, Dinh Phung, Bao Lac	CB-R202-WS5	105°49'16"	22°45'35"
14		Nam Lin, Dinh Phung, Bao Lac	CB-R202-WS6	105°48'55"	22°45'58"
15		Lung Vai, Dinh Phung, Bao Lac	CB-R202-WS7	105°48'55"	22°45'58"
16		Mo Din Village, Huy Giap, Bao Lac	CB-R202-WS8	105°47'38"	22°48'00"
17	Ha Giang	Na Lien, Du Gia, Yen Minh	HG-R176A-WS1	105°13'42"	22°55'59"
18		Cap Tay 1 Village, Lung Ho, Yen Minh	HG-R176A-WS2	105°14'50"	22°58'22"
19		Lung Ho, Lung Ho, Yen Minh	HG-R176A-WS3	105°14'50"	22°58'22"
20		Lung Than Man Village, Lung Ho, Yen Minh	HG-R176A-WS4	105°13'03"	23°00'36"
21		Sa Ly, Na Lau Village, Ngam La, Yen Minh	HG-R176A-WS5	105°12'05"	23°01'50"
22		Na Don, Mau Due, Yen Minh	HG-R176A-WS6	105°13'20"	23°03'37"
23	Ha Giang	Vinh Tuy Town, Bac Quang	HG-R183-WS1	104°53'57"	22°15'12"
24		Khuoi Lieng, Dong Thanh, Bac Quang	HG-R183-WS2	104°53'13"	22°14'39"
25		Lang Bung, Dong Thanh, Bac Quang	HG-R183-WS3	104°50'07"	22°13'36"
26		Ke Nhan, Dong Yen, Bac Quang	HG-R183-WS4	104°48'12"	22°13'39"
27		Dong La, Dong Yen, Bac Quang	HG-R183-WS5	104°46'48"	22°11'56"
28		Ha Village, Vi Thuong, Quang Binh	HG-R183-WS6	104°44'45"	22°14'01"
29		Yen Tram Village, Tien Yen, Quang Binh	HG-R183-WS7	104°41'56"	22°17'14"
30		Xuan Chang Village, Xuan Giang, Quang Binh	HG-R183-WS8	104°42'29"	22°16'50"
31	Tuyen Quang	Dai Thi Village, Yen Lap, Chiem Hoa	TQ-R187-WS1	105°20'46"	22°13'14"
32		Bac Muoi Village, Yen Lap, Chiem Hoa	TQ-R187-WS2	105°23'28"	22°13'56"
33		Na Nung Village, Yen Lap, Chiem Hoa	TQ-R187-WS3	105°24'03"	22°14'09"
34		Na Hec Village, Yen Lap, Chiem Hoa	TQ-R187-WS4	105°24'30"	22°13'54"
35		Tin Keo Village, Yen Lap, Chiem Hoa	TQ-R187-WS5	105°24'47"	22°14'00"
36		Tien Keo Village, Yen Lap, Chiem Hoa	TQ-R187-WS6	105°25'19"	22°14'14"
37	Tuyen Quang	Nam Ninh, Binh Xa, Ham Yen	TQ-R189-WS1	105°06'38"	22°03'54"
38		3 Village, Viet Thanh, Tan Thanh, Ham Yen	TQ-R189-WS2	105°04'51"	22°04'01"
39		1 Village, Thuoc Ha, Tan Thanh, Ham Yen	TQ-R189-WS3	105°02'53"	22°05'26"
40		Lech Hamlet, Tan Thanh, Ham Yen	TQ-R189-WS4	105°01'34"	22°06'22"
41		Phu Loan Village, Phu Luu, Ham Yen	TQ-R189-WS5	105°01'25"	22°08'15"
42		Kem Village, Phu Luu, Ham Yen	TQ-R189-WS6	105°00'45"	22°10'15"
43		Bau Village, Minh Khuong, Ham Yen	TQ-R189-WS7	104°58'07"	22°13'30"
44		Lang En Village, Bach Xa, Ham Yen	TQ-R189-WS8	104°55'53"	22°14'30"
45		Tan Thinh Village, Yen Thuan, Ham Yen	TQ-R189-WS9	104°55'47"	22°17'04"
46	Yen Bai	Go Xoan Village, Nga Quan, Tran Yen, YB	YB-R163-WS1	104°50'21"	21°44'36"
47		Dai Ban village, Hoa Cuong, Tran Yen, YB	YB-R163-WS2	104°49'15"	21°46'00"
48		Phu Tho Village, Viet Thanh, Tran Yen, YB	YB-R163-WS3	104°48'23"	21°46'52"
49		Ngoi Hop Village, Bao Dap, Tran Yen, YB	YB-R163-WS4	104°45'31"	21°49'16"
50		Yen Hung Village, Yen Hung, Van Yen, YB	YB-R163-WS5	104°43'56"	21°51'09"
51		Yen Thai Village, Yen Thai, Van Yen, YB	YB-R163-WS6	104°42'43"	21°51'59"
52		Quach Village, Mau Dong, Van Yen, Yen Bai	YB-R163-WS7	104°40'05"	21°53'52"
53		Ban Huong, Dong Cuong, Van Yen, Yen Bai	YB-R163-WS8	104°37'00"	21°56'37"
54	Lao Cai	Ba Xa village, Tan An, Van Ban	LC-151-WS1	104°22'13"	22°08'56"
55		Khe Quat Village, Tan An, Van Ban	LC-151-WS2	104°22'34"	22°08'22"
56		Khe Hong Village, Tan An, Van Ban	LC-151-WS3	104°23'22"	22°08'10"
57		Xuan Sang Village, Tan An, Van Ban	LC-151-WS4	104°23'47"	22°07'54"
58		Khe Sang Village, Tan An, Van Ban	LC-151-WS5	104°23'53"	22°07'26"
59	Lao Cai	Vinh Village, Vo Lao, Van Ban	LC-R151B-WS1	104°12'36"	22°11'11"

No	Province	Location of sampling	Reference No.	Longitude	Latitude
60		Lu Village, Vo Lao, Van Ban	LC-R151B-WS2	104°12'18"	22°10'51"
61		Cao Tong Village, Nam Dang, Van Ban	LC-R151B-WS3	104°12'11"	22°10'05"
62		Nam Lan Village, Nam Dang, Van Ban	LC-R151B-WS4	104°12'46"	22°08'46"
63		Thai Hoa Village, Hoa Mac, Van Ban	LC-R151B-WS5	104°12'29"	22°07'23"
64		Thai Hoa Village, Hoa Mac, Van Ban	LC-R151B-WS6	104°12'29"	22°06'03"
65		Vang Xa, Muong Khuong Town, Muong Khuong	LC-R154-WS1	104°06'04"	22°44'54"
66	Lao Cai	Vang Xa, Muong Khuong Town, Muong Khuong	LC-R154-WS2	104°06'00"	22°44'52"
67		Sa Lung Phin, Nam Chay, Muong Khuong	LC-R154-WS3	104°05'41"	22°44'12"
68		Coc Ngu, Nam Chay, Muong Khuong	LC-R154-WS4	104°04'14"	22°42'44"
69		Ta Lang, Nam Chay, Muong Khuong	LC-R154-WS5	104°02'50"	22°40'06"
70		San Pan, Nam Chay, Muong Khuong	LC-R154-WS6	104°02'40"	22°38'49"
71		Chinh Cuong, Bac Cuong Ward, Lao Cai City	LC-R156-WS1	103°58'21"	22°28'23"
72	Lao Cai	Bac Cuong Ward, Lao Cai City	LC-R156-WS2	103°58'12"	22°28'04"
73		Da Dinh 1, Ta Phoi, Lao Cai City	LC-R156-WS3	103°58'01"	22°25'08"
74		Da Dinh 1 Village, Ta Phoi, Lao Cai City	LC-R156-WS4	103°58'02"	22°25'23"
75		Da Dinh 2 Village, Ta Phoi, Lao Cai City	LC-R156-WS5	103°58'01"	22°25'08"
76		Phoi Village, Ta Phoi, Lao Cai City	LC-R156-WS6	103°58'35"	22°24'06"
77		Neighborhood 1, Pho Rang Town, Bao Yen	LC-R160-WS1	104°28'43"	22°14'03"
78	Lao Cai	Nam Na Village, Xuan Thuong, Bao Yen	LC-R160-WS2	104°29'30"	22°14'42"
79		Xuan Thuong, Bao Yen	LC-R160-WS3	104°29'35"	22°15'12"
80		Na 4 Village, Xuan Thuong, Bao Yen	LC-R160-WS4	104°29'44"	22°15'18"
81		2B Village, Xuan Hoa, Bao Yen	LC-R160-WS5	104°30'17"	22°16'12"
82		Sao Da Sat, Xuan Hoa, Bao Yen	LC-R160-WS6	104°30'17"	22°16'36"

5.11.3 Results of Air Quality Monitoring

67. The monitoring of ambient air quality that includes TSP and noise (Leq) was conducted from June 25-30th 2015 to July 15th, 2015 at 50 sampling sites. The results are discussed in detail in the report "Environmental Monitoring Results Construction Stage by C.O.M.P.O Vietnam Joint Stock Company dated January 2015.

68. In accordance with the approved monitoring plan, twelve roads were monitored during this period, namely: PR255 in Bac Kan; PR202 in Cao Bang; PR176A and PR183 in Ha Giang; PR187 and PR189 in Tuyen Quang; PR163 in Yen Bai; and PR151, PR151B, PR154, PR156 and PR160 in Lao Cai. The results are discussed in detail in the report "Environmental Monitoring Results - Construction Stage (Step 5) and was mentioned in Semi-annual periodic monitoring reports (No.3) period from January to June 2015.

69. The monitoring test results indicates that the TSP concentrations in all stations are still much lower than the QCVN maximum allowable limit of 300µg/m³ and ranged from 50 µg/m³ (HG-PR 176 Ha Giang) to 284 µg/m³ (HG-PR 183 Ha Giang). The average TSP concentrations in these road sections ranged 135-195 µg/m³. The monitoring test results was recorded construction works in these road sections caused increases in TSP concentrations, dust measurement results also increased in the contract packages that applies less management measures to minimize dust. And run through areas populated concentrated where many means of participating in traffic.

70. The equivalent noise levels monitoring test results, noise levels are much higher than the daytime limit of 70dBA was recorded in HG-PR183 at measurement location of Ke Nhan Village, Dong Yen Commune, Bac Quang District (72 dB), TQ-PR189, at measurement location of Tho village, Phu Luu Commune, Ham Yen District, LC-PR156, at measurement location of Phoi village, Ta Phoi Commune Lao Cai City– Miner Road (75dBA) where densely populated, greater traffic density

71. Monitoring results show that besides daily activities of local people, construction activities have also had an impact on the increased dust and noise levels at the monitoring stations.

72. The Results of Air Quality Monitoring are presented in detail in Appendix 2: 3rd Environmental Monitoring Results.

5.11.4 Results of Surface Water Quality Monitoring

73. Surface Water Quality Monitoring for 23 packages was conducted at 82 stations can be showed in Table 18 from 25 March 2015 to 9 April 2015, The surface water quality monitoring parameters are temperature, pH, turbidity, TSS, DO, BOD₅, COD, oil and grease, coliform, and fecal coliform. Temperature, pH, turbidity, TSS and COD, Oil, Coliform, Fecal coliform. The Results are presented in detail in "Environmental Monitoring Results - Construction Stage (Step 4) Attached in Appendix 2

74. In the monitoring parameters, parameters of turbidity, TSS, BOD₅, COD, oil and grease are related directly to the construction activities on site, parameters of DO, BOD₅, Coliform, Fecal coliform are indirectly related to construction activities due to the operating activities of workers on construction on sites and at camps. Therefore, only discussed the above parameters in this report.

5.11.4.1 Water Quality of Streams at Bac Kan Provincial Road

75. There are no marked changes of Turbidity compared to the results measured in January 2015 because the rainy season has not yet started, Turbidity levels of most monitoring stations ranges between 27 and 40 mg/l.

76. For TSS, actual measurements of water samples in the monitoring stations of Bac Kan province is shown on the following chart, The TSS levels of most monitoring stations are lower than the QCVN 08:2008/BTNMT limit and ranges relatively evenly between 29,1 mg/l and 43,2 mg/l. The DO levels of water samples of most monitoring stations are higher than the QCVN 08:2008/BTNMT minimum limit and ranges from 4,8 to 6,6 mg/l. The levels of BOD₅, COD in water sample at positions of R255 meet standards A1 of QCVN 08:2008/BTNMT, BOD level ranged from 2-3,8 mg/l; COD level ranged from 3,9 mg/l to 5,8 mg/l;

77. Oil and Grease level of R255 relatively high, 2 out of 8 sampling stations had grease level exceeding the limit in column B1 of QCVN (0,1 mg/l) which were: R255-WS5 (Khuoi Diec Slot, Na Khot village, Yen Thuong, Cho Don), R255-WS6-2 (Pho Cau Village, Yen Thinh, Cho Don). At R255-WS2 (Coc Thu Village, Ngoc Phai, Cho Don) and at R255-WS4-1 (Ban Bay Village, Yen Thuong, Cho Don), R255-WS6-1 (Pho Cau Village, Yen Thinh, Cho Don) Oil and Grease level reached the allowable limit:

78. Coliform in water sample measured at R255, Bac Kan Province were much lower than the standard A1 (2500 MPN/100ml) of QCVN, at WS6 was not found coliform; Fecal Coliform level was lower than the limit of QCVN 39:2011/BTNMT. At R255- WS1-1 (Coc Thu Village, Ngoc Phai, Cho Don) and R255- WS3 (streams Km 9+900, Ban Bay Village, Yen Thuong) with the highest Fecal Coliform is 130 MPN/100ml. At measured stations, Fecal Coliform was not be found at R255-WS4, WS5, WS6.

79. The Results of Environmental Monitoring along the road of PR255 showed streams/rivers in the construction area of PR255, Oil and Grease was found to be polluted, the contractors must strengthen the management method of petroleum stockpiling, gathering, repairing machinery and equipment with the regulations of EMP and SEMP to prevent oil spillage into the environment. The results of microbiological monitoring also showed that surface water in areas without contaminated by waste of animal and human, contractors should continue to maintain sanitary conditions in the worker camps and site.

5.11.4.2 Water Quality of Streams at Cao Bang Provincial Roads

80. The Results of baseline and Streams/Surface Water Monitoring along the road of PR202 described below. The monitoring test results in detail can be found in Appendix 2.

81. Turbidity level of R202, Cao Bang Province. Except for R202-WS8 (Mo Din Village, Huy Giap Commune, Bao Lac) with much much higher level is 120 mg/l. Almost turbidity level here is not high, the maximum level measured 27 mg/l at R202-WS3 (Luong Sung Village, Yen Lac Commune, Bao Lac) and lower than is 13 mg/l at R202- WS6 (Nam Lin Village, Dinh Phung Commune, Bao Lac); Except for R202-WS8 (Mo Din Village, Huy Giap Commune, Bao Lac) TSS level higher than the allowable limit in column B1 of QCVN 3 times. The other TSS levels at other monitoring stations were lower than allowable limit of QCVN, the smallest TSS level measured 14,6 mg/l at R202-WS6 (Nam Lin Village, Dinh Phung Commune, Bao Lac)

82. The levels of BOD5, COD much lower than the allowable limit, at sample station of Mo Din Village, Huy Giap Commune, Bao Lac (R202-WS3-2) Oil and Grease level higher than the limit of B1 QCVN and at Luong Sung Village, Yen Lac Commune, Nguyen Binh (at R202- WS8-1), Oil and Grease level meet the allowable limit.

83. Coliform at locations of PR202 Cao Bang Province, decreased compared to the previous monitoring period and much lower than the limit in column B1 of QCVN. At R202-WS7 (Lung Vai Village, Dinh Phung Commune, Bao Lac), R202-WS5 (Nam Pap Village, Dinh Phung Commune, Bao Lac) was not found Coliform, at all monitoring stations were not found Fecal Coliform.

5.11.4.3 Water Quality of Streams at Ha Giang Provincial Roads

84. The Results of Water Quality Monitoring along the road of HG-R176A and HG-183 Ha Giang Province in April 2015 are presented in detail in Appendix 2

TL 176

85. TSS levels at R176A-WS5 (Lung Village, Than Man, Lung Ho, Yen Minh), R176AWS6 (Na Don, Mau Due, Yen Minh), higher than the allowable limit. Monitoring stations at R176A-WS3-2 (crossing side ditch (Km 44+600), at Cap Tay village, Oil and Grease level exceeded the allowable limit of QCVN (exceeded the allowable limit from the baseline stage) and at R176A-WS3-1 (Lung Ho Commune, Yen Minh) meet the limit; The levels of BOD5, COD, Coliform, Fecal coliform were lower than the allowable limit, at R176A-WS3 (Lung Ho Village, Lung Ho Commune, Yen Minh) Fecal coliform measured 50MPN/100ml, lower than the limit of QCVN 39:2011/BTNMT (100MPN/100ml).

TL183

86. TSS of all water samples of PR183 were within the content ranged from 28,3 - 47,4 mg/l did not exceed the limit in column B1 of TCCP 08:2008/BTNMT. Oil and Grease level at R183-WS1-2, R183-WS8 (Xuan Chang Village, Xuan Giang, Quang Binh) - higher than the allowable limit, R183-WS3 (Bung Village, Dong Thanh, Bac Quang District) and R183-WS1- 1(Vinh Tuy Town, Bac Quang District) meet the limit. The levels of BOD, COD, coliform, fecal coliform were lower than the limit of QCVN, at stations of R183-WS5, R183-WS8, Fecal Coliform was found with concentrations respectively 30, 20 MPN/100 ml.

5.11.4.4 Water Quality of Streams at Tuyen Quang Provincial Roads

PR 187

87. The levels of TSS, BOD5, COD, grease, coliform and fecal coliform at monitoring stations were lower than the allowable limit of QCVN.

PR 189

88. At R189-WS8 (Tan Thinh commune, Yen Thuan, Ham Yen), the TSS sample exceeded 1.2 times compared to the allowable limit of QCVN (50mg/l), the level of TSS at different places of these two PR were quite high which ranged from 14-42 mg/l, but still within the allowable limit of QCVN B1 column. The highest level of coliform was 450

MPN/100ml at R189-WS7 (Bau commune, Minh Khuong, Ham Yen). At R189-WS9, the coliform was found unavailable. The level of fecal coliform was lower than the allowable limit in column B1 of QCVN.

5.11.4.5 Water Quality of Stream at Yen Bai Provincial Roads

PR 163

89. In this monitoring period, the levels of TSS at two stations R163-WS1 and R163-WS4 exceeded 1.2 to 1.4 times compared to the allowable limit in column B1 of QCVN 08:2008/BTNMT; 2 out of 8 sampling stations had grease level reaching the limit of QCVN which were R163-WS4 and R163-WS8-2; however, when comparing to previous monitoring events, the level of this 4th monitoring event tended to decrease, especially the grease levels at R163-WS1 and R163-WS8.

90. At sampling stations, coliform level ranged from 0-33-MPN/100ml, much lower than the limit in column B1 of QCVN and also lower than the limit in column A1 (2500MPN/100ml), at R163-WS7 (Tran Quach, Mau Dong commune) the coliform level was found unavailable and the highest level was at R163-WS8-2 (Ban Huong village, Dong Cuong commune, Van Yen). The fecal coliform was found unavailable at R163-WS1 (Go Xoan village, Nga Quan commune, Tran Yen), R163-WS2 (Dai Ban village, Hoa Cuong commune, Tran Yen); the R163-WS8 (Ban Huong village, Dong Cuong commune, Van Yen) had the highest level of fecal coliform which was 60 MPN/100ml; however, still lower than the limit of QCVN 39:2011/BTNM

5.11.4.6 Water Quality of Stream at Lao Cai Province

91. PR 151B: TSS levels at LC-R151B-WS3 (Khe Hong village, Tan An, Van Ban); LC-R151B-WS4 (Xuan Sang village, Tan An, Van Ban); LC-151B-WS5 (Khe Sang village, Tan An, Van Ban) were higher than the allowable limit, only at TLC-R151B-WS3 reached 498mg/l higher than the allowable limit 10 times; the levels of BOD, COD, coliform, fecal coliform, grease were lower than the limit of QCVN (except for LC-151-WS2 (Khe Quat village, Tan An, Van Ban), the COD level nearly meet the limit and grease level was higher than the limit 1.3 times).

92. PR 151: TSS levels at LC-151-WS3 (Khe Hong village, Tan An, Van Ban); LC-151B-WS4 (Xuan Sang village, Tan An, Van Ban); LC-151-WS5 (Thai Hoa village, Hoa Mac, Van Ban) were higher than the limit from 2.8 to 3.6 times; the levels of BOD, COD, coliform, fecal coliform were lower than the limit of QCVN. Grease level at LC-151-WS1 (Ba Xa village, Tan An, Van Ban) and LC-151-WS5 (Thai Hoa village, Hoa Mac, Van Ban) nearly meet the limit.

93. PR 154: TSS level in water sample at R154 was lower than the limit (column B1) of QCVN 08:2008/BTNMT, ranged from 27.7-46.6 mg/l. the levels of BOD, COD were lower than the limit of QCVN.

94. TL 156: The high levels of TSS at 5 out of 6 monitoring positions exceeded the limit from 1.2 to 4 times, at R156-WS6 (San Pan, Nam Chay, Muong Khuong) the measured values exceeded the limit of QCVN 4 times.

95. The levels of BOD, COD, coliform, fecal coliform were lower than the limit of QCVN; except for the grease level at monitoring position of package LC-R156-WS6 (Phoi village, Ta Phoi, Lao Cai) exceeded the limit.

96. PR 160: The TSS levels in water sample of R160 at LC-R160-WS1 (Group 1, Pho Rang burgh, Bao Yen); LC-R160-WS6 (Sao Da Sat, Xuan Hoa, Bao Yen) were higher than the limit from 1.2 – 1.4 times; the level of BOD, COD were lower the limit of QCVN.

VI. CONCLUSION AND RECOMMENDATIONS

Overall Progress of Implementation of Environmental Management Measures

97. As previously reported, the environmental management system of the project has been completely prepared during the preconstruction phase. All the environmental preparatory activities that would ensure that consideration will be given to environmental protection during the construction stage have been put in place. All the EMPs had been updated and approved, all SEMPS had been prepared and approved by the respective PPMUs, and capacity-building and environmental awareness orientation programs had been conducted. Still, there are remaining documentations that need to be completed. Some areas along the road alignments are being used as spoils disposal sites without permit. There is a need to ensure that permits are secured for these sites prior to use by the contractors.

98. The water quality test results indicate that construction activities, particularly the removal of vegetation and earthworks are contributing to increases in temperature, turbidity, TSS, BOD and coliform, particularly where loose soils are eroded down the streams.

99. At the construction sites, the environmental mitigation measures are not being paid much attention by the Contractors. While some measures are being implemented for compliance, environmental protection is not a concern. New waste sites have been opened and are being used without the necessary permits. Other non-compliance issues have been noted during this period. These include: limited provision of PPE to workers; workers not enjoined to wear PPE; lack of acceptable sanitary facilities at camp sites; improper management of spoils; failure to ensure road accessibility and traffic safety during blasting and other critical road works; improper disposal of wastewater, especially used bentonite; and lack of measures to prevent soil from eroding down the streams.

100. The contractors are trying to comply with the required environmental management measures. The PPMU, with assistance from the PCC and CSC is continually conducting discussions and reminding the contractors to improve the implementation of environmental measures. The CSC and the PCC are regularly monitoring the contractors' performance according to plan. Monitoring of air quality and surface water quality are also regularly conducted according to plan.

Recommendations

101. The PPMUs could help facilitate getting clearances for new disposal sites and should remind the contractors to refrain from using sites prior to issuance of permits. The contractors should require their assigned safety and the environment officers to attend to securing permits for disposal sites prior to use.

APPENDIX 1: SUMMARY OF ASSESSMENT ON EFFECTIVENESS OF MITIGATION MEASURES FROM JANUARY TO JUNE 2015

Appendix 1.1: Contract Packages in Bac Kan Province

Impacts/Mitigations	Effectiveness of mitigation (1 to 5)																							
	BK-R255-01						BK-R255-02						BK-R255-03						BK-R255-04					
Contract package	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun
1) Spoil disposal	3	3	3	3	3	3	4	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3
2) Solid waste management and disposal (domestic waste and construction waste)	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2
3) Hazardous Waste Management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	3	3
4) Bitumen and Asphalt concrete	-	-	-	-	-	3	-	-	-	-	3	3	-	-	-	-	3	3	-	-	-	-	3	3
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7) Pollution of surface water:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3
a) Waste water discharging	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	2
b) Maintenance of vehicles and equipment	4	3	3	4	4	3	4	3	3	4	4	3	4	3	3	4	4	3	4	3	3	4	3	3
8) Noise and vibration: Site preparation, construction management, and materials transport	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3
9) Dust and exhaust: site preparation, construction management, and materials transport	2	2	3	4	4	3	2	2	3	4	4	3	4	3	3	4	4	3	3	3	3	4	2	3
10) Health and safety: Public and workplace	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	3	3
11) Traffic Management	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	2

Note:

A. Mitigation Effectiveness Rating Criteria

1. Very good (meet all requirements)
4. Poor (take few measures)

2. Good (take main measures)
5. Very poor (take very few measures)

3. Medium (take several measures)

Appendix 1.2 : Contract Packages in Cao Bang Province

Impacts/Mitigations	Effectiveness of mitigation (1 to 5)																	
	CB-R202-01						CB-R202-02						CB-R202-03					
Contract package	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun
1) Spoil disposal	4	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	3	3
2) Solid waste management and disposal (domestic waste and construction waste)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3) Hazardous Waste Management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4) Bitumen and Asphalt concrete	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	4
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7) Pollution of surface water:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
a) Waste water discharging	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
b) Maintenance of vehicles and equipment	3	3	3	4	4	3	3	3	3	4	4	3	3	3	3	3	3	3
8) Noise and vibration: Site preparation, construction management, and materials transport	4	3	3	3	3	3	3	3	3	3	3	3	4	3	3	4	4	3
9) Dust and exhaust: site preparation, construction management, and materials transport	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
10) Health and safety: Public and workplace	2	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	2	3
11) Traffic Management	3	4	4	3	3	3	4	3	3	3	3	3	4	3	3	3	3	3

Note:
A. Mitigation Effectiveness Rating Criteria

1. Very good (meet all requirements)
4. Poor (take few measures)

2. Good (take main measures)
5. Very poor (take very few measures)

3. Medium (take several measures)

Appendix 1.3 : Contract Packages in Ha Giang Province

Impacts/Mitigations	Effectiveness of mitigation (1 to 5)																							
	HG-R176A-01						HG-R176A-02						HG-R183-01						HG-R183-02					
Contract package	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun
1) Spoil disposal	4	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2) Solid waste management and disposal (domestic waste and construction waste)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3) Hazardous Waste Management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4) Bitumen and Asphalt concrete	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	3
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7) Pollution of surface water:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
a) Waste water discharging	2	4	2	2	2	3	2	4	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	3
b) Maintenance of vehicles and equipment	3	3	3	4	4	3	3	3	3	4	4	3	4	3	3	4	4	3	4	3	3	4	4	3
8) Noise and vibration: Site preparation, construction management, and materials transport	4	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9) Dust and exhaust: site preparation, construction management, and materials transport	3	3	4	4	4	3	4	3	4	4	4	3	4	3	4	4	4	3	4	3	3	3	3	3
10) Health and safety: Public and workplace	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3
11) Traffic Management	3	3	3	3	2	2	3	3	3	3	3	3	4	4	4	4	3	4	3	3	3	3	3	3

Note:
A. Mitigation Effectiveness Rating Criteria

1. Very good (meet all requirements)
4. Poor (take few measures)

2. Good (take main measures)
5. Very poor (take very few measures)

3. Medium (take several measures)

Appendix 1.4 : Contract Packages in Tuyen Quang Province

Impacts/Mitigations	Effectiveness of mitigation (1 to 5)																							
	TQ-R187-01						TQ-R189-01						TQ-R189-02						TQ-R189-03					
	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun
1) Spoil disposal	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3
2) Solid waste management and disposal (domestic waste and construction waste)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3) Hazardous Waste Management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4) Bitumen and Asphalt concrete	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	-	-
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
7) Pollution of surface water:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
a) Waste water discharging	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
b) Maintenance of vehicles and equipment	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
8) Noise and vibration: Site preparation, construction management, and materials transport	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9) Dust and exhaust: site preparation, construction management, and materials transport	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
10) Health and safety: Public and workplace	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
11) Traffic Management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Note:

A. Mitigation Effectiveness Rating Criteria

1. Very good (meet all requirements)
4. Poor (take few measures)

2. Good (take main measures)
5. Very poor (take very few measures)

3. Medium (take several measures)

Appendix 1.5 : Contract Package in Yen Bai Province

Impacts/Mitigations	Effectiveness of mitigation (1 to 5)																	
	YB-R163-01						YB-R163-02						YB-R163-03					
	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun
Contract package																		
1) Spoil disposal	Have completed the construction, under construction of the reincluded item	Have completed the construction, under construction of the reincluded item	3	3	3	3	Have completed the construction, under construction of the reincluded item	Have completed the construction, under construction of the reincluded item	3	3	3	3	3	3	3	3	3	3
2) Solid waste management and disposal (domestic waste and construction waste)			3	3	3	3			3	3	3	3	3	3	3	3	3	3
3) Hazardous Waste Management			3	3	3	3			3	3	3	3	3	3	3	3	3	3
4) Bitumen and Asphalt concrete			3	-	-	-			3	-	-	3	3	3	3	3	3	3
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control			3	3	3	3			3	3	3	3	3	3	3	3	3	3
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings			3	3	3	3			3	3	3	3	3	3	3	3	3	3
7) Pollution of surface water:			3	3	3	3			3	3	3	3	3	3	3	3	3	3
a) Waste water discharging			3	3	3	3			3	3	3	3	2	2	2	3	3	3
b) Maintenance of vehicles and equipment			3	3	3	3			3	3	3	3	3	3	3	3	3	3
8) Noise and vibration: Site preparation, construction management, and materials transport			3	3	3	3			3	3	3	3	3	3	3	3	3	3
9) Dust and exhaust: site preparation, construction management, and materials transport			3	3	3	3			3	3	3	3	3	3	3	3	3	3
10) Health and safety: Public and workplace			2	2	2	2			2	2	2	2	3	3	3	3	3	3

11) Traffic Management			3	3	3	3			3	3	3	3	3	3	3	3	3	3
Note: A. Mitigation Effectiveness Rating Criteria 1. Very good (meet all requirements) 2. Good (take main measures) 3. Medium (take several measures) 4. Poor (take few measures) 5. Very poor (take very few measures)																		

Appendix 1.6 : Contract Package in Lao Cai Province

Impacts/Mitigations	Effectiveness of mitigation (1 to 5)																																
Contract package	LC-R156-01						LC-R154-01						LC-R151B-01						LC-R151-01						LC-R160-01								
	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun	Jan	Feb	Mar	Apr	May	Jun			
1) Spoil disposal	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	Construction completed	Construction completed	3	3	3	3	3	3		
2) Solid waste management and disposal (domestic waste and construction waste)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
3) Hazardous Waste Management	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
4) Bitumen and Asphalt concrete	3	3	3	3	3	3	-	-	-	3	3	3	-	-	-	3	3	3	-	-	-	3	3			3	3	-	-	-	3	3	3
5) Drainage and erosion: Site management, Drainage/ Erosion prevention/ Sediment control	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
6) Materials Management: Manage the material piles, spoil waste piles and surface runoff from construction sites and buildings	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
7) Pollution of surface water:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
a) Waste water discharging	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
b) Maintenance of vehicles and equipment	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
8) Noise and vibration: Site preparation, construction management, and materials transport	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3			3	3	3	3	3	3	3	
9) Dust and exhaust: site preparation, construction management, and materials transport	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3	3	

10) Health and safety: Public and workplace	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2			3	3	3	3	3	3
11) Traffic Management	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			3	3	3	3	3	3

Note: A. Mitigation Effectiveness Rating Criteria

1. Very good (meet all requirements)

4. Poor (take few measures)

2. Good (take main measures)

5. Very poor (take very few measures)

3. Medium (take several measures)

APPENDIX 2: ENVIRONMENTAL MONITORING REPORT (January to June 2015)

Appendix 2.1. ENVIRONMENTAL MONITORING RESULTS AND ASSESSMENT (stage 4)**II.1. Current status of construction activities**

Environmental monitoring program of construction stage of the project Transport Connection in Northern mountainous provinces has been conducted from March 25th to April 9th, 2015 at locations as described in Table 18 above. The monitored factors of surface water quality include: temperature, pH, turbidity, TSS, DO, BOD, COD, oil and grease, coliform and faecal coliform. The construction activities carried out during the monitoring time are described briefly in the table as below:

Table VI-1. Current status at the construction package

No.	Province	Contract package	Name of contract	Construction circumstance
1	Bac Kan	BK-R255-01	Construction of 04 bridges on provincial road 255, Bac Kan province	Na Tum bridge (Km 0+ 747): beams and approach bridge under construction Ban Bay bridge (Km 9+974): piers done, beam is waiting Na Ca bridge (Km13+388): piers built, awaiting girder Ban Cau bridge (Km18+120): not have been repaired yet Ban Vay bridge (Km 22+309): piers under construction Na Tum bridge (Km 0+ 747): beams and approach bridge under construction Ban Bay bridge (Km 9+974): piers done, beams waiting Na Ca bridge (Km13+388): piers and flat of bridge done Ban Cau bridge (Km18+120): foundation of piers are bored Ban Vay bridge (Km 22+309): piers and flat of bridge done, approach bridge is being finished,
		BK-R255-02	Construction of Section Km1+00 – Km8+00, PR255, Bac Kan Province	Km1+00-Km8+00: slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the road are built Km8+00-Km18+120: spreading base, preparing to cover road and vertical drain with asphalt Km 18+120-Km24+981: surface road, vertical drain and base under construction
		BK-R255-03	Construction of Section Km8+00 – Km18+120, PR255, Bac Kan Province	
		BK-R255-04	Construction of Section Km18+120 to Km24+981, PR 255 Bac Kan Province	
2	Cao Bằng	CB-R202-01	Rehabilitation of PR202 (Ca Thanh – Lung Pan – Ban Rien), in Cao Bang Province	Road bed, vertical drains under construction, road beds and sewers across the road are built, prepare to cover all with asphalt
		CB-R202-02	Rehabilitation of PR202 (Ca Thanh – Lung Pan – Ban Rien), in Cao Bang Province (km15- km23)	slopes are lowered, route are adjusted, talus on site under canvas, road beds and vertical drain are built, prepare to spread base and asphalt
		CB-R202-03	Rehabilitation of PR202 (Ca Thanh – Lung Pan – Ban Rien), in Cao Bang Province (km23- km30+618.43)	Road bed, vertical draining construction, spreading base

No.	Province	Contract package	Name of contract	Construction circumstance
3	Ha Giang	HG-R176A-01	Rehabilitation of road section Minh Ngoc – Mau Due (PR176A) km38-km52	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built, (the beginning part of the route Km 38- Km 45).
		HG-R176A-02	Rehabilitation of road section Minh Ngoc – Mau Due (PR176A) km52-km73	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built
		HG-R183-01	Rehabilitation of road section Vinh Tuy-Yen Binh (DT183) (Km0+747-Km16+000)	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built,
		HG-R183-02	Rehabilitation of road section Vinh Tuy-Yen Binh (DT183) (Km16+000-Km36+300)	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built
4	Tuyen Quang	TQ-R187-01	TQ-R187-01 Rehabilitation of PR 187 section 187 km 0+000- km 12+953	Keo Mac Bridge (Km10+300) done, sanitary activities for stream
		TQ-R189-1/3	Rehabilitation of PR 189 (km2+500 – km26+000), Tuyen Quang Province	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds, vertical drain and sewers across the route are built
		TQ-R189-2/3	Rehabilitation of PR189 (Km26+000 – Km41+500), Tuyen Quang Province	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds, vertical drains and sewers across the route are built
		TQ-R189-3/3	Rehabilitation of PR189 (Km41+500 – Km56+914), Tuyen Quang Province	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds, vertical drains and sewers across the route are built
5	Yen Bai	YB-R163-01	Yen Bai – Khe Sang Road Construction, Section Yen Bai – Trai Hut, Yen Bai Province (Km4+303.14m – Km23+500m)	some generated items under construction (vertical drain, talus)
		YB-R163-02	Yen Bai – Khe Sang Road Construction, Section Yen Bai – Trai Hut, Yen Bai Province, (PR 163) section Km23+500 + Km49+00	Vertical drains, spillway, talus under construction
		YB-R163-03	Yen Bai – Khe Sang Road Construction, Section Yen Bai – Trai Hut, Yen Bai Province, 5 bridges	Nga Quan bridge: Done Nghia Phuong bridge: Done Viet Thanh bridge: Done Yen Hung bridge: Done, activities for sanitizing bridge, stream

No.	Province	Contract package	Name of contract	Construction circumstance
				Trang bridge: Done, activities for sanitizing bridge, stream Ngoi Hop bridge: drilling the piers
6	Lao Cai	LC-R156-01	Rehabilitation of PR156 (Bac Cuong – Ta Phoi – Hop Thanh) Km0+00-Km3+175 and Km6 – Km12+647	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built (Km4-10- Km12) spreading base and covering road with asphalt (Km0-Km 2) drain under construction and collecting material for Km7-Km10 Piers under construction (on the left of Bridge Suoi Chan)
		LC-R154-01	LC-R154-01 Rehabilitation of PR 154 (km 0+000- km 13+000)	slopes are lowered(Km0 –Km 0+700),spread base, vertical drains are built, talus on site under canvas, covering road with asphalt
		LC-R151B-01	Rehabilitation of PR151B (Vo Lao – Nam Rang – Hoa Mac)	Hoa Mac bridge (Chan stream) at Km10 under construction slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built. Km 4+ Km 7, base and surface of road under construction
		LC-R151-01	Rehabilitation of PR151 (Tan An – Khe Sang)	Ba Xa bridge: done, activities for sanitizing stream Khe Quat Bridge: done, activities for sanitizing stream Khe Hong bridge: done, talus under canvas, activities for sanitizing stream Khe Sang spillway: underground drains two side of spillway, approaching part under construction .
		LC-R160-01	Rehabilitation of PR160	Pho Rang bridge: beams of bridge under construction roadbeds under construction(spreading base, covering asphalt)

II.2. Current status of surface water quality

The monitoring period of surface water quality was conducted from March 25th to April 9th, 2015 at 82 points (detailed descriptions of the sampling sites in Tale 18).

Surface water quality at 82 points in 12 roads of 6 project areas was assessed through monitoring results of basic parameters including pH, temperature, turbidity, TSS, COD, BOD5, SS, DO, oil and grease, Coliform, Fecal coliform. At each monitoring point, water is sampled and monitored at two sites, one is 50 m upstream (1) and the other is 50m downstream (2). Results of water quality parameters are shown as below.

II.2.1. Temperature

The third monitoring period for construction stage is conducted in the spring. The water temperature at each monitoring position fluctuates depending on the weather of different days and at different times in day. The water temperatures upstream (1) and downstream (2) from the construction site vary

inconsiderably. The actual values obtained from the monitoring positions of 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 12/2014 are presented on the figures from Figure II.2.1.1 to Figure II.2.1.6.

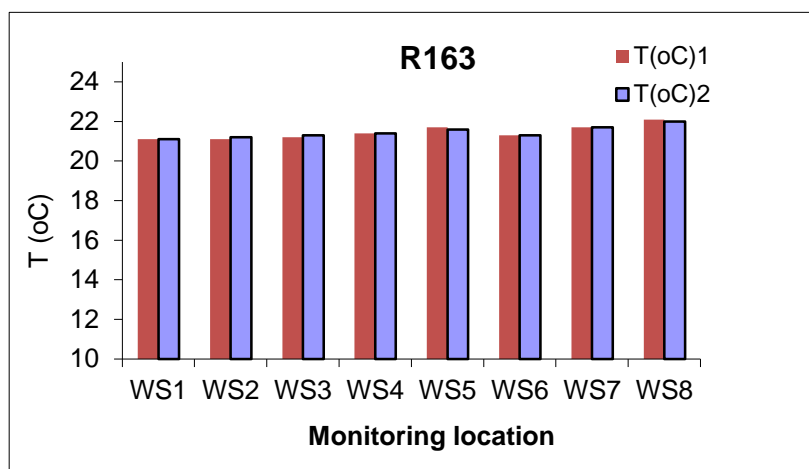
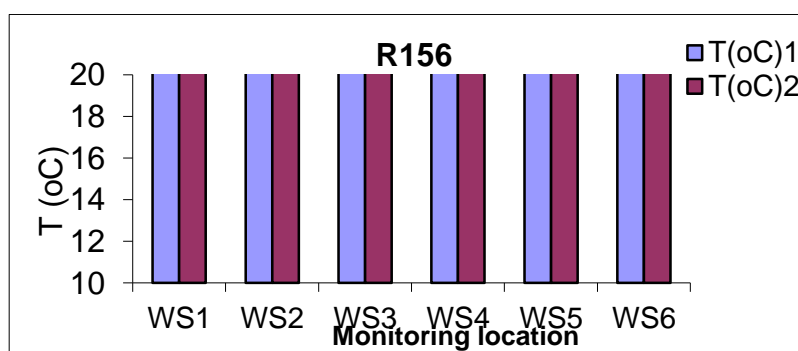
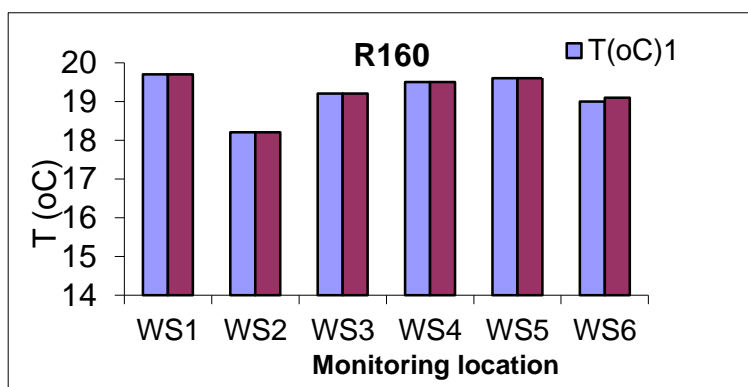
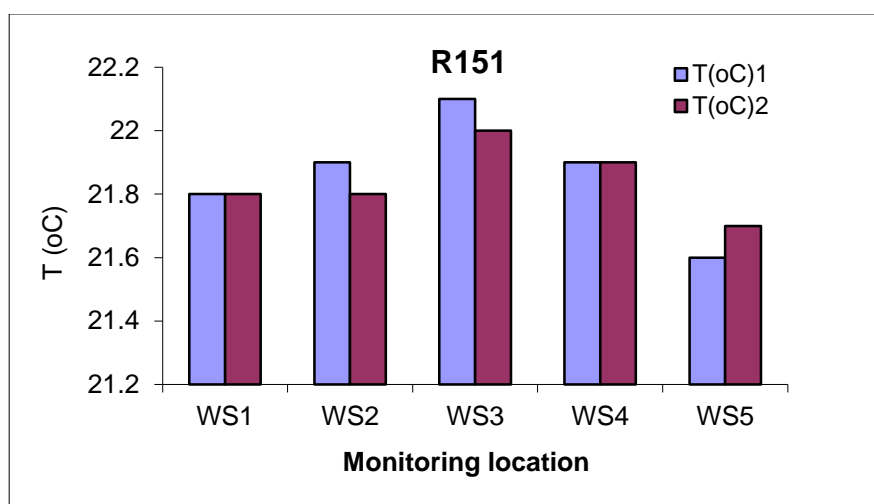
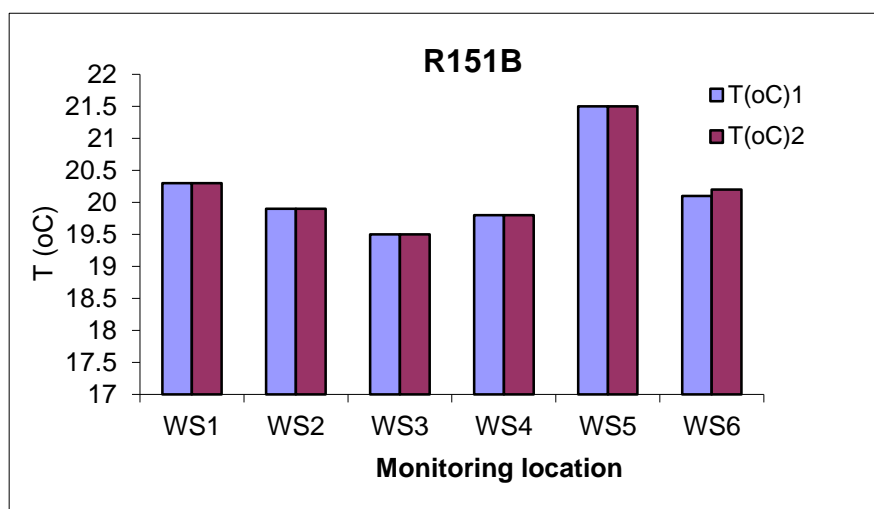
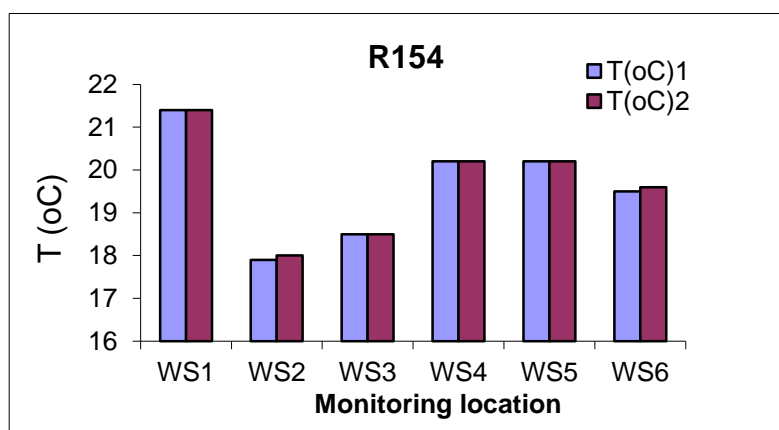


Figure II-2.1.1. Actual Temperature values of water measured in Yen Bai





FigureII-2.1.2. Actual Temperature values of water measured in Lao Cai

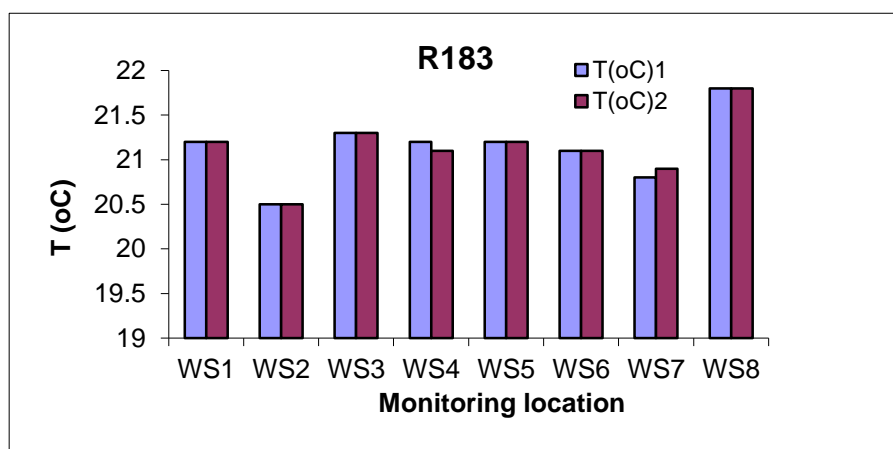
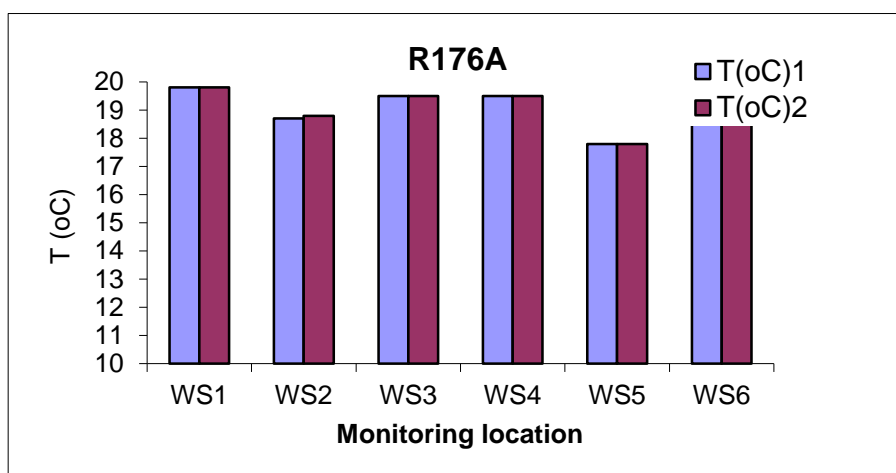
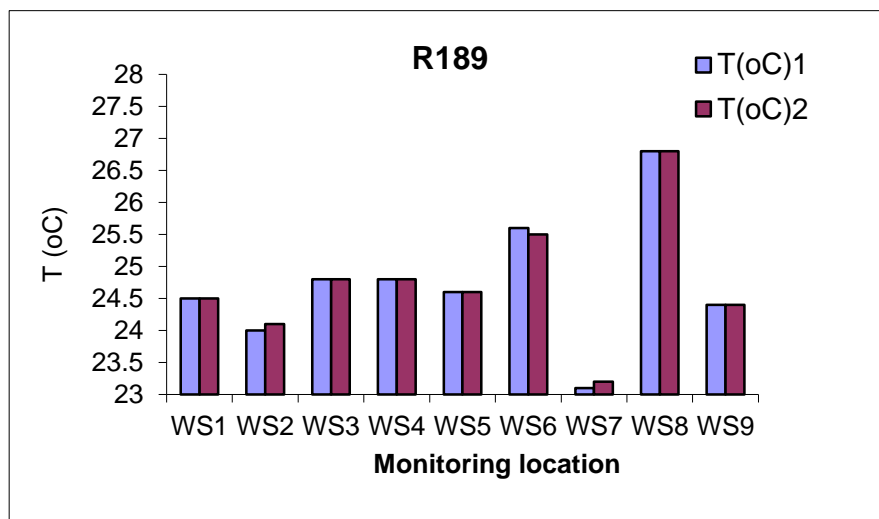


Figure II-2.1.3. Actual Temperature values of water measured in Ha Giang



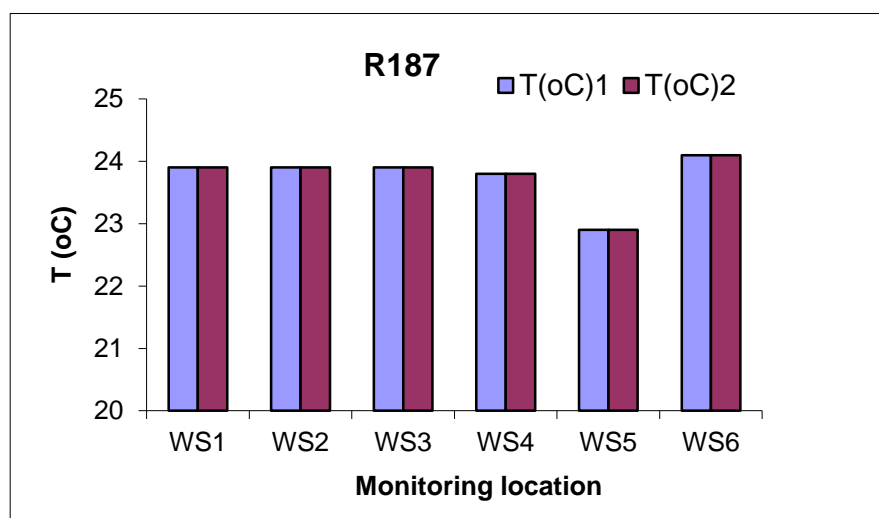


Figure II-2.1.4. Actual Temperature values of water measured in Tuyen Quang

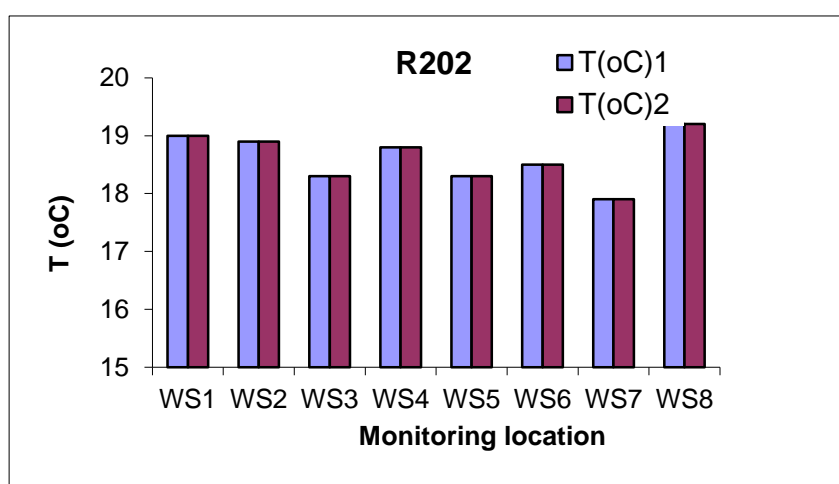


Figure II-2.1.5. Actual Temperature values of water measured in Cao Bang

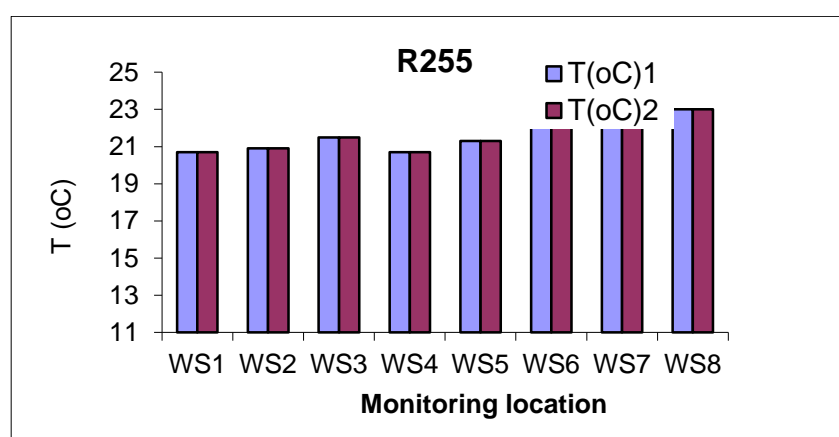


Figure II-2.1.6. Actual Temperature values of water measured in Bac Kan

II.2.2. pH

Actual pH values of each position at each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan are shown on the graph from Figure II-2.2.1 to Figure II-2.2.6. It can

be seen that the pH values upstream (1) and downstream (2) at all monitoring positions are not different considerably.

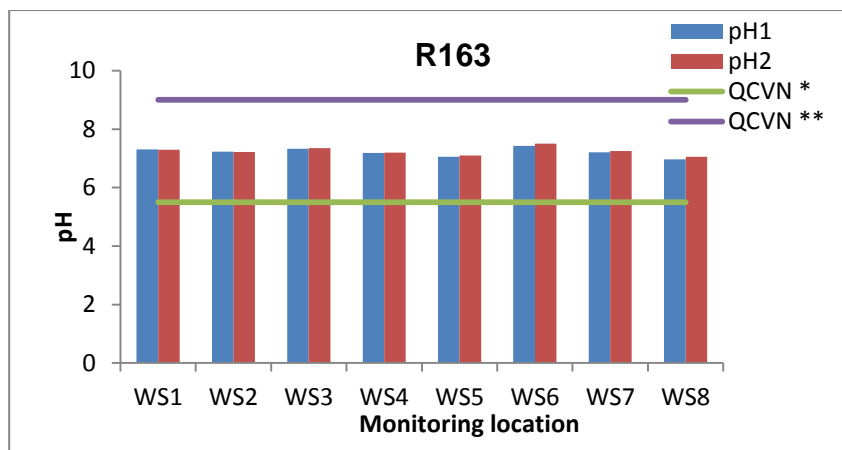
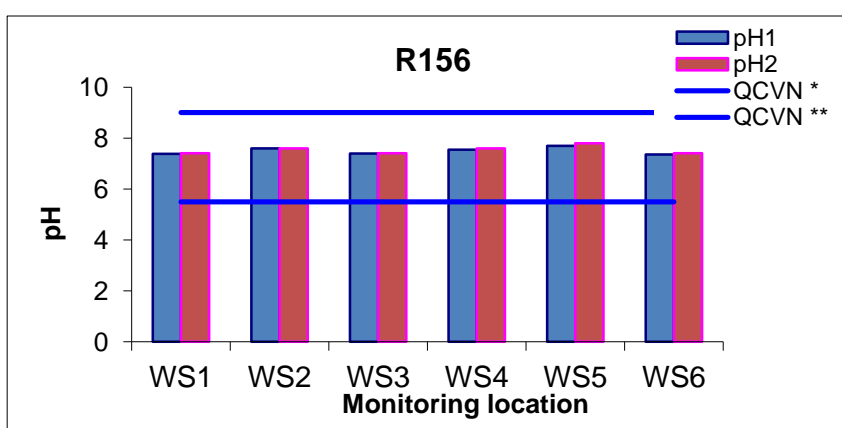
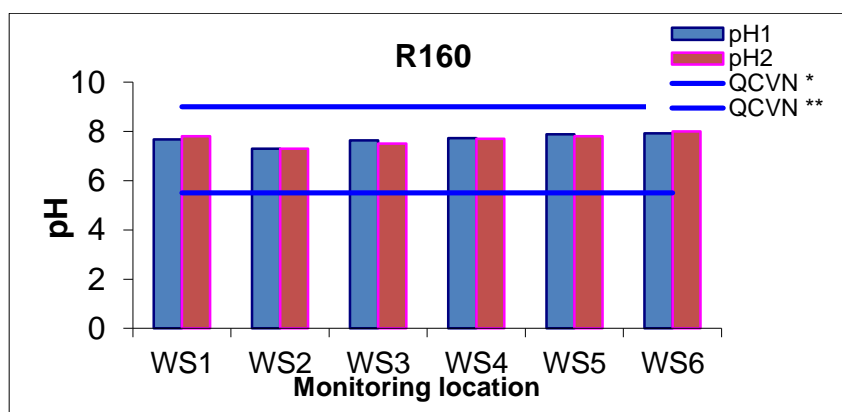


Figure II-2.2.1. Actual pH values of water in Yen Bai

It can be seen from Figure II-2.2.1 that the pH values measured at the monitoring positions along R163 in Yen Bai province are from 7,0 to 7,5. All the values are in the range of permissible limitations stipulated in QCVN 08:2008/BTNMT.



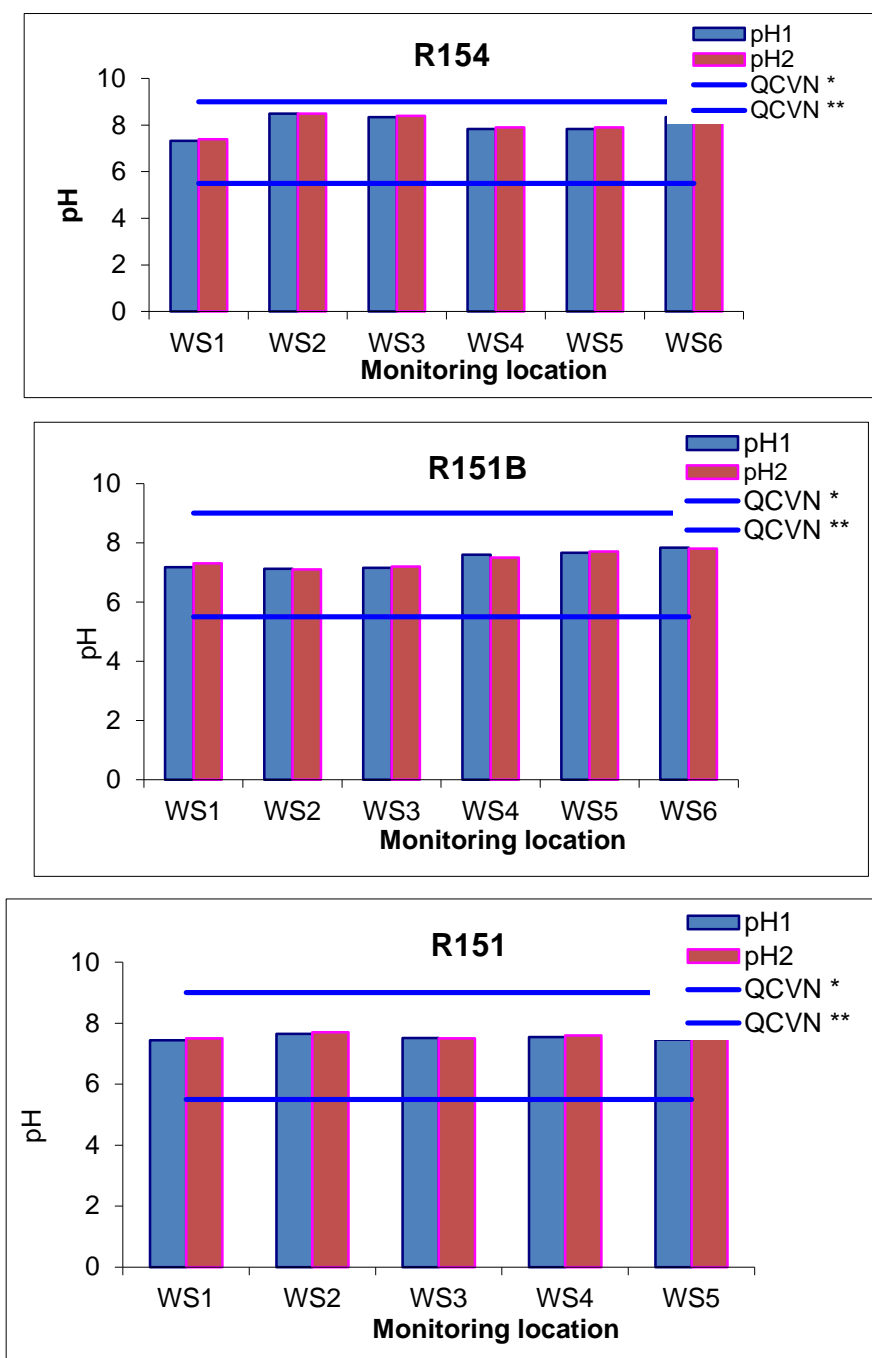


Figure II-2.2.2. Actual pH values of water in Lao Cai

All measured pH values in Lao Cai province are in the permissible range (5.5-9.0) according to QCVN 08:2008/BTNMT. It is shown on the graph Figure II-2.2.2. The lowest pH value 7.1 is obtained at position R151B-WS2-1 (Lu village, Vo Lao commune, Van Ban) and the highest pH value 8.5 is obtained at position R154-WS2 (Vang Xa, Muong Khuong).

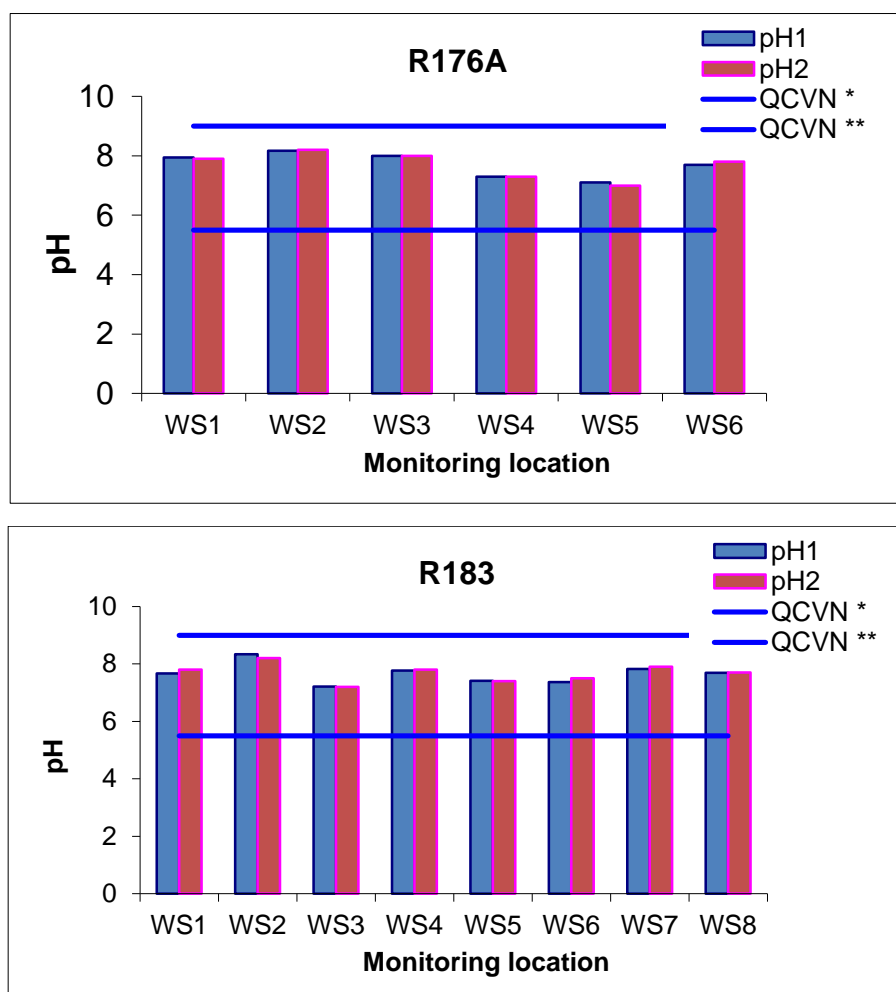
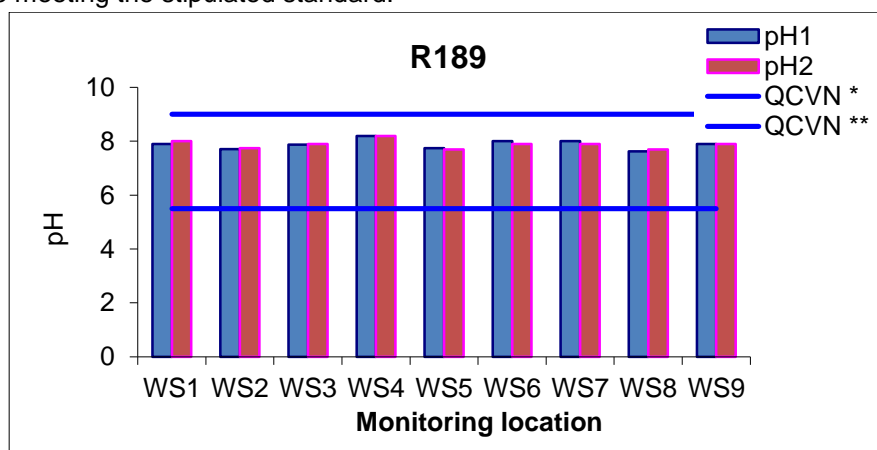


Figure II-2.2.3. Actual pH values of water in Ha Giang

Figure II-2.2.3 shows that pH values measured at the positions along R176A and R183 in Ha Giang are from 7.0 to 8.3 meeting the stipulated standard.



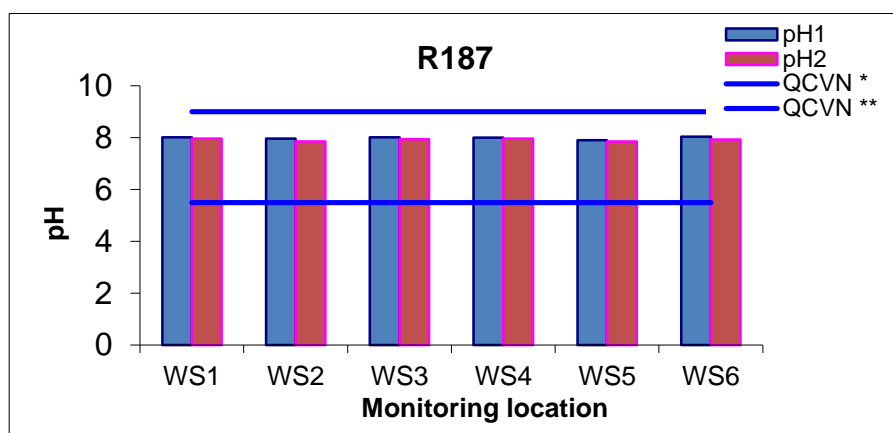


Figure II-2.2.4. Actual pH values of water in Tuyen Quang

The pH values at monitoring positions along R187 and R189 in Tuyen Quang province shown on Figure II-2.2.4 depict that the pH upstream and downstream values are not different significantly, ranging from 7.6 to 8.2, satisfying the permissible range of QCVN.

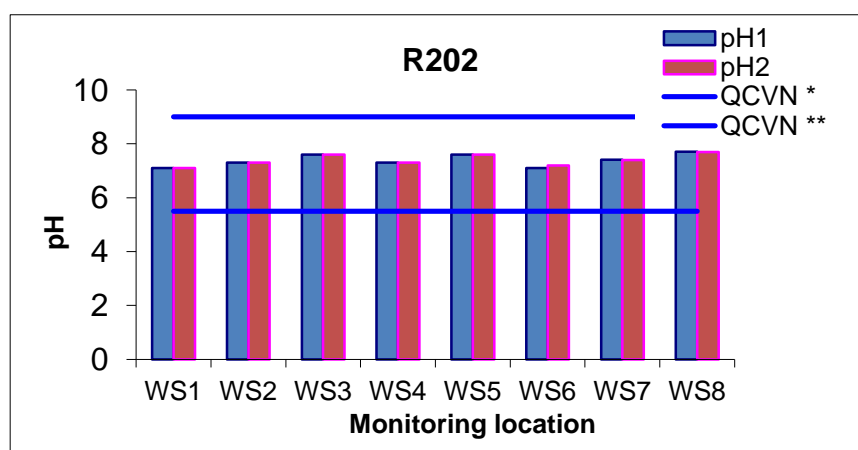


Figure II-2.2.5. Actual pH values of water in Cao Bang

Figure II-2.2.5 the measured pH value at monitoring positions along R202. The pH values monitored in this period meet QCCP and ranging from 7.1 to 7.7.

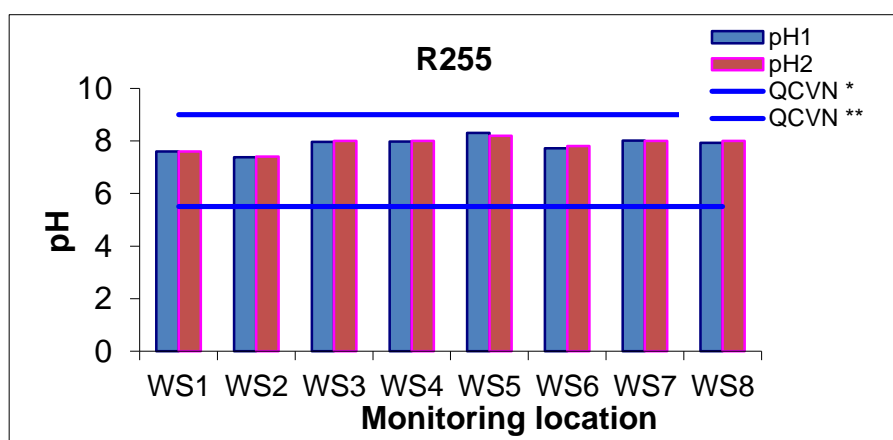


Figure II-2.2.6. Actual pH values of water in Bac Kan

Figure II-2.2.6 represents the results of pH values measured at R255, the lowest pH values 7.4 is obtained at the monitoring position R255-WS2 (Coc Thu village, Ngoc Phai, Cho Don) and the highest

8.3 is obtained at the monitoring position R255- WS5 (Khuoi Diec, Na Khot village, Yen Thuong, Cho Don). There are no pH values which is over the limitation of QCVN.

II.2.3. Turbidity

The figures from Figure II-2.3.1 to Figure II.2.3.6 demonstrate measured turbidity values of water at each positions in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 3/2015. The turbidity values at upstream (1) and downstream (2) position have no significant difference.

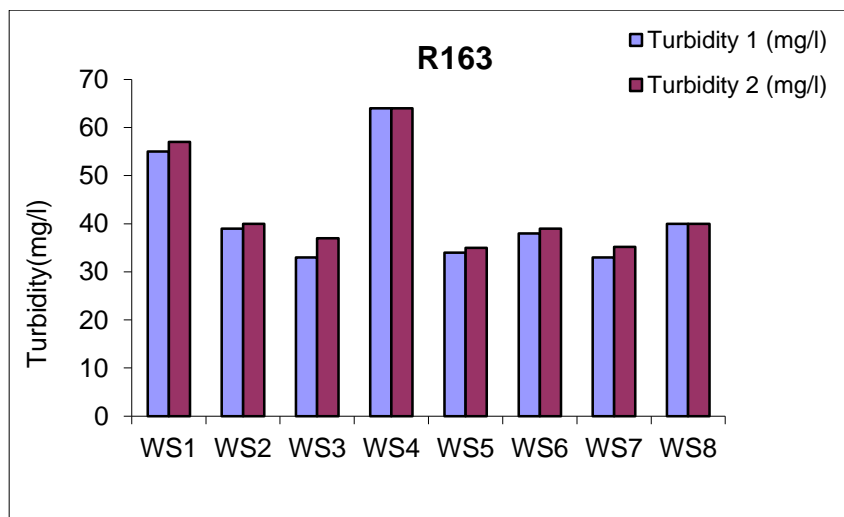
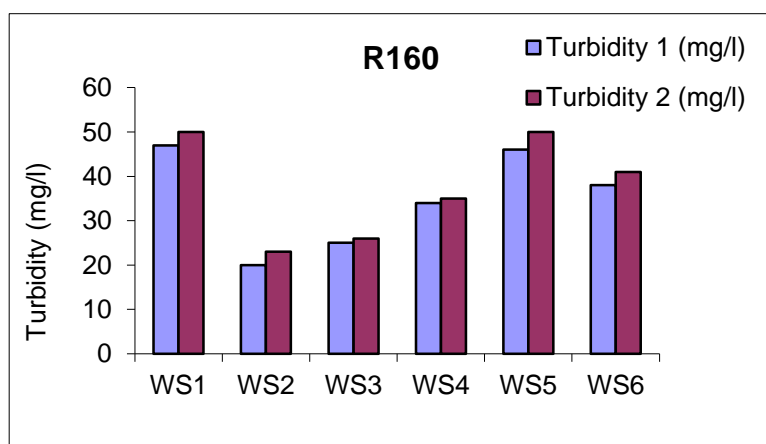


Figure II-2.3.1. Actual Turbidity values of water in Yen Bai

Generally, at the monitoring positions along R163 in Yen Bai province, turbidity values are quite high. At position R163-WS4 (Ngoi Hop village, Bao Dap commune, Tran Yen), the highest 64 mg/l is obtained and the lowest 10 mg/l is obtained at position R163-WS7 (Quach village, Mau Dong village, Van Yen) (Figure II-2.3.1).



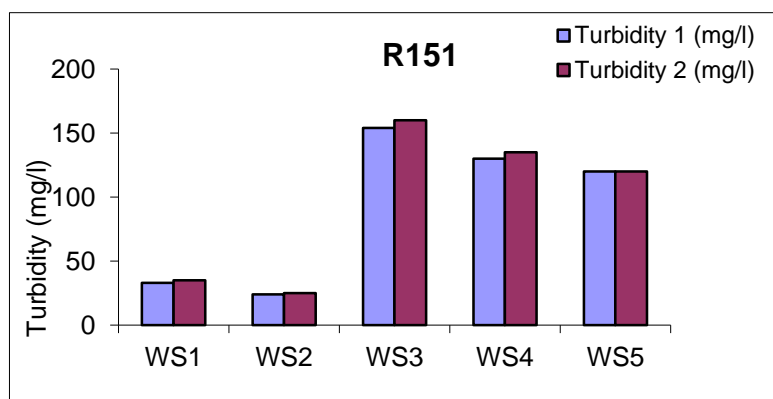
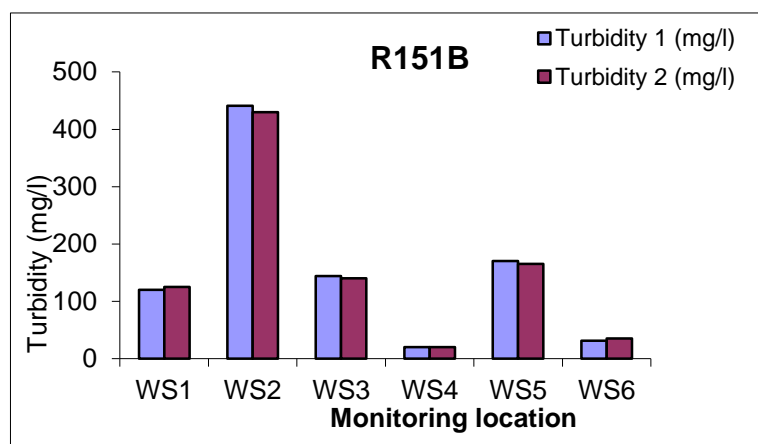
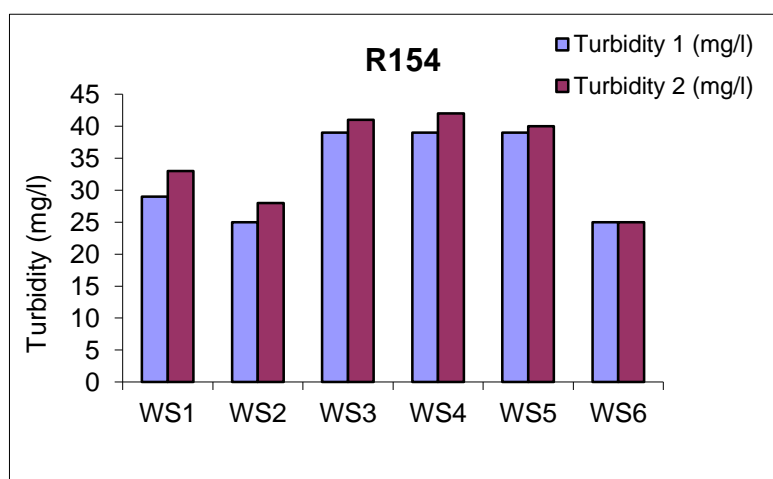
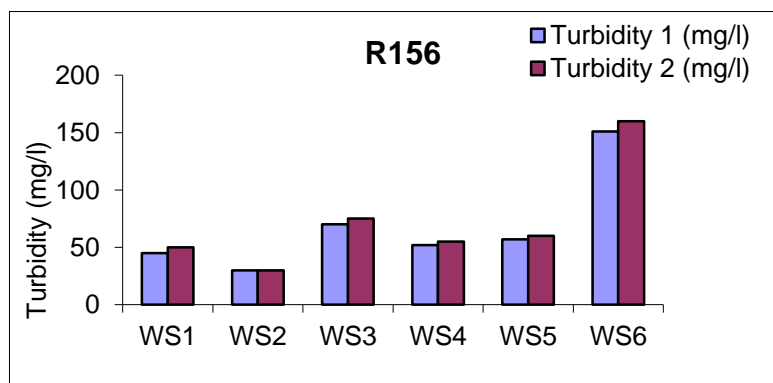


Figure VI-2.3.2. Actual Turbidity values of water in Lao Cai

In Lao Cai province, Turbidity values are relatively high, the highest is 441 mg/l, the values obtained at R151-WS3, R151-WS4, R151-WS5, R156-WS6, R151B-WS3, R151B-WS5 over 100 mg/l, especially R151B-WS2 are considerably high (Figure II- 2.3.2), at other positions, turbidity values range from 20 to 75 mg/l.

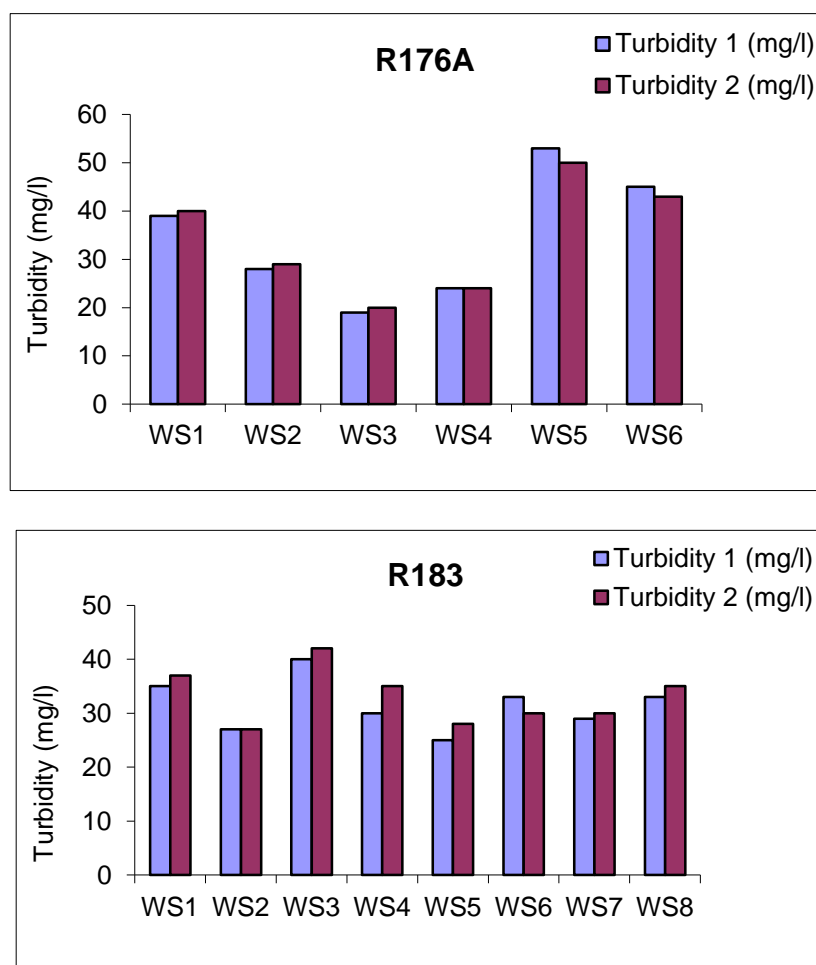
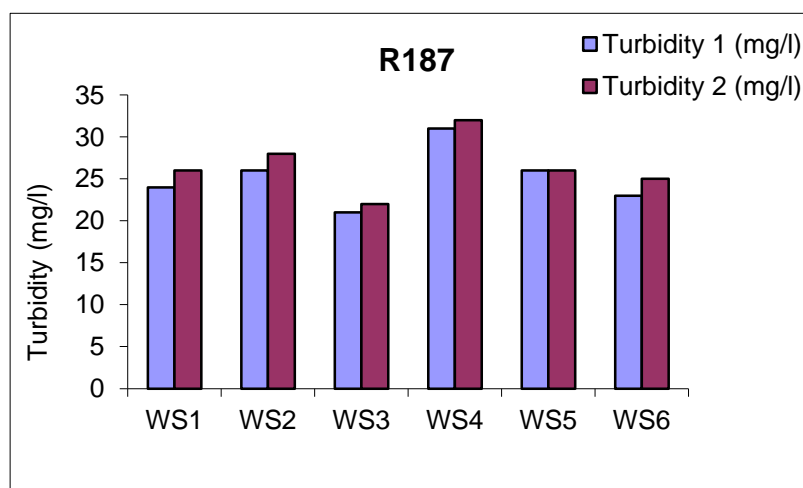


Figure II-2.3.3. Actual turbidity values of water in Ha Giang

Almost of the turbidity values of water at the monitoring positions along 176A and 183 are low, in range of 20-53 mg/l. (Figure II.-2.3.3).



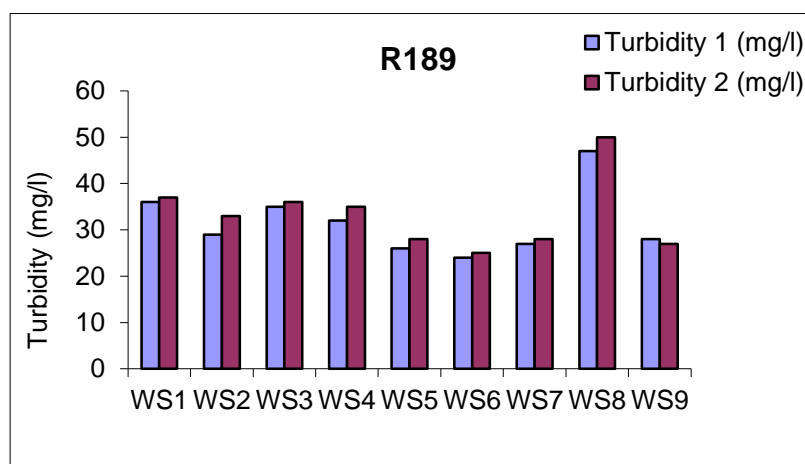


Figure II-2.3.4. Actual turbidity values of water in Tuyen Quang

The turbidity at the positions along R187, R189 in Tuyen Quang depicted in Figure II-2.3.4 are not high, ranging from 21 to 50 mg/l,

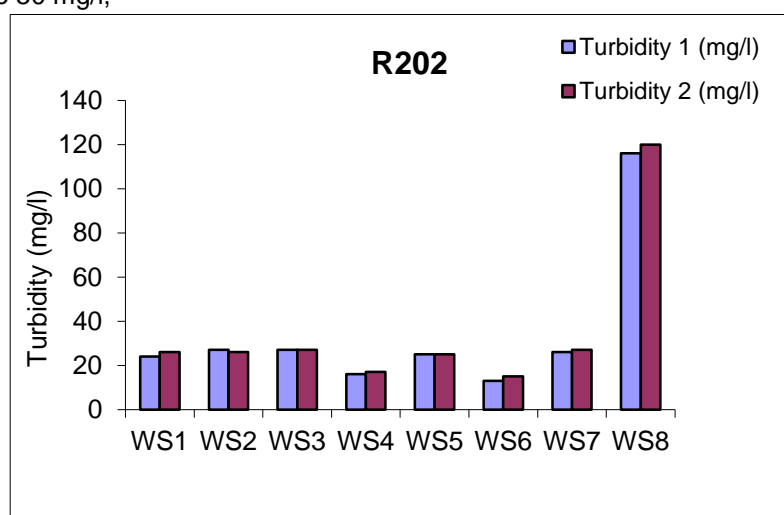


Figure II-2.3.5. Actual Turbidity values of water in Cao Bang

Turbidity values at the monitoring positions along R202 in Cao Bang are shown in Figure II- 2.3.5. The noticeable values 120 mg/l is obtained at R202-WS8. Almost values measured are not high in the range of 13-27 mg/l, the highest is obtained at R202-WS3 (Luong Sung village, Yen Lac commune, Bao Lac) and the lowest is obtained at R202-WS6 (Nam Lin village, Dinh Phung commune, Bao Lac).

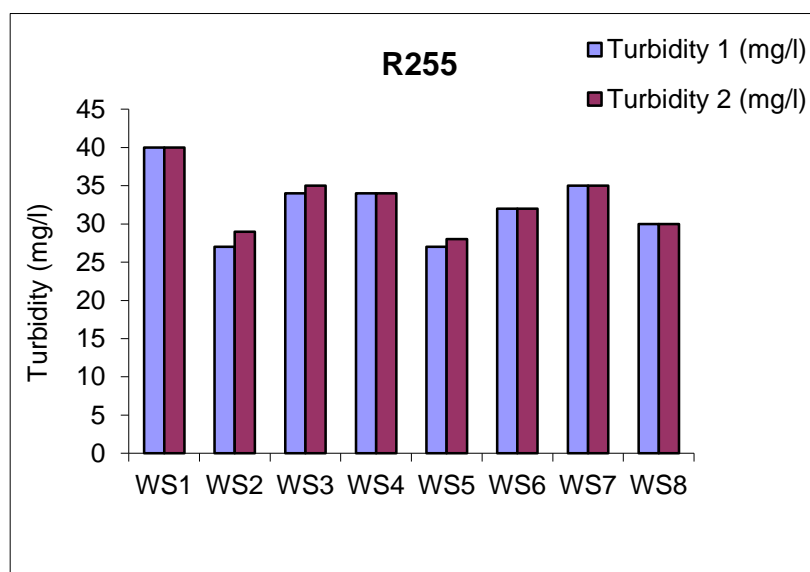


Figure II-2.3.6. Actual Turbidity values of water in Bac Kan

Turbidity values at the monitoring positions along R255 in Bac Kan are demonstrated on the graph in Figure II- 2.3.6. Turbidity concentrations fluctuate in the range from 27 to 40 mg/l.

II.2.4. TSS

The Figures from Figure II- 2.4.1 to Figure II- 2.4.2 represent TSS values of each position along each specific road of 6 areas: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 3/2015. Upstream(1) and downstream(2) TSS value at some monitoring positions have inconsiderable difference.

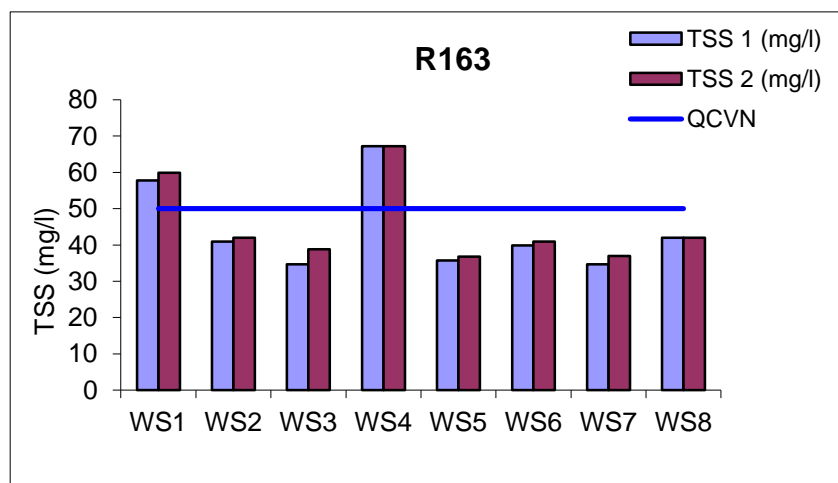
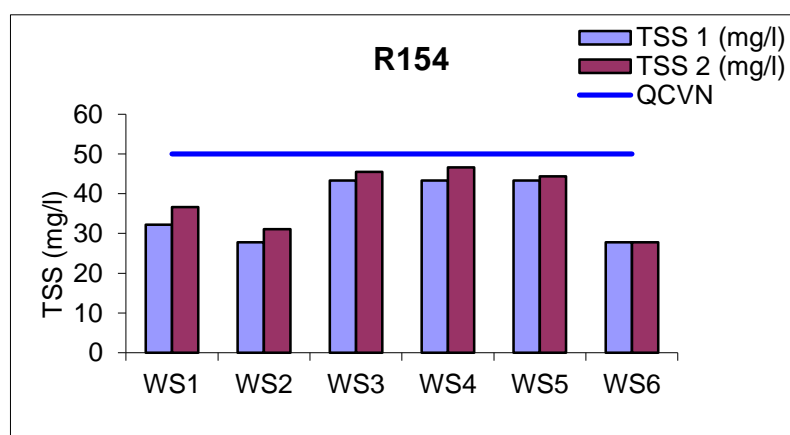
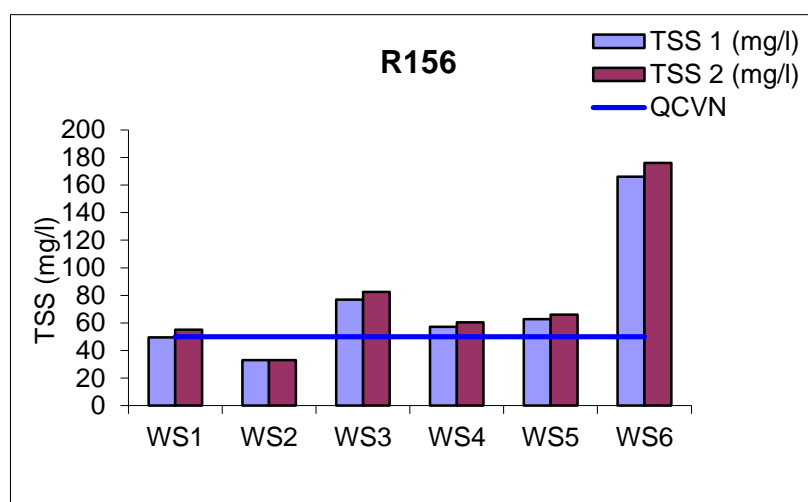
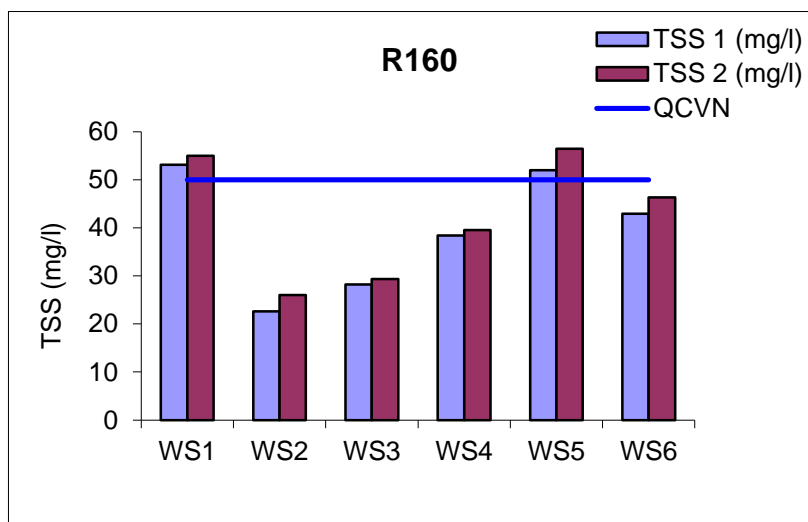


Figure II-2.4.1. Actual TSS values of water in Yen Bai

At the monitoring positions along R163 in Yen Bai province, excepting the TSS concentration at R163-WS1, R163-WS2 over the permissible limitation, almost values range from 35 mg/l to 42 mg/l (Figure II- 2.4.1) and meet the standard of column B1 (QCVN 08:2008/BTNMT).



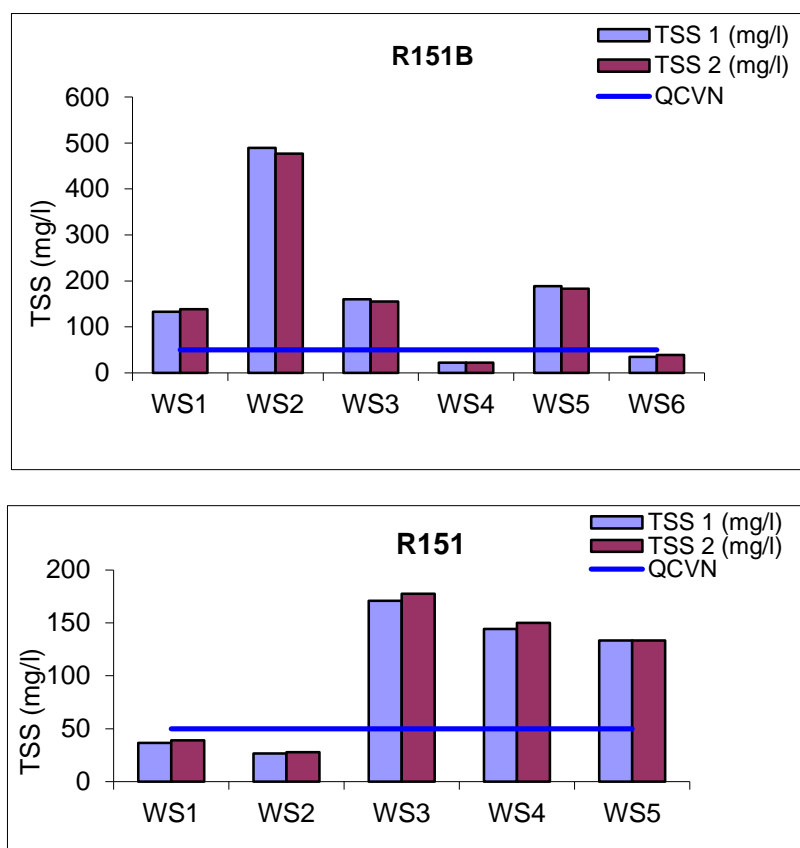
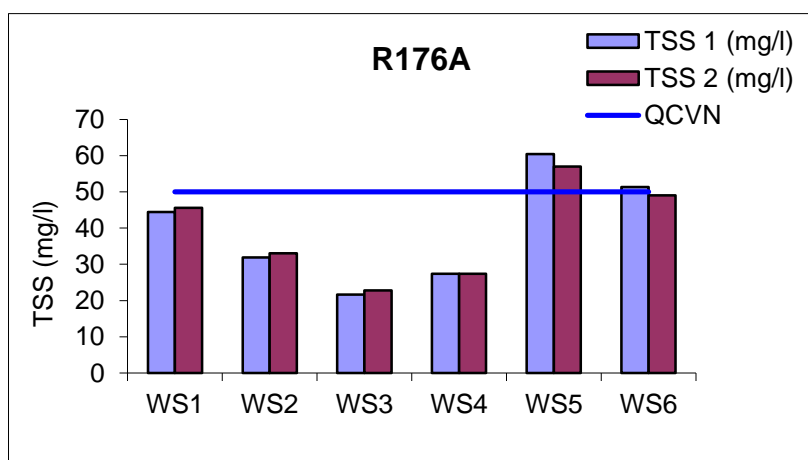


Figure II-2.4.2. Actual TSS values of water in Lao Cai

Based on Figure II-2.4.2, it can be found that in Lao Cai province, TSS values at monitoring positions at R154 are below the permissible limitation of QCVN 08:2008/BTNMT (column B1), ranging from 27,7 mg/l to 46,6 mg/l. At the other routes, TSS values are relatively high. The TSS concentrations at R156-WS6, R151-WS3 are over 3 times as high as permissible limitation. Particularly, at the position R151B-WS2, TSS concentrations obtained is 489,5 mg/l, nearly 10 times as high as permissible limitation. The other positions at which TSS values over permissible limitation include: vị trí R156-WS1, R156-WS3, R156-WS4, R156-WS5, R160-WS1, R160-WS5, R151B-WS1, R151B-WS3, R151B-WS5, R151-WS3, R151-WS4, R151-WS5.



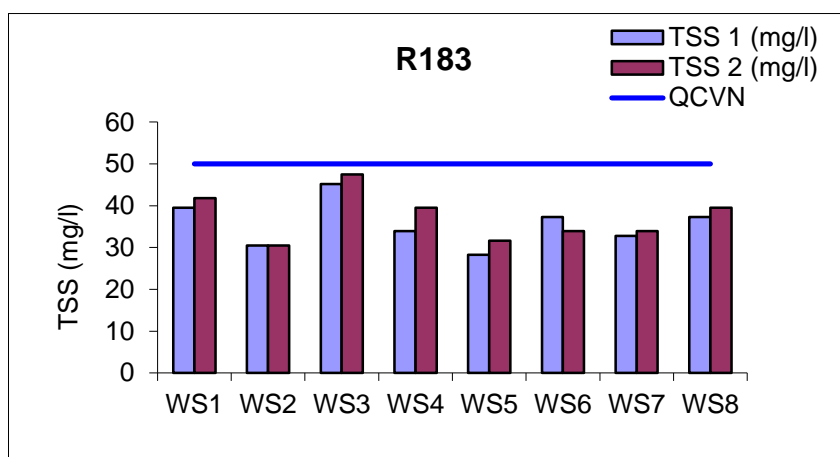


Figure II-2.4.3. Actual TSS values of water in Ha Giang

TSS concentration at R183 are relative high in the range of 28,3 -47,4 mg/l, not exceeding 50 mg/l- the permissible limitation of B1 column (TCVN 08:2008/BTNMT). TSS values at the monitoring positions along R176A are higher at 2 monitoring positions R176A-WS5, R176A-WS6, turbidity values are higher the permissible limitation of QCVN (Figure II-2.4.3).

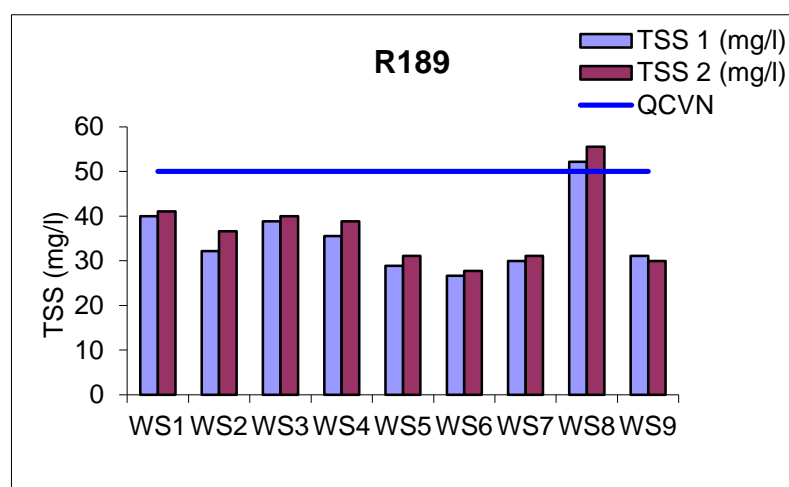
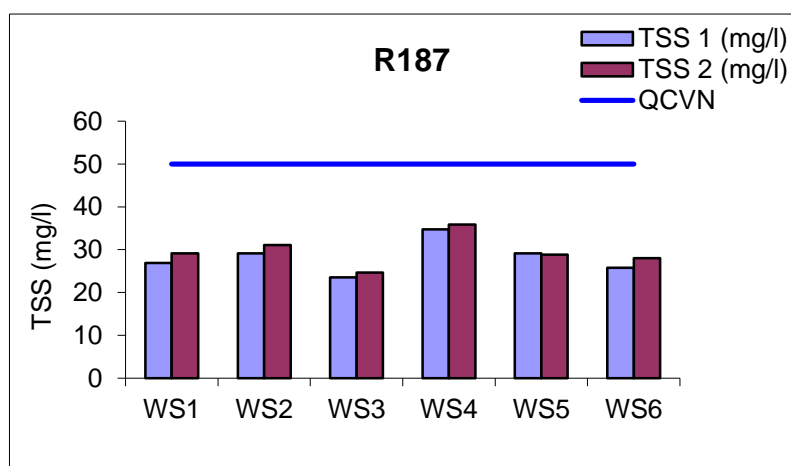


Figure II-2.4.4. Actual TSS values of water in Tuyen Quang

Figure II- 4.4.4 presents TSS values of water of the locations along two roads R187 and R189 in Tuyen Quang. The remarkable TSS value found at R189-WS8 (Tan Thinh village, Yen Thuan, Ham Yen) is higher than the value of the stipulated limitation. TSS values of water of the other positions are relatively high, from 14 to 42 mg/l meeting the standard of B1 column.

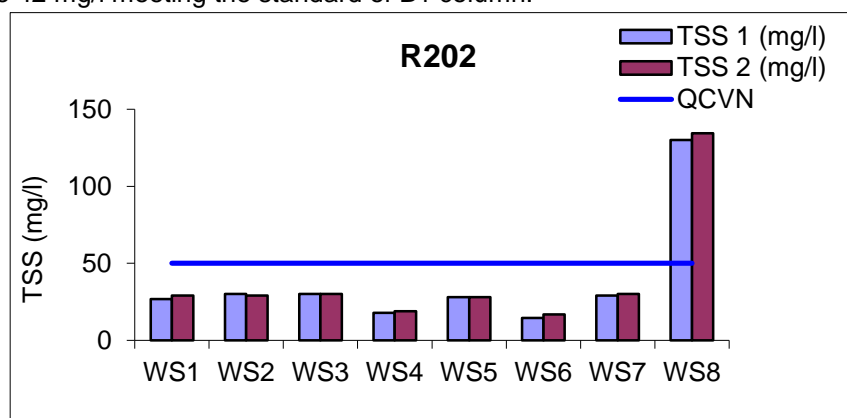


Figure II-2.4.5. Actual TSS values of water in Cao Bang

Figure II- 2.4.5 shows TSS values monitored at the positions along R202 in Cao Bang. The noticeable TSS value at R202-WS8 (Mo Din village, Huy Giap commune, Bao Lac) is nearly 3 times as high as the permissible limitation B1 of QCVN. The other TSS values are under the limitation of QCVN, the lowest is of 14,6 mg/l at R202- WS6 (Nam Lin village, Dinh Phung commune, Bao Lac).

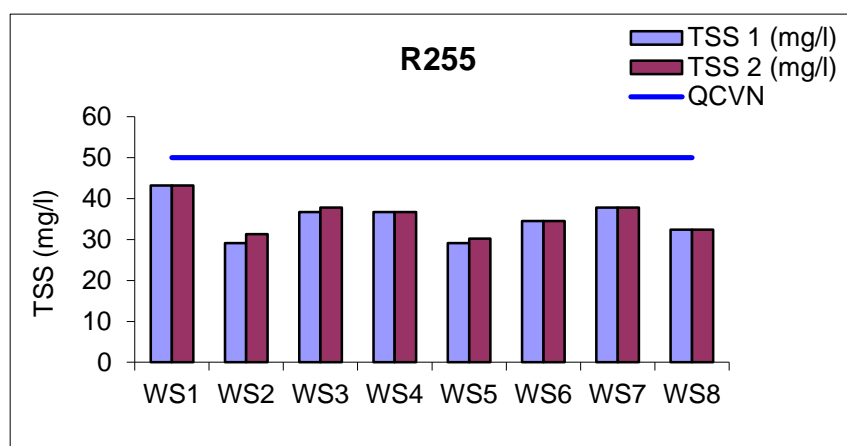


Figure VI-2.4.6. Actual TSS values of water in Bac Kan

TSS values monitored at the monitoring positions along R255 in Bac Kan are presented on the graph in Figure II- 2.4.6.

The low TSS concentrations are below QCCP and fluctuate in the range from 29,18 mg/l to 43,2 mg/l.

II.2.5. DO

The actual DO values of each position on each road of 6 areas: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 3/2015 are shown on the graphs from Figure II- 2.5. 1 to Figure II- 2.5.6, DO measurements upstream (1) and downstream (2) from the construction site at each monitoring location have no significant differences.

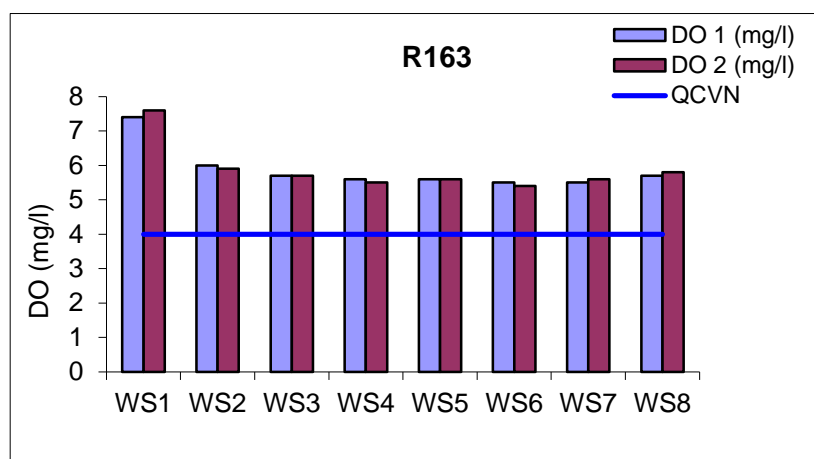
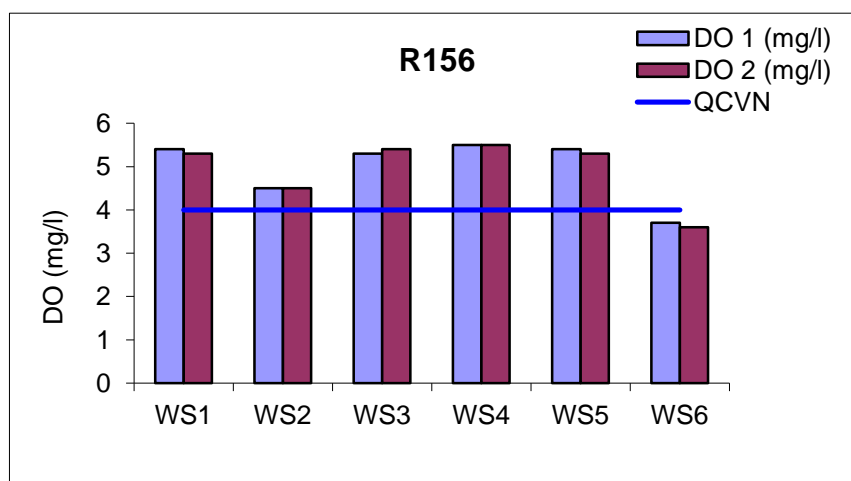
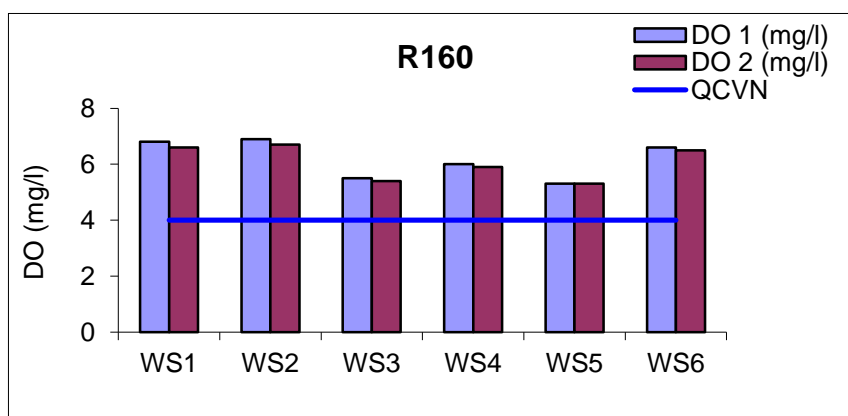


Figure II-2.5.1. Actual DO concentrations of water in Yen Bai

All DO measured values at the positions along R163 in Yen Bai meet the limits of QCVN 08:2008/BTNMT. Range of values is from 5.4 mg/l to 7.6 mg/l (Figure II- 2.5.1).



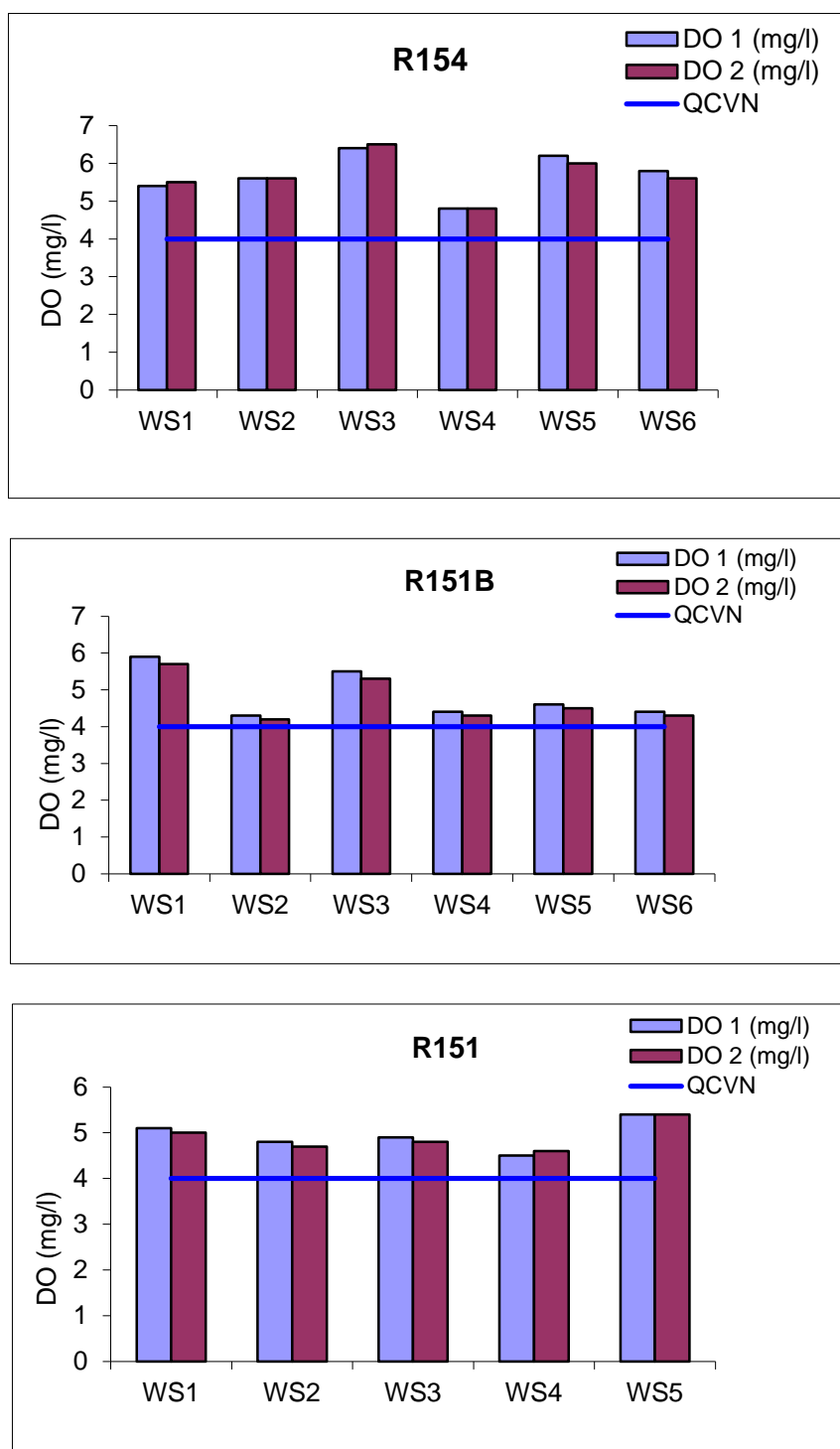


Figure II-2.5.2. Actual DO concentrations of water in Lao Cai

Figure II- 2.5.2 presents the graphs of the measured DO values at the monitoring positions along 5 roads R151, R151B, R154, R156 and R160 in Lao Cai area. Most of the values above the limitation 4 mg/l of column B1 of QCVN 08:2008/BTNMT. Particularly, DO concentrations at the positions R156-WS4 do not meet the QCVN 08:2008/BTNMT (B1), the value of 3,6 mg/l. is lower than the permissible limitation

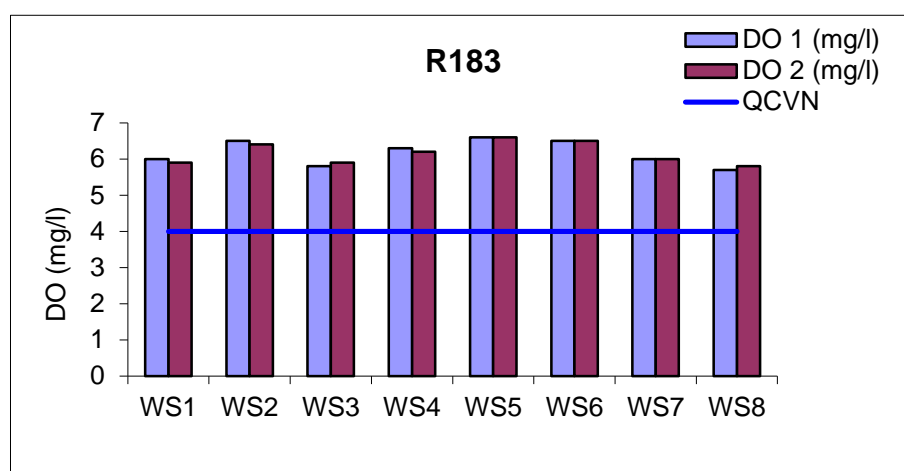
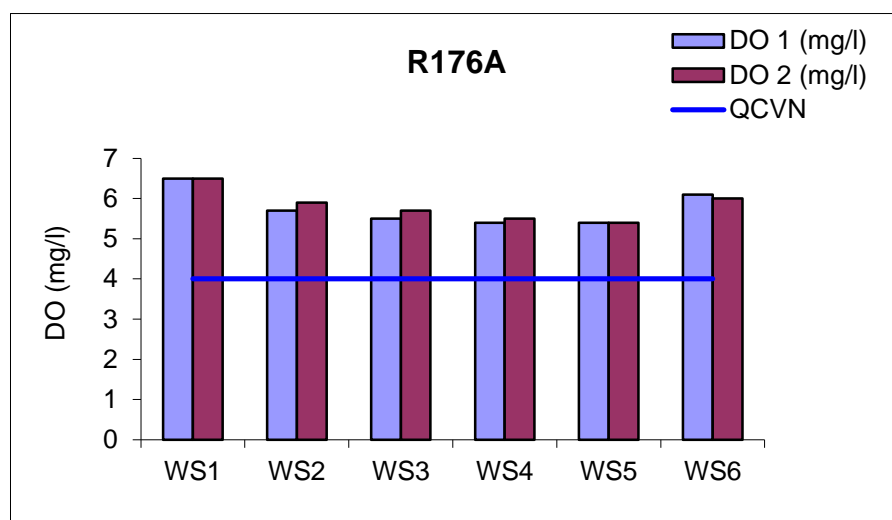
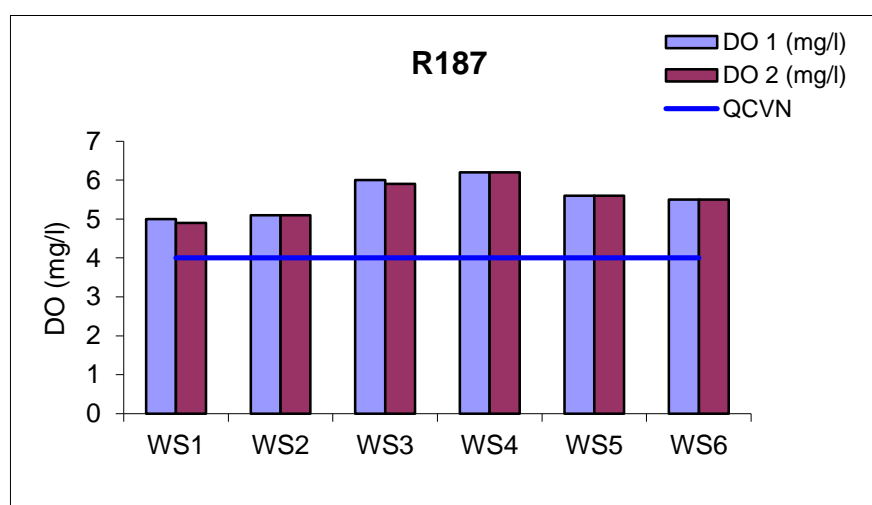
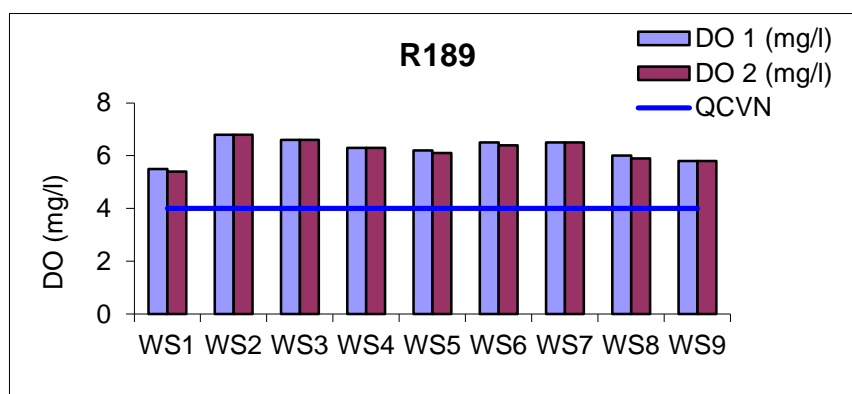


Figure II-2.5.3. Actual DO concentrations of water in Ha Giang

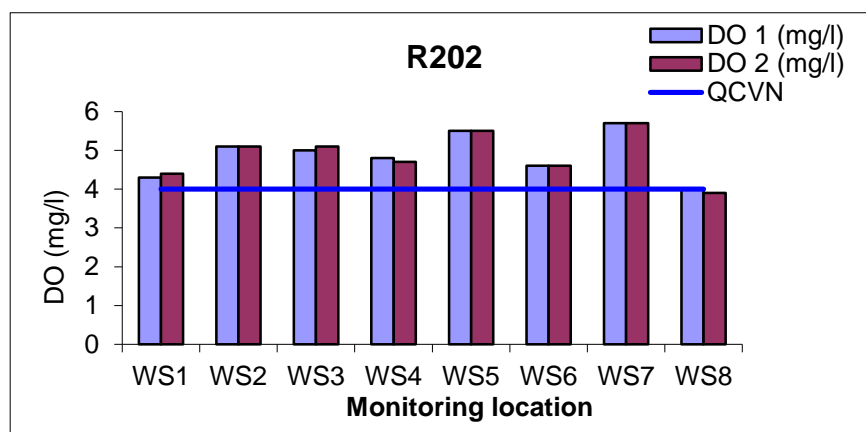
Figure II- 2.5.3 displays graphs of the DO results of the water bodies along the two roads R176A and R183 in Ha Giang. All values satisfy the permissible limit of QCVN 08:2008/BTNMT. The DO concentrations at R176A-WS4, R176A- WS5 are the lowest, 5.8 mg/l.





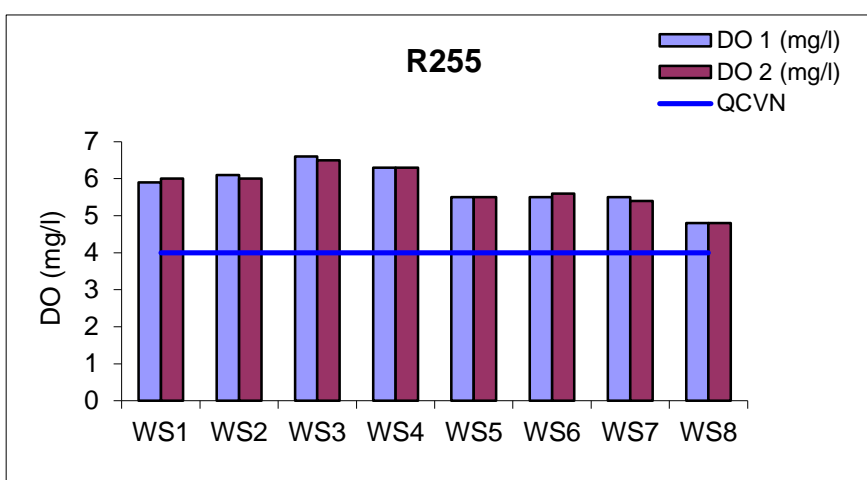
FigureII-2.5.4. Actual DO concentrations of water in Tuyen Quang

Figure II- 2.5.4 shows the DO concentrations at the monitoring positions along R187 and R189 in Tuyen Quang province. All values here meet well QCVN for DO. DO obtains at R187-WS1(Dai Thi village, Yen Lap, Chiem Hoa) is the lowest, 4.9 mg/l.



FigureII-2.5.5. Actual DO concentrations of water in Cao Bang

The obtained DO results at location along R202 in Cao Bang province are presented in Figure II- 2.5.5. At position R202- WS8 (Mo Din village, Huy Giap commune, Bao Lac) DO value observed is lower than the permissible standard, 3.9mg/l. Other DO values satisfy QCVN 08:2008/BTNMT.



FigureII-2.5.6. Actual DO concentrations of water in Bac Kan

DO results at the monitoring positions along R255 in Bac Kan province are shown on Figure II- 2.5.6. DO values at all positions are above the permissible limitation of QCVN 08:2008/BTNMT and range from 4.8 mg/l to 6.6 mg/l.

II.2.6. BOD5

Actual BOD5 values of each position along each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 3/2015 are shown on the graphs from Figure II- 2.6.1 to Figure II-2.6.6.

BOD5 values upstream (1) and downstream (2) from the construction site at each monitoring location have no significant differences.

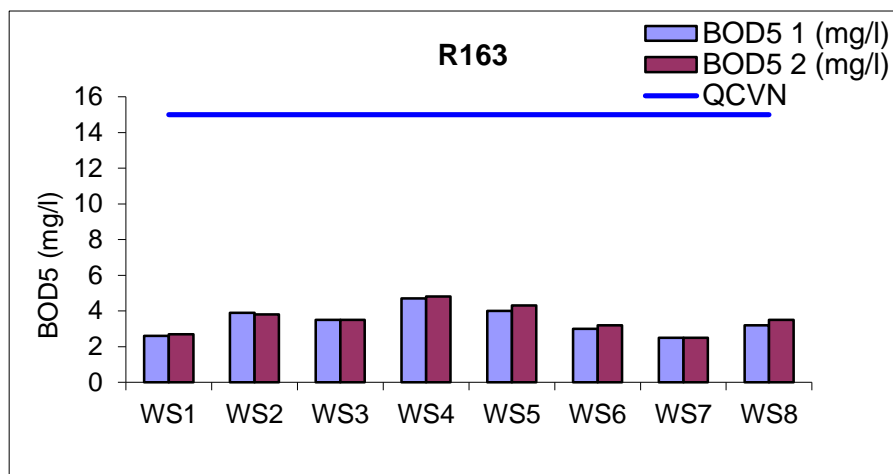
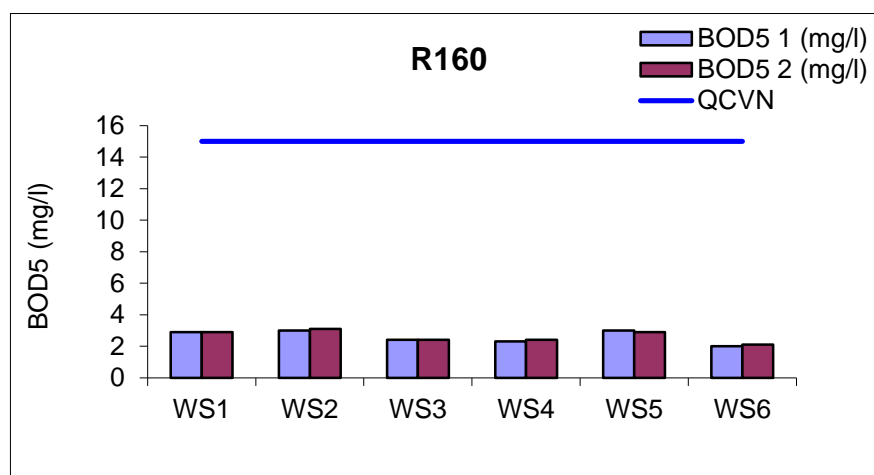
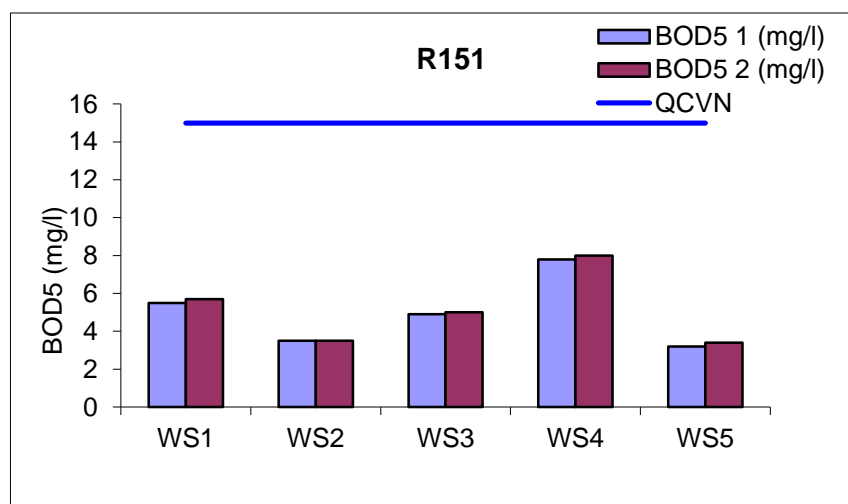
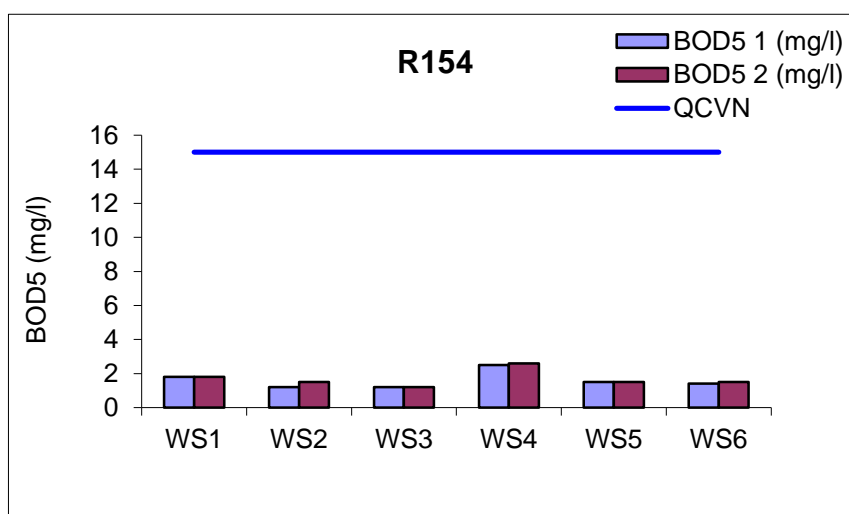
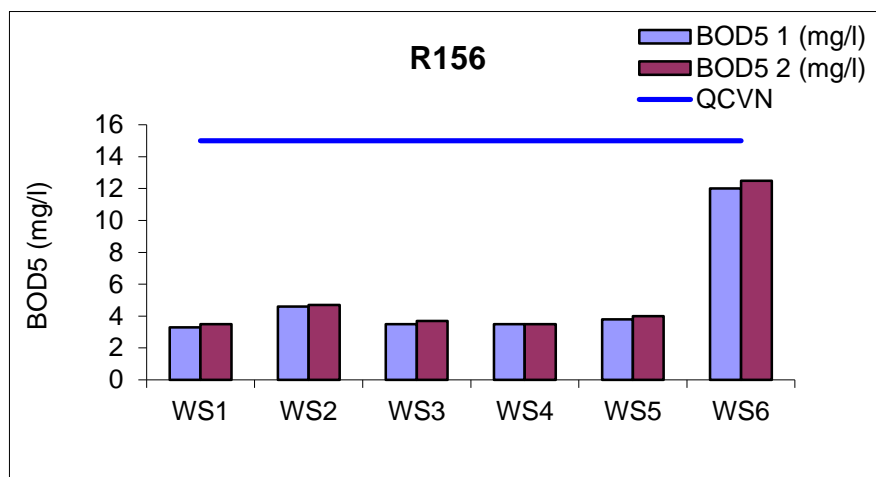


Figure II-2.6.1. BOD5 concentrations of water in Yen Bai

The BOD5 values of the water body along R163 ranging from 2.5 to 4.8 mg/l are lower than the limitation of QCVN 08:2008/BTNMT. It can be seen that the pollution level with respect to BOD5 is insignificant. (excepting BOD5 at R163-WS4 and R163-WS5-2, the values at the other positions meet the standard of column A1 (4mg/l) for domestic water supply.





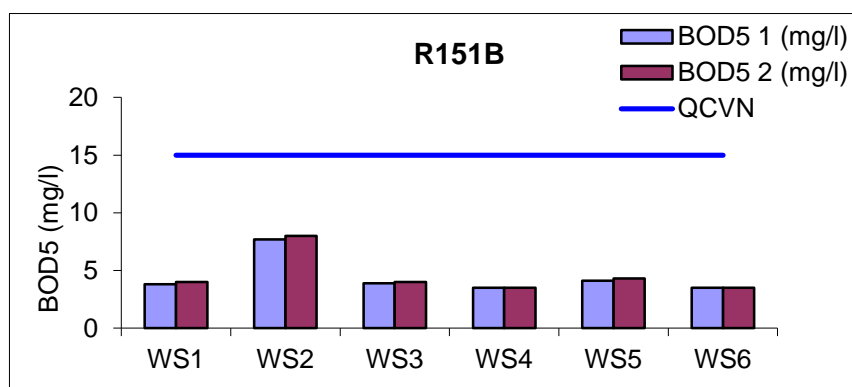


Figure II-2.6.2. BOD5 concentrations of water in Lao Cai

Figure II-2.6.2 displays the graphs of the measured BOD5 values at the positions along 5 roads R151, R151B, R154, R156 and R160 in Lao Cai province. None of the measured BOD5 values of the water bodies do not meet the standard of column B1 of QCVN 08:2008/BTNMT. Those at R160, R154 even meet the standard of column A1 (4mg/l). It is noticed that BOD5 values at R151-WS4, R151B-WS2, R156-WS6 are relative high, respectively 8 mg/l, 8 mg/l, 12,5 mg/l.

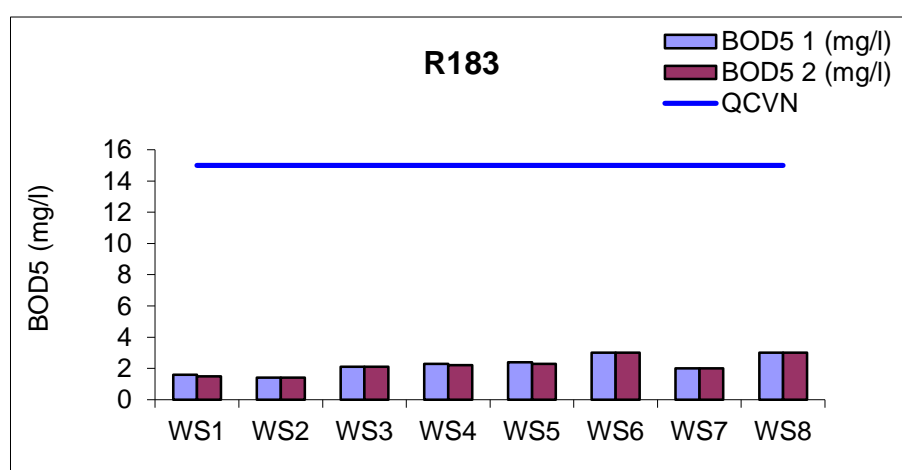
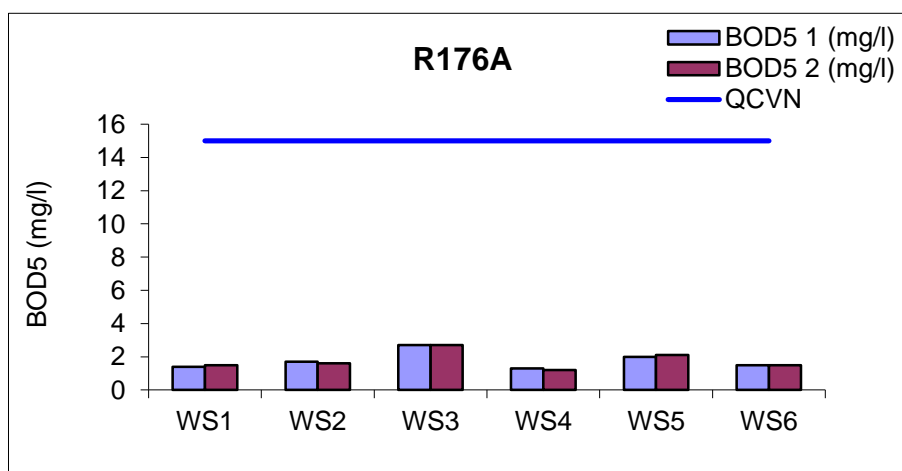


Figure II-2.6.3. BOD5 concentrations of water in Ha Giang

The actual BOD5 values at the monitoring positions along two roads in Ha Giang province are presented in Figure II- 2.6.3. The pollution level with respect to BOD5 is low, values range from 1.5 to 3.0 mg/l, lower than the standard of column A1 (QCVN 08:2008/BTNMT).

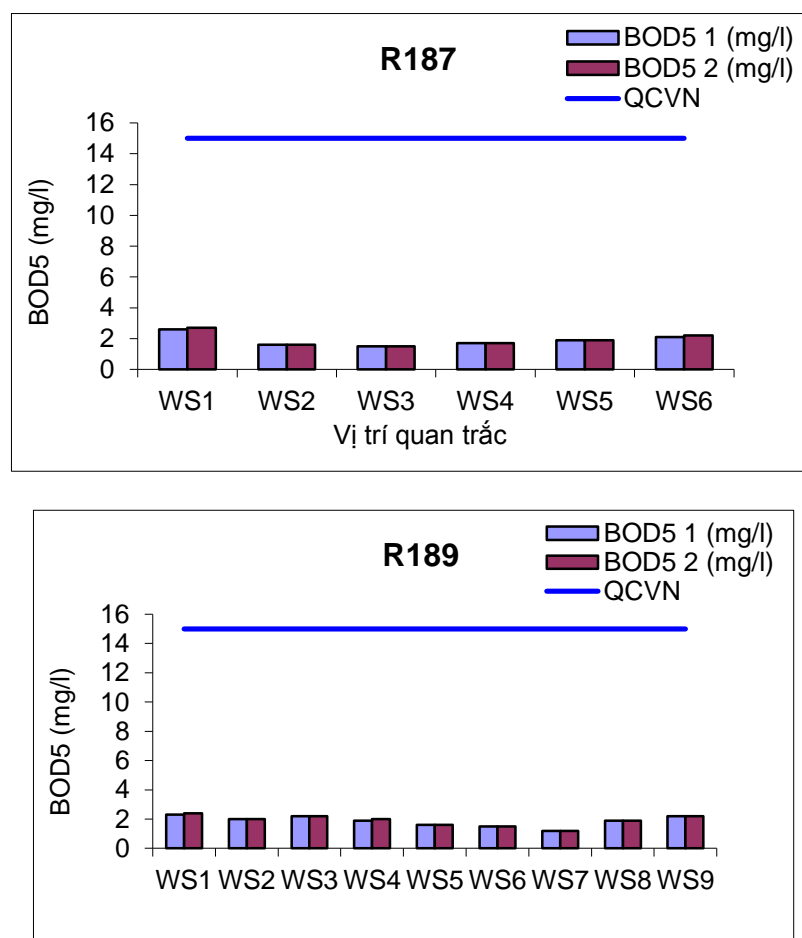


Figure II-2.6.4. BOD5 concentrations of water in Tuyen Quang

Project area in Tuyen Quang includes two roads R187 and R189. The BOD5 values are represented graphically in Figure II- 2.6.4. The pollution level with respect to BOD5 is low, actual values fluctuated from 1.2 to 2.7 mg/l, lower than the limit of column A1 (QCVN 08:2008/BTNMT).

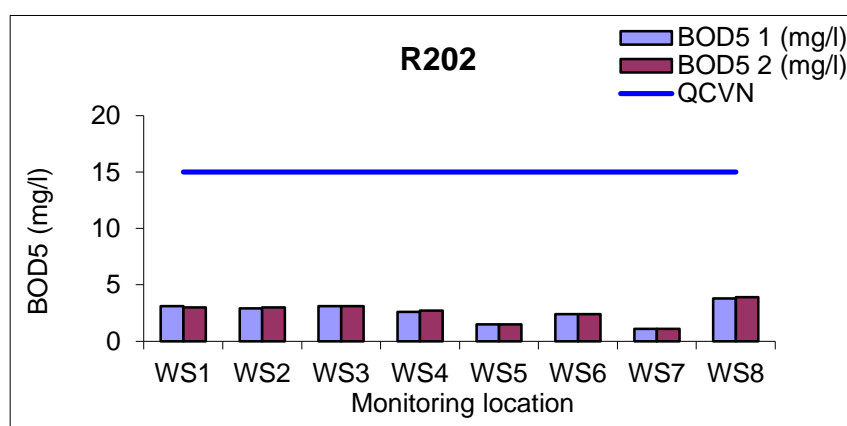
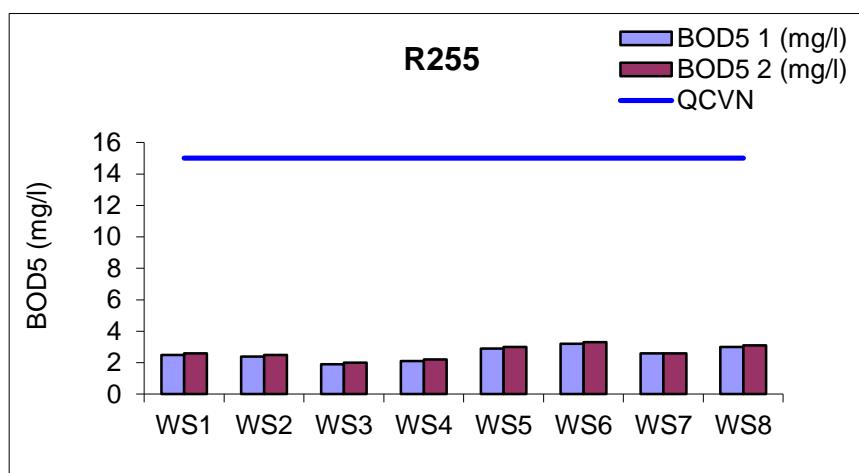


Figure II-2.6.5. BOD5 concentrations of water in Cao Bang

The BOD5 values at the positions along R202 in Cao Bang ranging from 1.1 mg/l to 3.9 mg/l, are under the limitation of column A1 of QCVN 08:2008/BTNMT. Based on Figure II-2.6.5. the lowest BOD5 is obtained at R202-WS7 (Lung Vai village, Dinh Phung commune, Bao Lac).



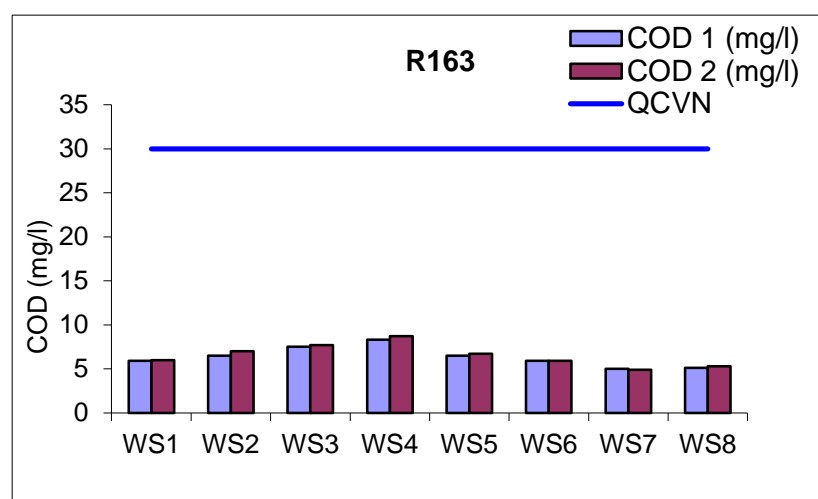
FigureII-2.6.6.BOD5 concentrations of water in Bac Kan

Figure II-2.6.6 shows that all BOD5 values monitored at the locations along R255 are below the limitation of A1 column (4mg/l).

II.2.7. COD

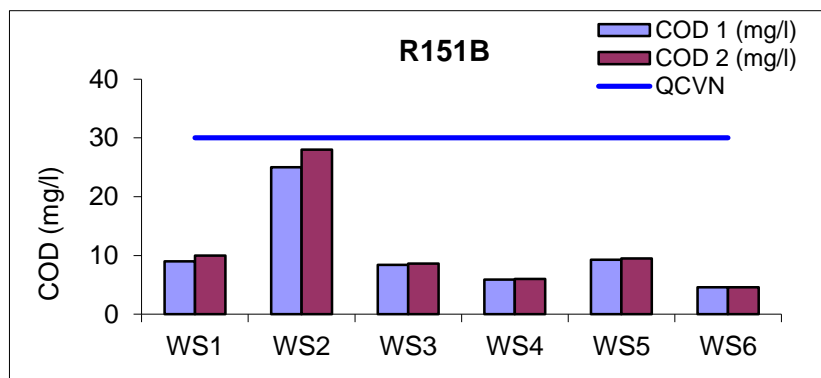
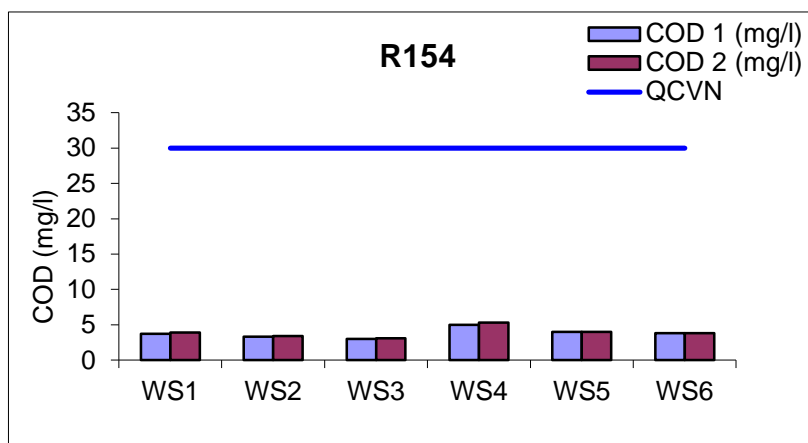
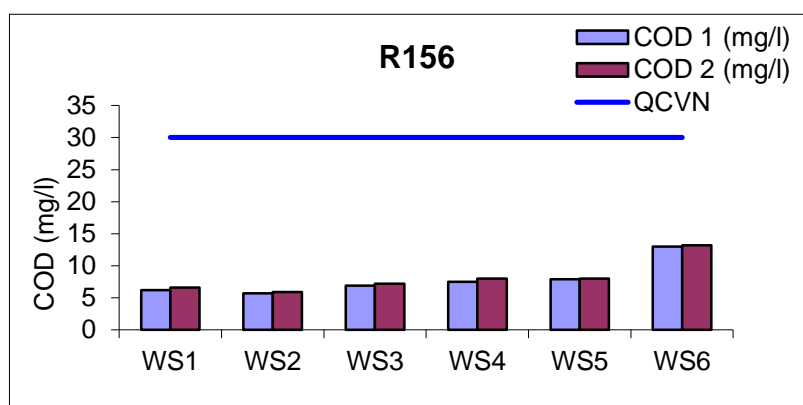
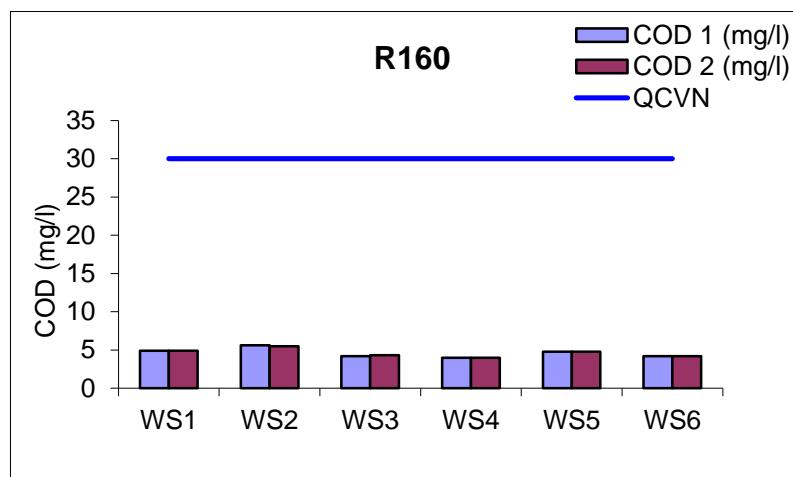
Actual COD values at each position on each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 3/2015 are shown on the graphs from Figure II-2.7.1 to Figure II-2.7.6

COD values upstream (1) and downstream (2) from the construction site at each monitoring location have no significant differences.



FigureII-2.7.1. COD concentrations of water in Yen Bai

The COD values at the monitoring positions along R163 ranging from 4.9 to 8.7 mg/l are lower than QCVN 08:2008/ BTNMT column A1 (10mg/l). It can be seen that pollution level respect to COD here are insignificant. Figure II-2.7.1.



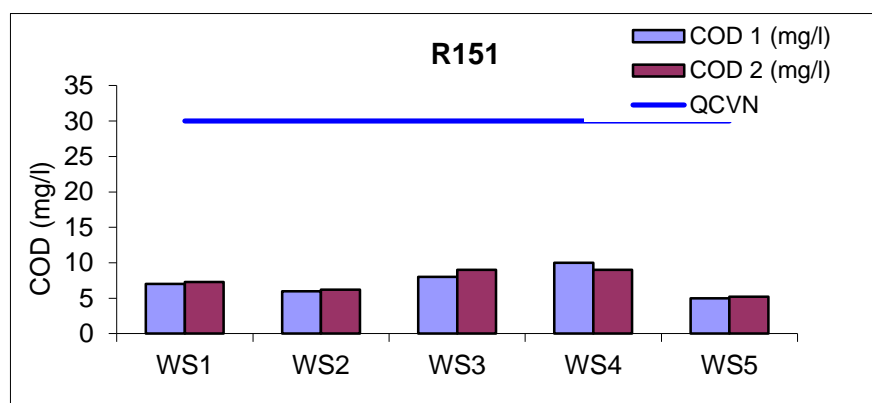


Figure II-2.7.2. COD concentrations of water in Lao Cai

Figure II-2.7.2. displays the graphs of the measured COD values at the monitoring position along 5 roads R151, R151B, R154, R156 and R160 in Lao Cai province. Almost actual COD values are below the limitation of column B1 of QCVN 08:2008/BTNMT, some even meet the limitation of column A1, including those obtained at R154, R160. . 3 positions at which COD values are relatively higher, are R156-WS6 (13,2mg/l), R151B- WS2 (28mg/l), R151-WS4 (10mg/l). .

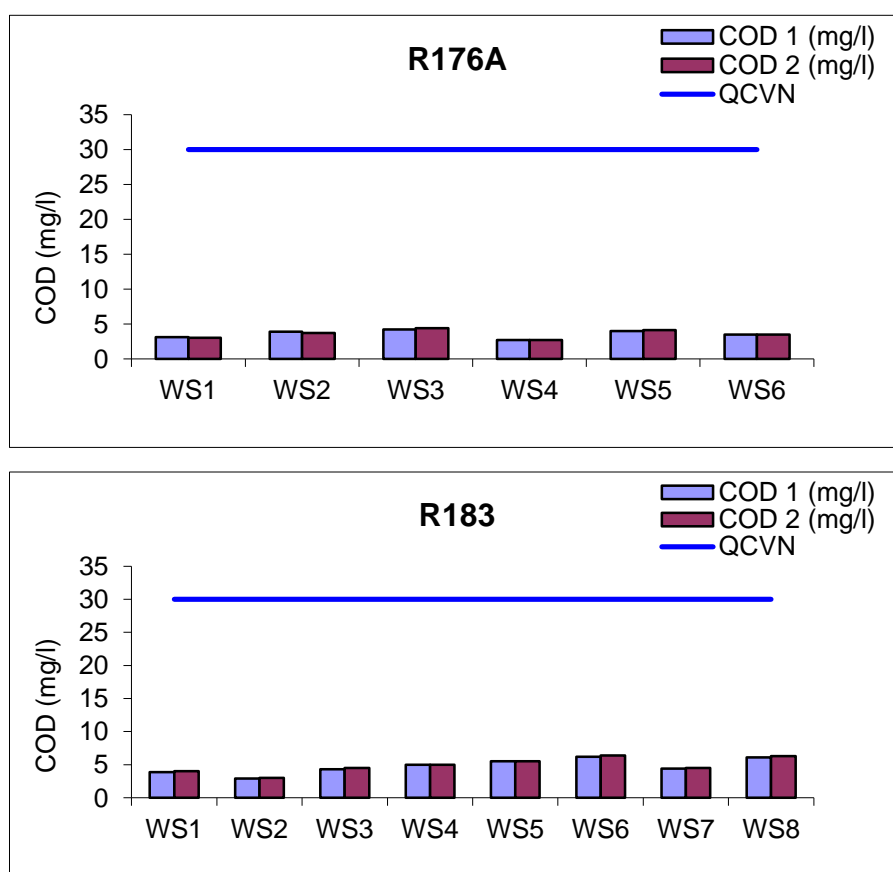


Figure II-2.7.3. COD concentrations of water in Ha Giang

The actual COD values at the positions along two roads in Ha Giang province are presented in Figure II.2.7.3. The pollution level with respect to COD is low, lower than permissible limit, the values range from 2.7 to 6.4 mg/l. The position at which the highest COD is obtained is R183- WS6.

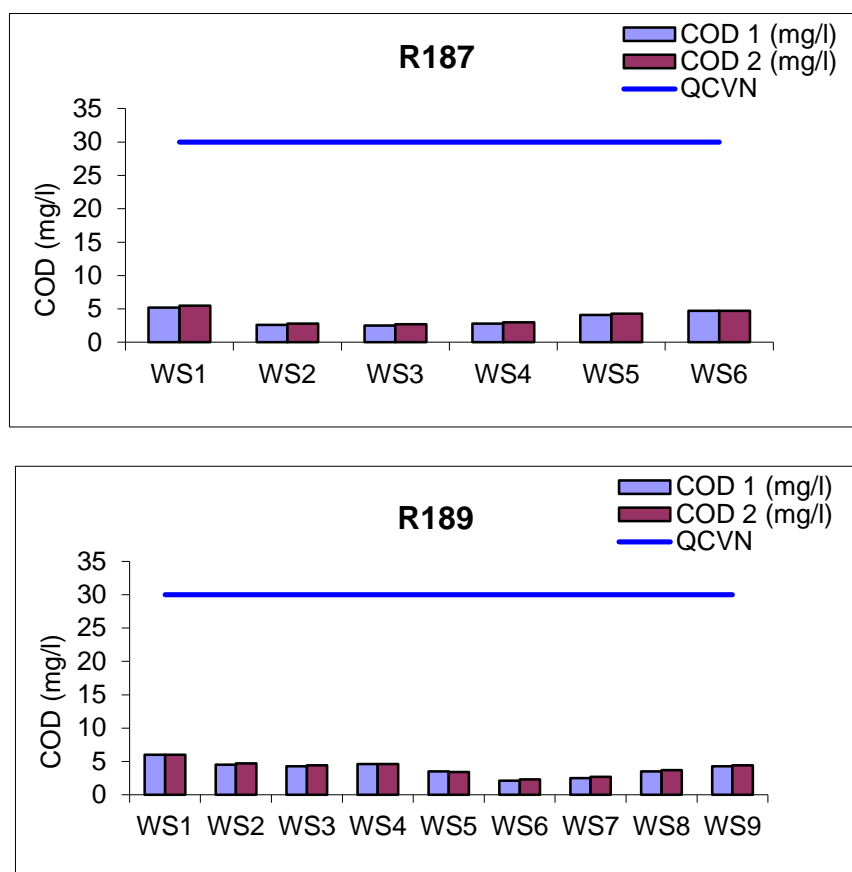


Figure II-2.7.4. COD concentrations of water in Tuyen Quang

Project area in Tuyen Quang includes two roads R187 and R189. The COD values are presented graphically in Figure II-2.7.4. It can be found that the pollution level respect to COD is low, actual values fluctuate from 2.1 to 6.0 mg/l, are much lower than QCVN 08:2008/BTNMT column B1, even meet limitation column A1.

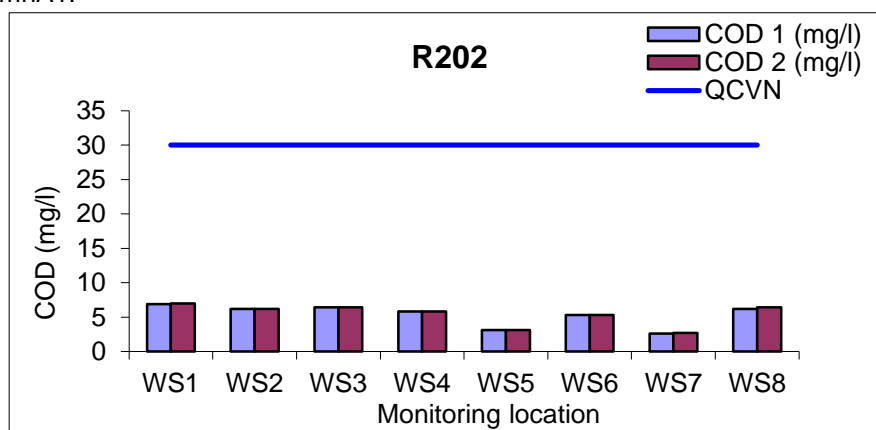


Figure II-2.7.5. COD concentrations of water in Cao Bang

The COD values at the positions along R202 in Cao Bang are much lower than the limitation value in column B1, the range of values from 2.6 to 7.0 mg/l (Figure II-2.7.5). The highest COD is obtained at R202- WS1.

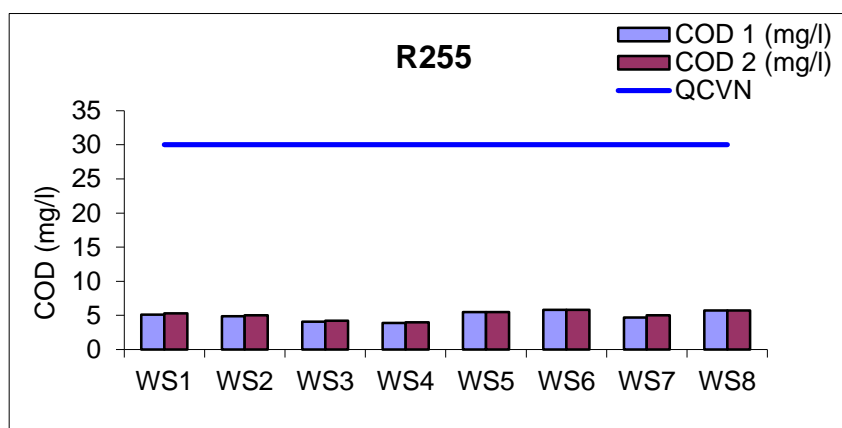


Figure II-2.7.6. COD concentrations of water in Bac Kan

Figure II -2.7.6 shows the COD values monitored at the monitoring positions along R255. It can be seen that most values fluctuated in the range from 3.9 to 5.8 mg/l are below the permissible limit (column A1), QCVN 08:2008/BTNMT.

II.2.8. Oil and grease

Observed grease value at each position on each specific road of 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan are shown on the graphs from Figure II-2.8.1 to Figure II-2.8.6 in 3/2015.

Grease concentrations measured upstream (1) and downstream (2) from the construction site at each monitoring location have no other significant differences.

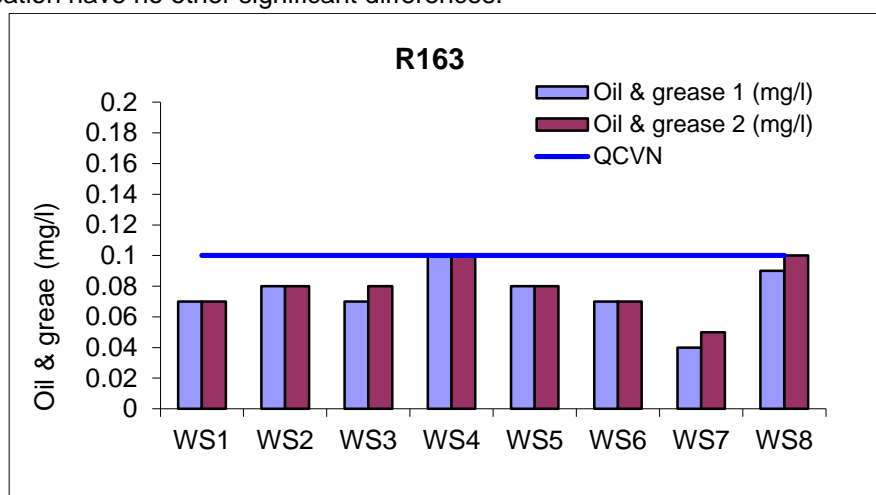
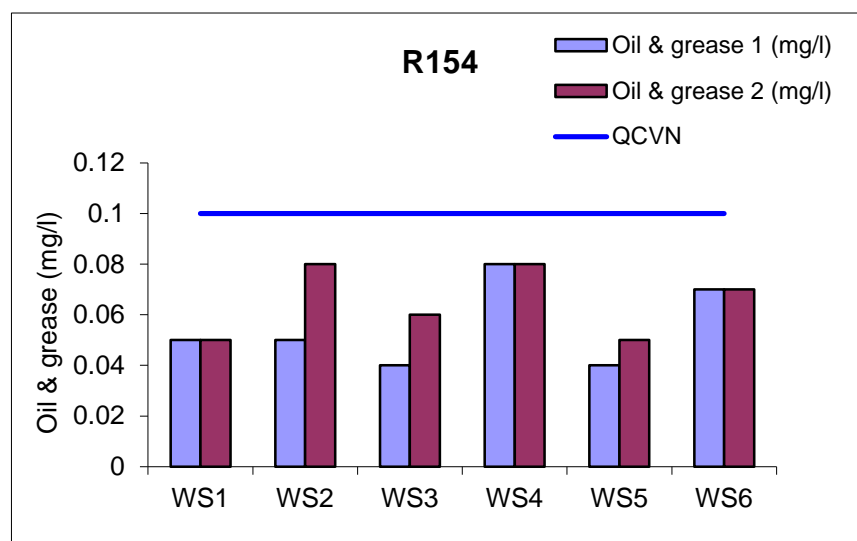
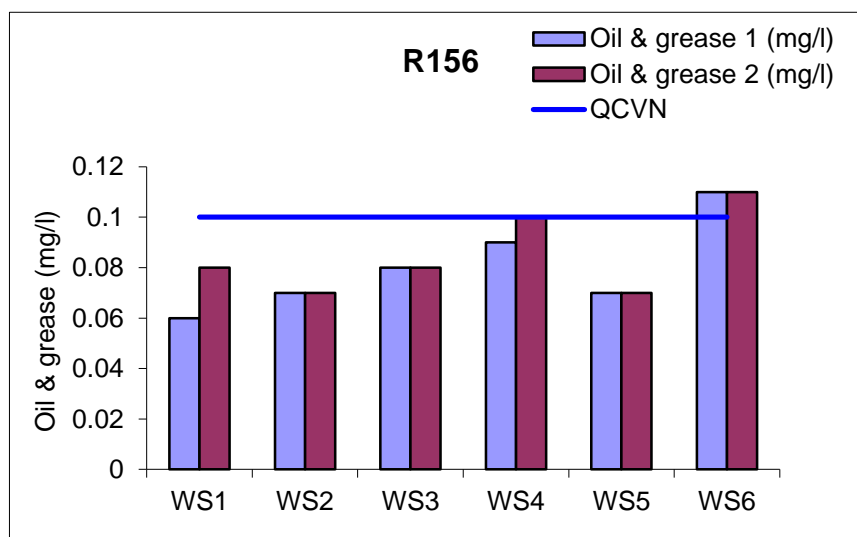
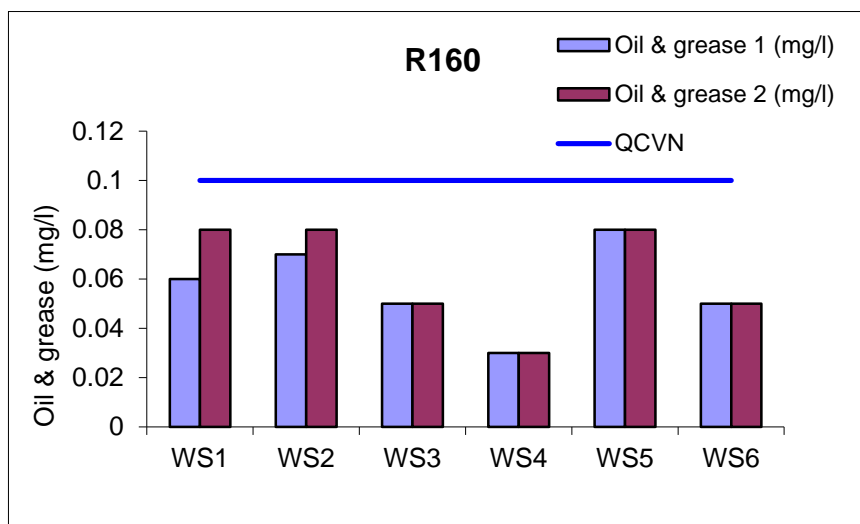


Figure II-2.8.1. Oil/grease concentrations of water in Yen Bai

There are 2 out of 8 positions at R163 (Yen Bai) at which oil/grease concentrations reach the limitation of QCVN 08:2008/BTNMT B1 column including: R163-WS4, R163-WS8 (Figure II-2.8.1). It can be seen that in comparison with oil/grease values monitored at the previous environmental monitoring steps, oil/grease concentrations are in decrease trend, especially those at R163-WS1 and R163-WS8.



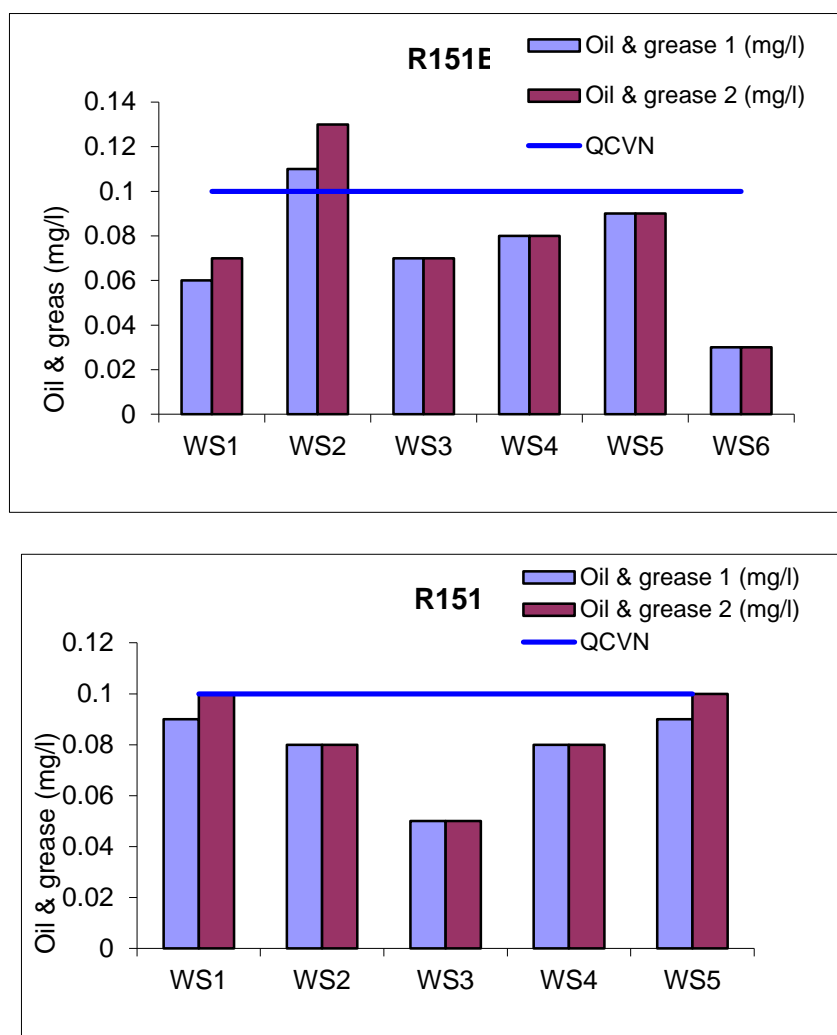


Figure II-2.8.2. Oil/grease concentrations of water in Lao Cai

Figure II-2.8.2 is the graph presenting the oil/grease values measured at the monitoring positions at 5 roads R151, R151B, R154, R156 and R160 in Lao Cai province. Most of the values measured are below permissible limitation.

- On the road R151, there are 2 positions at which oil/grease concentration reach the limitation of QCVN 08:2008/BTNMT including R151-WS1-2 (Ba Xa bridge, Tan An), R151-WS5-2 (Khe Sang village, Tan An, Van Ban)
- The oil/grease concentrations obtained at R151B- WS2 (Lu village, Vo Lao commune, Van Ban) exceed the permissible limitation.
- On the road R156, concentration value at R156-WS6 (Phoi village, Ta Phoi commune) is over the limitation, that of position R156-WS4 (Da Dinh village, Ta Phoi village) reach the limitation.

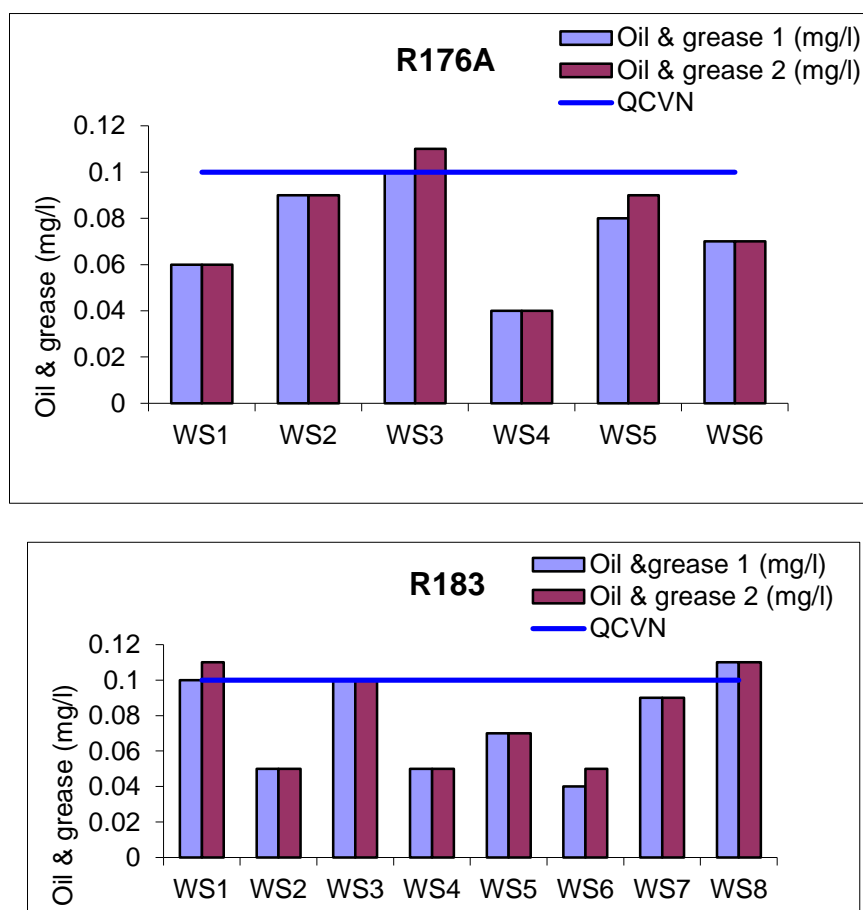
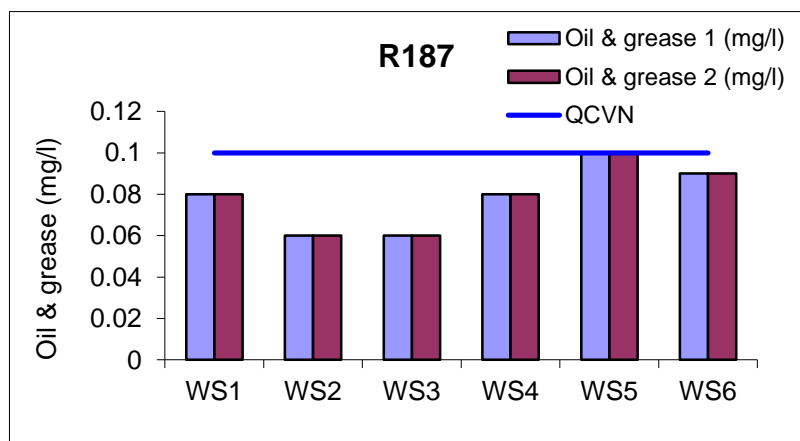


Figure II-2.8.3. Oil/grease concentrations of water in Ha Giang

The oil/grease concentrations measured at the positions along two roads R176A and R183 in Ha Giang province are shown on graphs in Figure II-2.8.3.. In this area, there are monitoring positions at which oil/grease contents are over the limitation of QCVN including.

- R176A- WS3-2 (Km 44+600, Cap Tay village; over the QC in the baseline stage) and, R183- WS1-2 (Vinh Tuy, Bac Quang), R183-WS8 (Xuân Chang village, Xuân Giang, Xuân Bình)

The oil/grease values equalling the limitation are obtained at: R176A - WS3-1 (Lung Ho commune, Yen Minh), R183-WS3 (Bung village, Dong Thanh, Bac Quang), R183- WS1-1 (Vinh Tuy, Bac Quang).



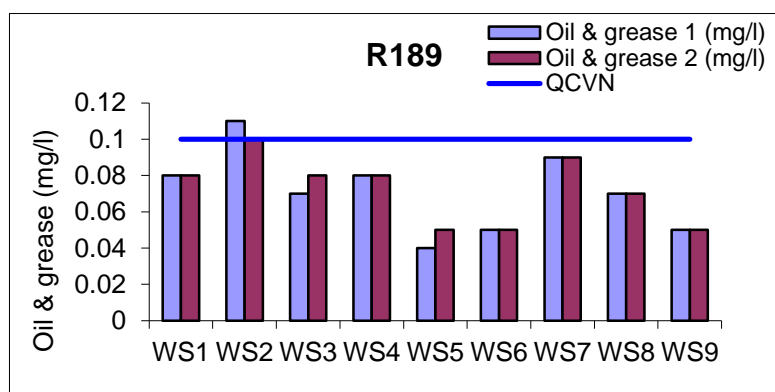


Figure II-2.8.4. Oil/grease concentrations of water in Tuyen Quang

The oil/grease values at the monitoring position along R187 and R189 (Tuyen Quang province) are presented graphically in Figure II-2.8.4.. The only position at which the measured value exceeds the limitation of QCVN is R189-WS2-1 (Village 3, Viet Thanh, Tan Thanh, Ham Yen). In addition the value obtained at R189-WS2-2 (village 3 Viet Thanh, Tan Thanh, Ham Yen) and at R189-WS5 (Phu Loan village, Phu Luu commune, Ham Yen) reach the limitation of QCVN.

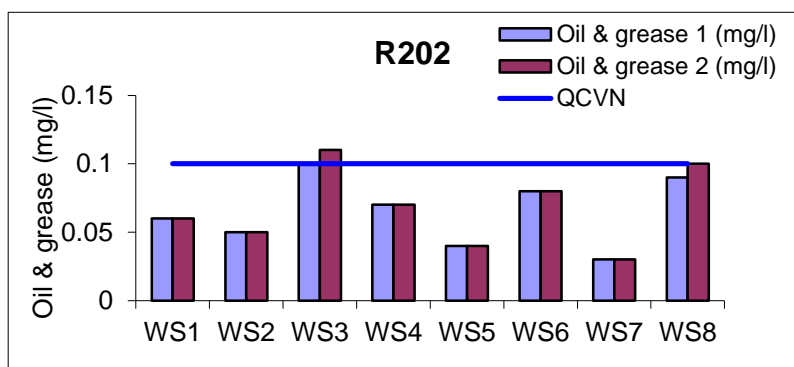


Figure II-2.8.5. Oil/grease concentrations of water in Cao Bang

As shown In Figure II-2.8.5, 1 positions at which oil/grease concentrations are over the limitation of column B1 of QCVN are R202-WS-23 (Luong Sung village, Yen Lac commune, Nguyen Binh), the value at R202-WS8 (Km 26, Mo Din village, Huy Giap, Bao Lac). reaches the permissible limitation.

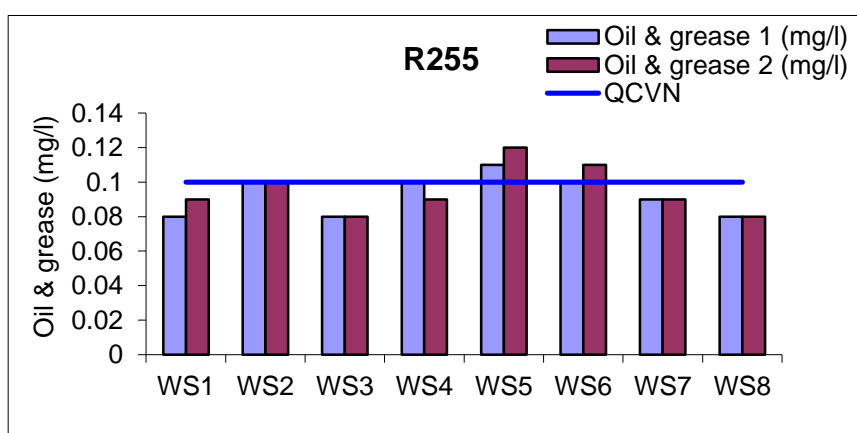


Figure II-2.8.6. Oil/grease concentrations of water in Bac Kan

Graph in Figure II-2.8.6 shows the natively high oil/grease values at R255. There are 2 out of 8 positions that measured values exceed the limitation of column B1 of QCVN08:2008/BTNMT are R255-

WS5 (Khuoi Diec stream, Na Khot village, Yen Thuong, Cho Don), R255-WS6 (Pho Cau village, Yen Thinh, Cho Don) . At the positions including R255-WS2 (Coc Thu village, Ngoc Phai, Cho Don), R255-WS4-1 (Ban Bay village, Yen Thuong, Cho Don), R255-WS6-1 (Pho Cau village, Yen Thinh, Cho Don), oil/grease concentrations reach the permitted standard.

II.2.9. Coliform

The graphs from Figure II-2.9.1 to Figure II-2.9.6 demonstrate coliform concentrations measured for each position at each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang and Bac Kan in 3/2015.

Coliform values upstream (1) and downstream (2) from the construction site at the monitoring positions have no significant difference.

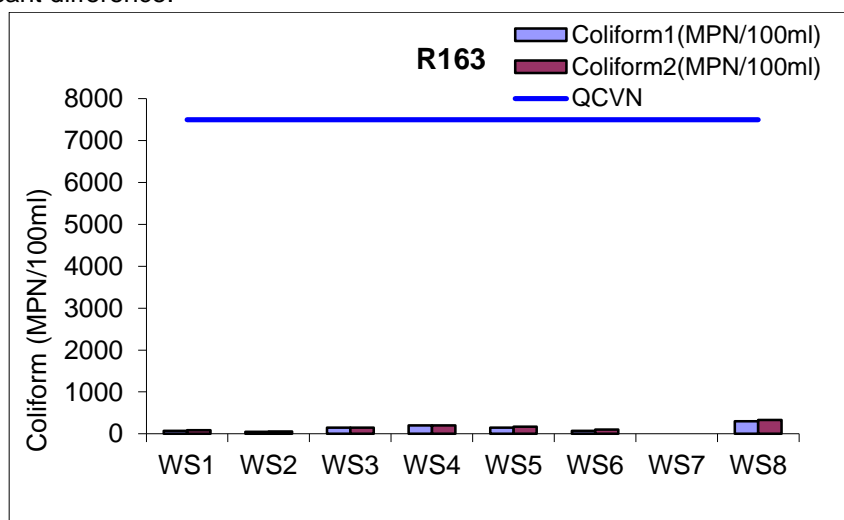
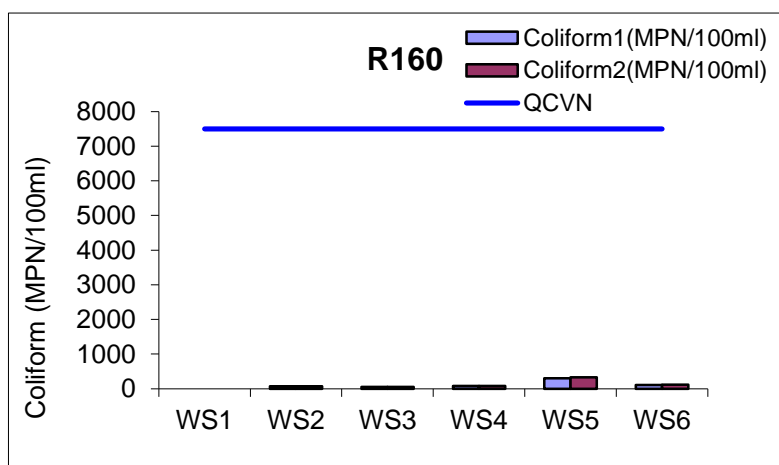


Figure II-2.9.1. Coliform concentrations of water in Yen Bai

Figure II-2.9.1 presents Coliform concentrations at R163 in Yen Bai province. It can be seen that Coliform contents here ranging from 0 MPN/100ml to 330 MPN/100ml are much lower than permissible limitation of not only column B1 but also that of column A1 of QCVN 08:2008/BTNMT. The lowest is obtained at R163-WS7 (Tran Quach, Mau Dong commune) and the highest is obtained at R163-WS8-2 (Ban Huong village, Dong Cuong commune, Van Yen).



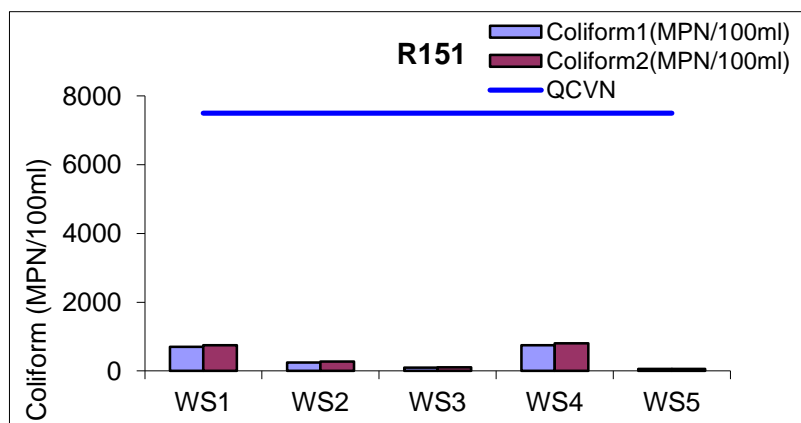
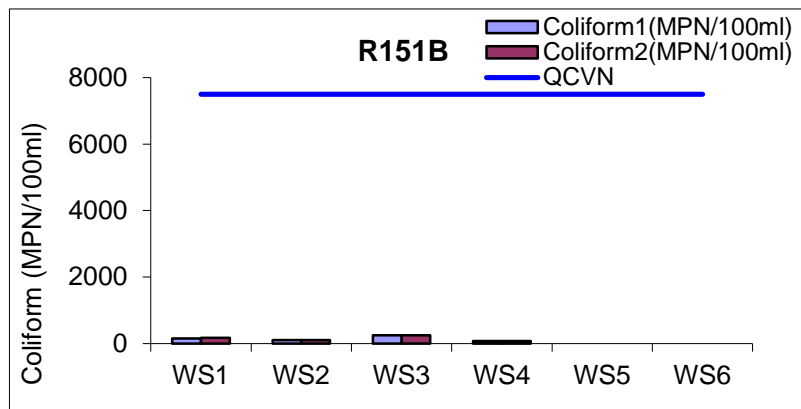
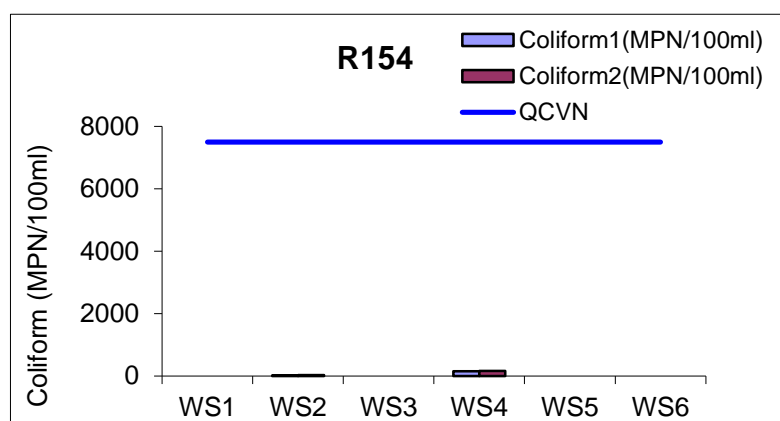
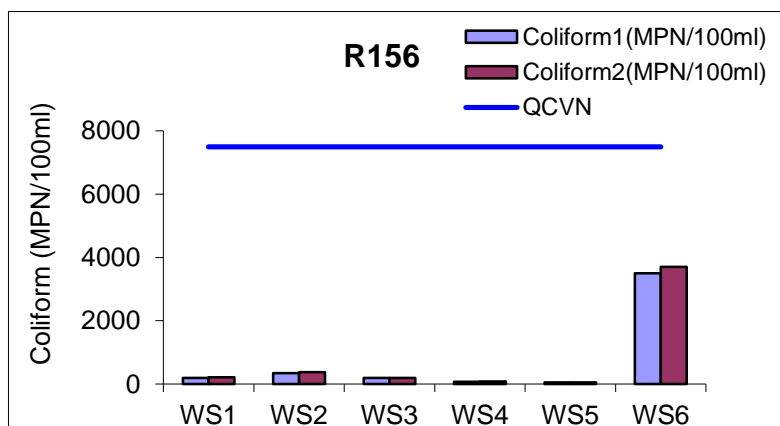


Figure II-2.9.2. Coliform concentrations of water in Lao Cai

Generally, coliform values at the monitoring positions along 5 roads 151, 151B, 154, 156, and 160 are low and in the decrease trend in comparison with those of the previous environmental monitoring step). Most of obtained values are satisfied the standard of column A1, even at R160-WS1, R154-WS1, R154-WS3, R154-WS5 and R154-WS6, no coliform is detected. At the position R156-WS6 (Phoi village, Ta Phoi village) Coliform concentrations are significantly higher than those at other positions along R156 and also higher than those at the positions of the other roads in the area, the respective values are 3500 MPN/100ml and 3700 MPN/100ml (Figure II-2.9.2). At R156-WS6, Coliform concentration are inherently high in the baseline monitoring stage.

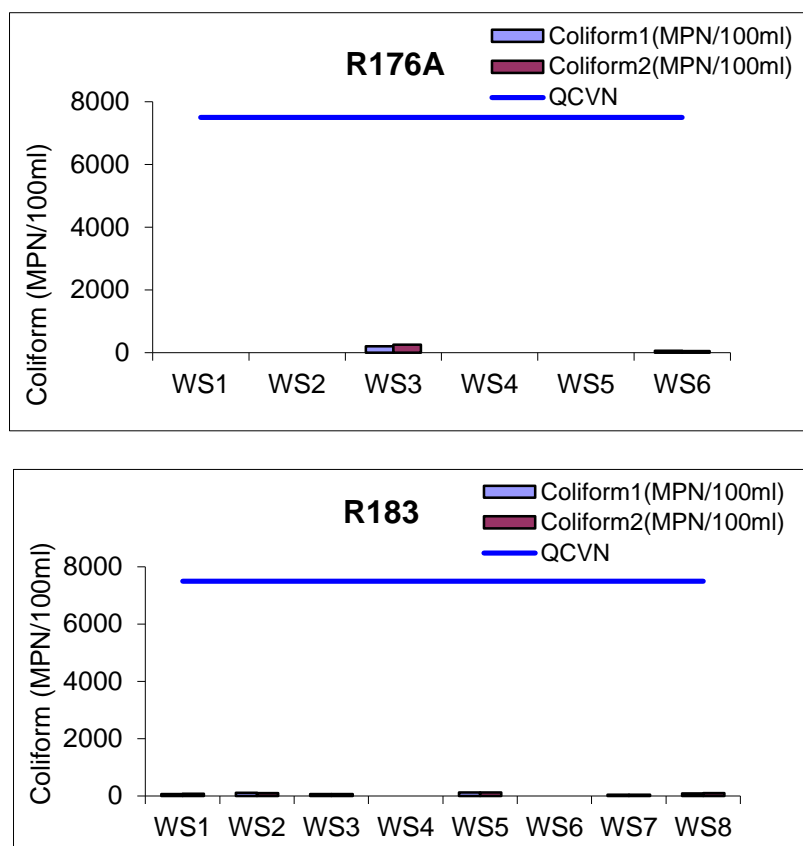
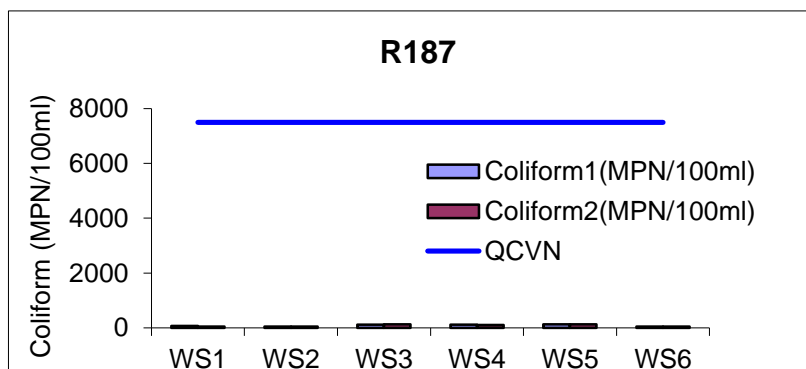


Figure II-2.9.3. Coliform concentrations of water in Ha Giang

Coliform results in Ha Giang province are presented in Figure II-2.9.3. Coliform concentrations are much lower than limit of column A1 of QCVN. At all the positions, Coliform concentrations decrease in comparison with those of the previous monitoring environmental step. At R176A-WS1, R176A-WS2, R176-WS4, R176-WS5 and R183-WS4, R183-WS6 no Coliform is detected.



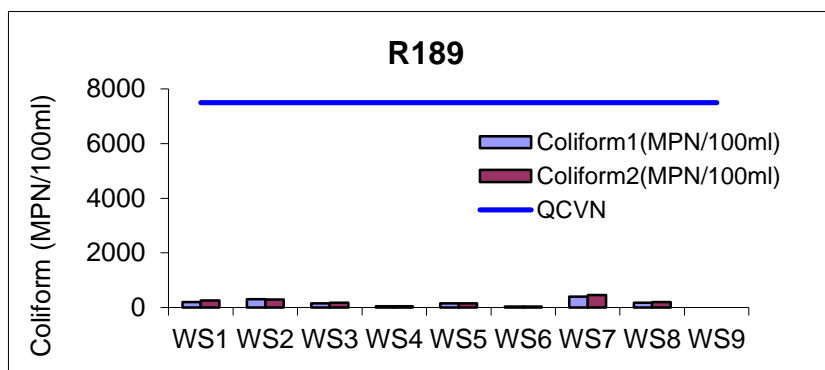


Figure II-2.9.4. Coliform concentrations of water in Tuyen Quang

graphically presents monitoring results at the water bodies along two roads 187 and 189 in Tuyen Quang. Coliform concentrations are low and decrease much in comparison with those of the previous environmental monitoring steps. The highest value obtained at position R189- WS7 (Bau village, Minh Khuong, Ham Yen) is of 450 MPN/100ml. At R189-WS9, no Coliform is detected.

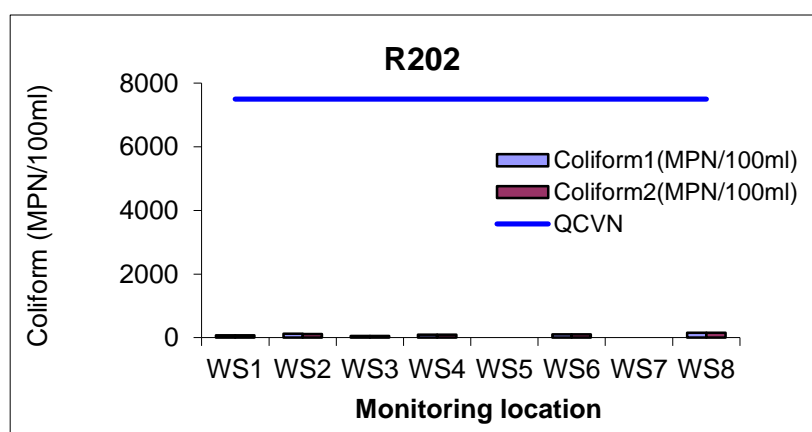


Figure II-2.9.5. Coliform concentrations of water in Cao Bang

Coliform concentrations at the positions along R202 (Cao Bang) decrease in comparison with those of the previous environmental monitoring steps and are lower than limitation in column A1 of QCVN. At the position R202-WS7 (Lung Vai village, Dinh Phung commune, Bao Lac), and at R202-WS5 (Nam Pap village, Dinh Phung commune, Bao Lac) there is no coliform detected (Figure II-2.9.5).

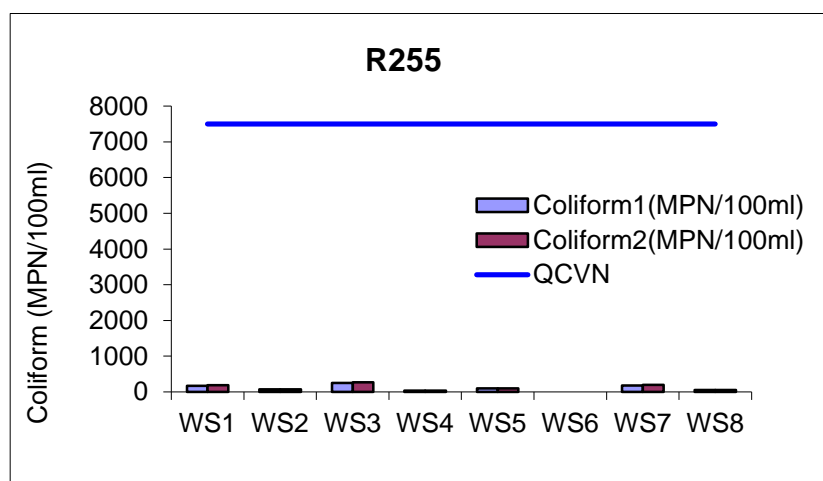


Figure II-2.9.6. Coliform concentrations of water in Bac Kan

Figure II-2.9.6 shows the results of coliform measured at the monitoring positions along road R255 in Bac Kan province. Graphically, Coliform concentrations are much lower than limitation in column A1 of QCVN 08:2008/BTNMT (2500 MPN/100ml). The highest is obtained at the position R255-WS3 (Ban Bay village, Yen Thuong, Cho Don). At R255-WS6 (Pho Cau village, Yen Thinh, Cho Don) no Coliform is detected

II.2.10. Fecal Coliform

The graphs from Figure II-2.10.1 to Figure II-2.10.6 demonstrate Faecal coliform concentrations measured for each position at each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 3/2015.

Faecal Coliform values of water sample in upstream (1) and downstream (2) from the construction site at the monitoring positions have a little difference.

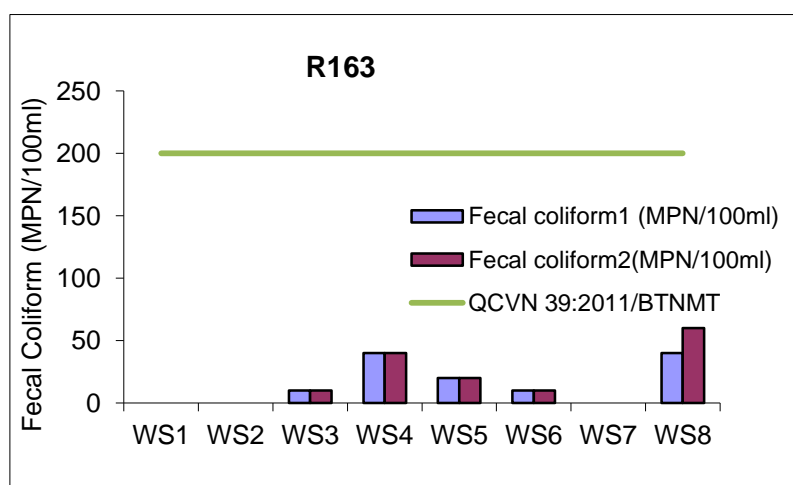
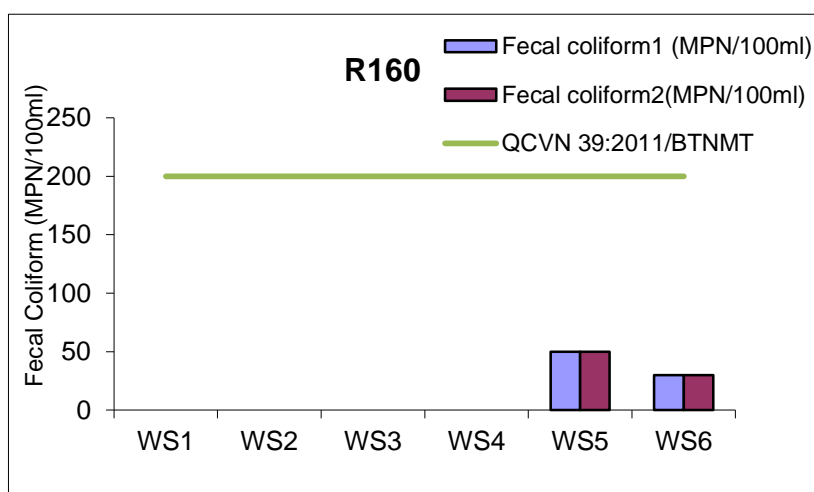
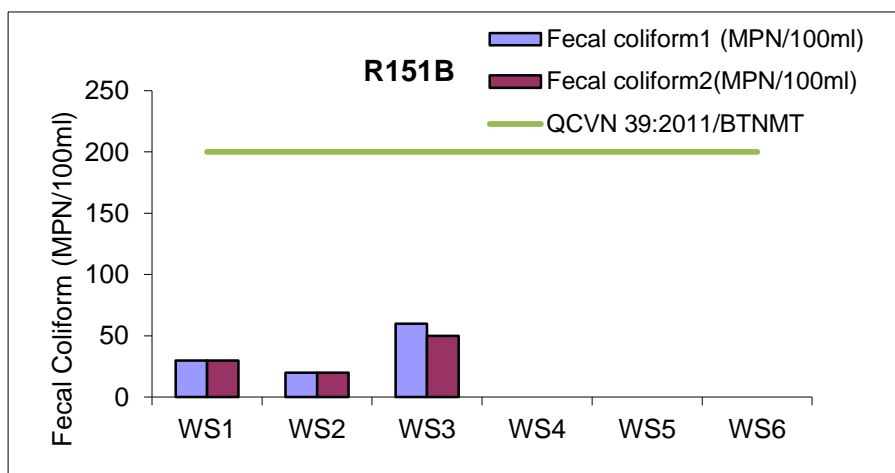
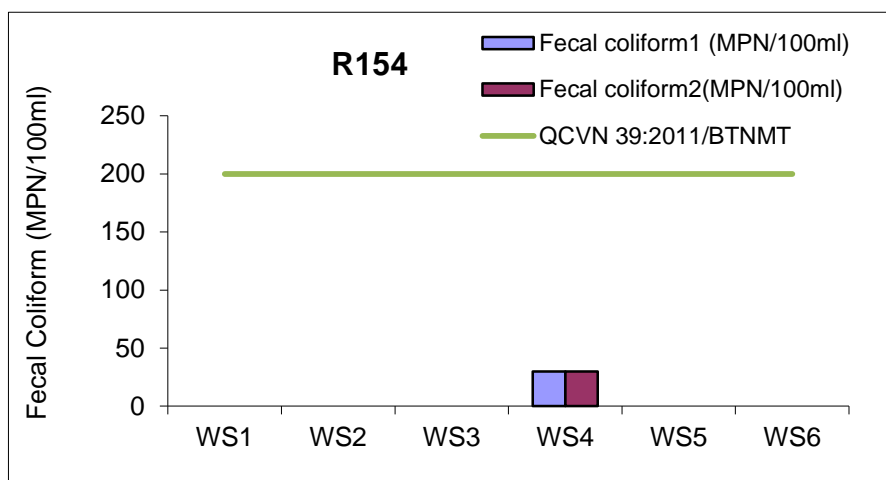
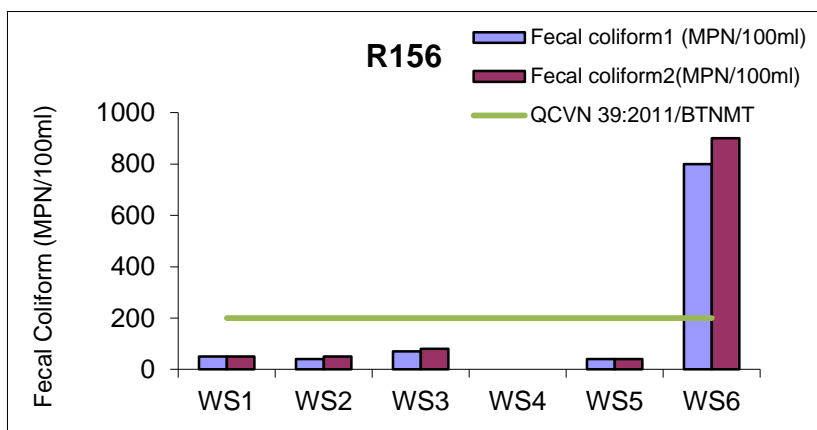


Figure II-2.10.1. Fecal coliform concentrations of water in Yen Bai

Figure II-2.10.1 presents Faecal Coliform concentrations at the monitoring positions along R163 in Yen Bai province. It can be seen that Faecal Coliform concentrations here are low. At R163-WS1 (Go Xoan village, Nga Quan commune, Tran Yen), R163-WS2 (Dai Ban village, Hoa Cuong commune, Tran Yen), R163-WS7 (spill Tran Quach, Mau Dong commune, Van Yen), no faecal coliform is detected. The highest values obtained at R163-WS8 (Ban Huong village, Dong Cuong commune, Van Yen) is of 60 MPN/100ml, much lower than the limitation in QCVN 39:2011/BTNMT.





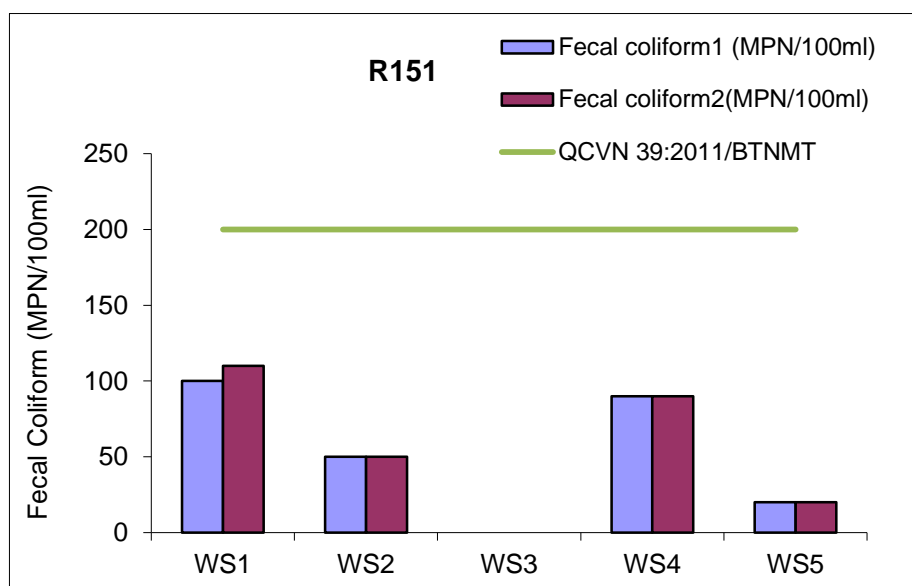


Figure II-2.10.2. Faecal coliform concentrations of water in Lao Cai

Overall, along 5 roads 151, 151B, 154, 156, 160 Faecal Coliform concentrations decrease in comparison with those in the environmental monitoring steps. The position at which Faecal Coliform concentration exceed QCVN 39:2011/BTNMT is R156-WS6 (Phoi village, Ta Phoi commune) with the highest value of 900 MPN/100ml (Figure II-2.10.2). no Faecal Coliform is detected at the positions including R160-WS1,2,3,4, R156-WS6, R154-WS1,2,3,5,6, R151B-WS4,5,6, R151-WS3.

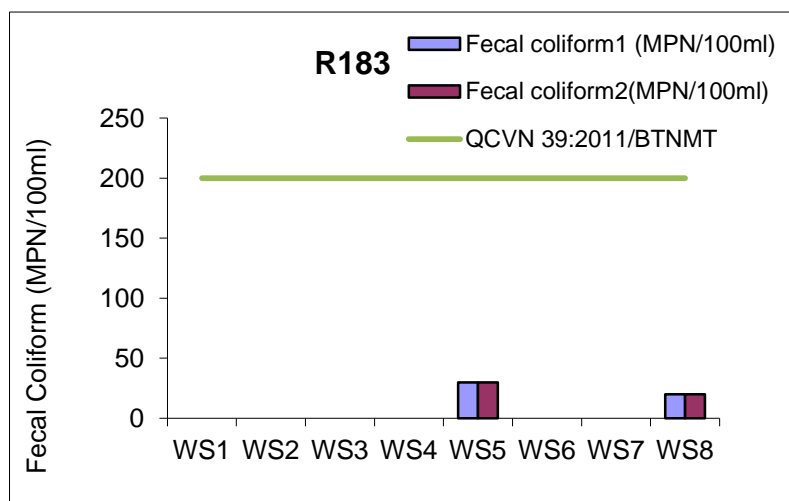
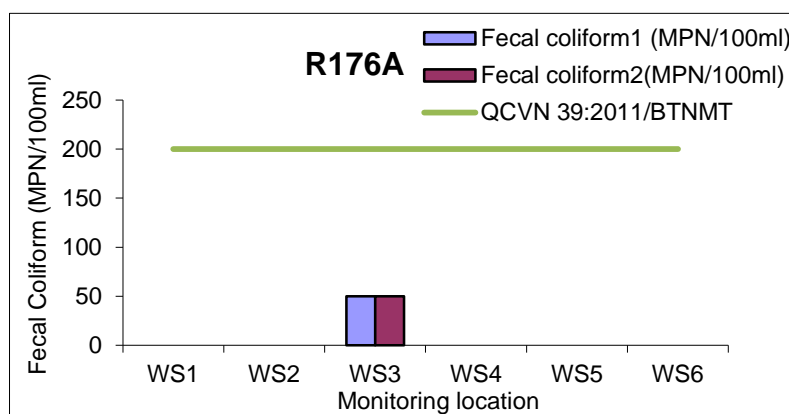


Figure II-2.10.3. Faecal coliform concentrations of water in Ha Giang

Monitoring results of Faecal Coliform in Ha Giang province are presented in Figure II-.2.10.3. At the water bodies along R176A, R183, there are 3 positions at which Faecal coliform is detected including R176A-WS3, R183-WS5, R183-WS8 with the concentrations of 50, 30, 20 MPN/100ml, much lower than the limitation of QCVN 39:2011/BTNMT.

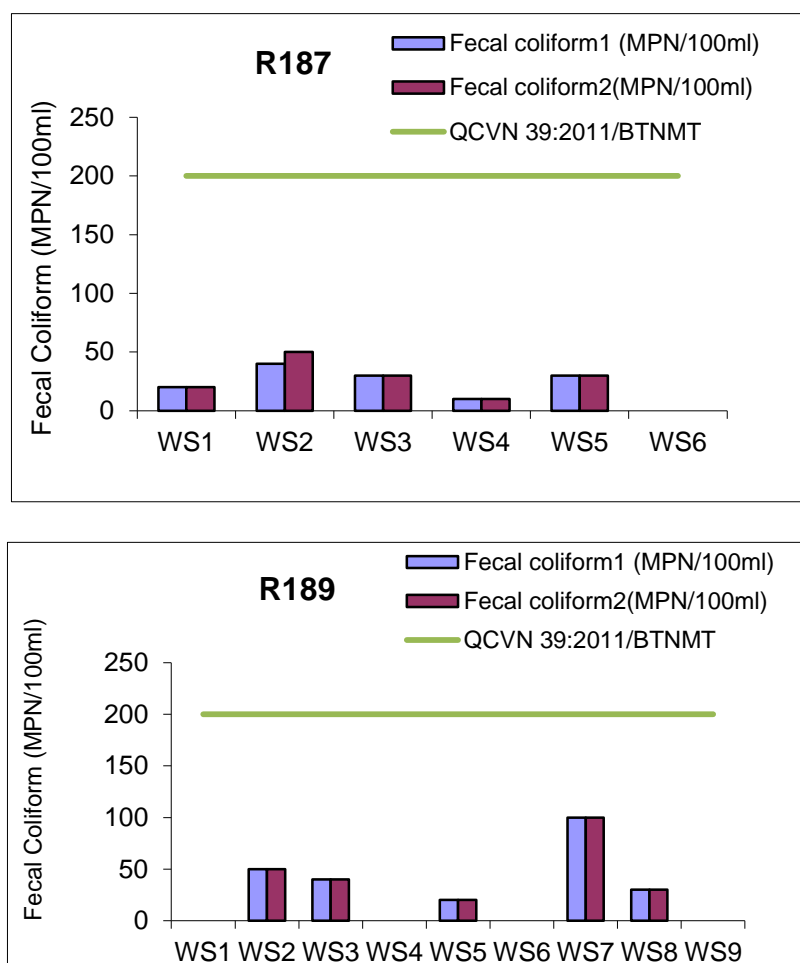
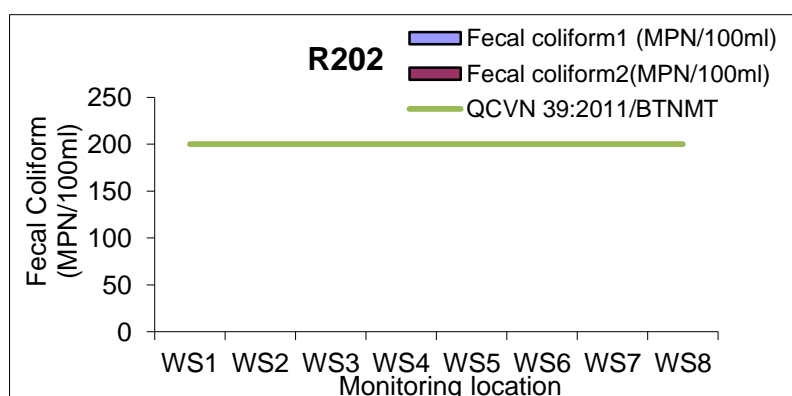


Figure II-2.10.4. Faecal coliform concentrations of water in Tuyen Quang

Figure II-2.10.4 graphically presents Faecal Coliform results at the monitoring positions along two roads 187 and 189 in Tuyen Quang. It can be seen that Faecal Coliform concentrations are lower than the limitation of QCVN, No Faecal coliform is detected at the positions including R187-WS6, R189-WS1, R189-WS4, R186-WS6, R189-WS9.

Figure II-.2.10.5. Faecal coliform concentrations of water in Cao Bang

Figure II-4.10.5 It can be seen that, at all positions along R202, no Faecal Coliform is detected.



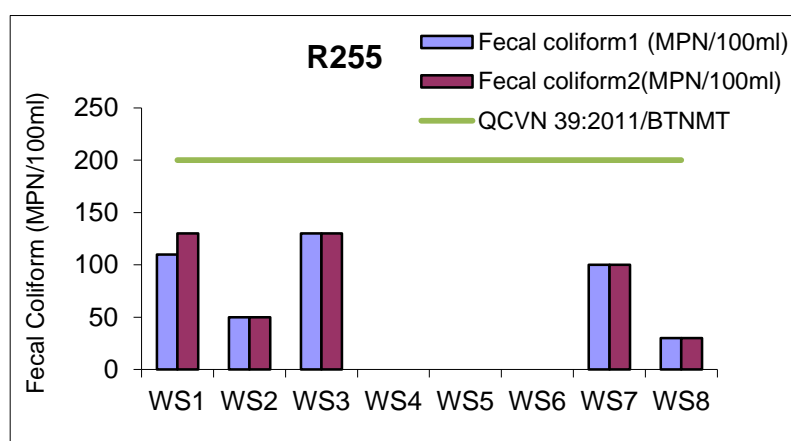


Figure II-2.10.6. Faecal coliform concentrations of water in Bac Kan

Figure II-2.10.4 shows the results of Faecal coliform values measured at the monitoring positions along the road R255 in Bac Kan province. Graphically, Faecal Coliform concentrations are under the permissible limitation of QCVN 39:2011/BTNMT. The highest Faecal coliform concentration, 130 MPN/100ml is obtained at the position R255-WS1-1 (Coc Thu village, Ngoc Phai, Cho Don) and R255-WS3 (stream Km 9+900, Ban Bay village, Yen Thuong). At R255-WS4, R255-WS5 and R255-WS6, there is no Faecal coliform detected.

II.3. Discussion and assessment

The detailed results of monitoring of water quality parameters of the stages at the positions along 12 roads of 6 provinces in the project area. It can be seen that:

- About pH: generally, pH values downstream and upstream are not considerably different, all pH values are in the permissible range of QCVN 08:2008/BTNMT. About turbidity and TSS: compared to values obtained in the previous monitoring stage-the 3rd step of the construction, those monitored at the positions along R154, R183, R255 change inconsiderable and still satisfy the limitation of column B1 QCVN 08: 2008/BTNMT. At some positions along R151, R156, R202, turbidity and TSS values are many times as high as the limitation. Especially, those at R151B increase remarkably and higher than the values obtained at the positions along the other road.
- About DO: in this monitoring step – the 4th step, almost DO concentrations of water bodies satisfy the limitation of column B1 QCVN 08:2008/BTNMT, excepting for those of two positions R156-WS6 (DO concentrations monitored in the previous steps of construction stage were lower than the limitation) and R202-WS8 (DO values in the baseline stage and the previous steps of construction stage were lower than the limitation).
- About BOD5 and COD: the values of BOD5 and COD of water bodies around R151B in the 4th step of the construction stage satisfy the permissible the limitation of column B1 QCVN 08:2008/BTNMT.
- About oil and grease: Oil and grease concentrations obtained in the 4th step decrease in comparison with those of the 3rd step, almost satisfy the limitation of column B1 QCVN 08:2008/BTNMT, excepting some reach the limitation or exceed the limitation but not much. About Coliform and Faecal Coliform: all values of Coliform concentrations of the 4th step decrease in comparison with those obtained in the 3th step and meet the QCVN 08:2008/BTNMT. Faecal coliform values generally decrease and satisfy the limitation of QCVN 39:2011/BTNMT, excepting for that monitored at R156-WS6, (Faecal coliform concentrations were inherently high and exceed the permissible limitation in the baseline construction stage, and the previous steps of the construction stage).

Overall, based on the results of measurement and analysis of some basic parameters in the monitoring periods including the prior stage, the construction stage- step from 1 to 4, it can be found that in the 4th step, the quality of surface water in the project areas is improved respect to DO, oil and grease, Coliform, Faecal Coliform. DO concentrations at almost monitoring positions satisfy the permissible limitation excepting those of several positions are inherently low in the baseline construction stage. Almost values of oil/grease, Coliform, Faecal Coliform in this step decrease below the respective limitation of QCVN or exceed inconsiderable. This shows that, in this period, the collecting of domestic wastewater and wastewater of construction activities as well as applying the methods to reduce the amount of oil and grease and microbiological released to the environment are conducted well, especially at the above monitoring positions at which the pollutant concentrations exceed the QCVN comparing to the values of the baseline stage. However, at some positions, turbidity and TSS concentration increase and exceed the limitation many times or decrease in comparison with those in the 3rd step but are still higher than the permissible limitation. This could be due to, the construction activities regarding to transfer materials for construction were carried out around and due to the impact from agricultural activities (land preparation transplanting rice).

After consideration about construction status as well as the condition and position at which water samples were sampled, some comments were given as below:

- Although the water quality in project area was affected by construction activities but the impact is not great
- Water quality is partial and not significant.
- The effect on quality of surface water was displayed mainly by the specific indicators turbidity and TSS.

Appendix 2.2. ENVIRONMENTAL MONITORING RESULTS AND ASSESSMENT (stage 5)**II.1. Current status of construction activities**

Environmental monitoring program of construction stage of the project Transport Connection in Northern mountainous provinces has been conducted from June 25-30th 2015 to July 15th, 2015 at locations as described in Chapter I and Appendix 1. The monitored factors include total suspended particulates (TSP) in ambient air, noise level, and surface water parameters.

The construction activities carried out during the monitoring time are described briefly in the table as below:

Table VI-2. Current status at the construction package

No.	Province	Contract package	Name of contract	Construction circumstance
1	Bac Kan	BK-R255-01	Construction of 04 bridges on provincial road 255, Bac Kan province	Na Tum bridge (Km 0+ 747): flat of bridge and approach bridge under construction Ban Bay bridge (Km 9+974): flat of bridge and approach bridge under construction Na Ca bridge (Km13+388): flat of bridge and approach bridge done Ban Cau bridge (Km18+120): piers and approach bridge under construction Ban Vay bridge (Km 22+309): flat of bridge done, baluster are being finished,
		BK-R255-02	Construction of Section Km1+00 – Km8+00, PR255, Bac Kan Province	Km1+00 – Km8+00: route are adjusted, talus on site under canvas, roadbeds and sewers across the road are built Km8+00 - Km18+120: spreading base, covering road and vertical drain with asphalt Km 18+120 - Km24+981: covering surfaceroad with asphalt, vertical drain under construction
		BK-R255-03	Construction of Section Km8+00 – Km18+120, PR255, Bac Kan Province	
		BK-R255-04	Construction of Section Km18+120 to Km24+981, PR 255 Bac Kan Province	
2	Cao Bang	CB-R202-01	Rehabilitation of PR202 (Ca Thanh – Lung Pan – Ban Rien), in Cao Bang Province	Road bed, vertical drains under construction, spreading base, covering all with asphalt
		CB-R202-02	Rehabilitation of PR202 (Ca Thanh – Lung Pan – Ban Rien), in Cao Bang Province (km15- km23)	road beds and vertical drain under construction, spreading base, covering all with asphalt
		CB-R202-03	Rehabilitation of PR202 (Ca Thanh – Lung Pan – Ban Rien), in Cao Bang Province (km23- km30+618.43)	vertical drain under construction, spreading base and covering all with asphalt
3	Ha Giang	HG-R176A-01	Rehabilitation of road section Minh Ngoc – Mau Due (PR176A) km38-km52	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built, (the beginning part of the route Km 38- Km 45).
		HG-	Rehabilitation of road	slopes are lowered, route are adjusted, talus on

No.	Province	Contract package	Name of contract	Construction circumstance
		R176A-02	section Minh Ngoc – Mau Due (PR176A) km52-km73	site under canvas, roadbeds and sewers across the route, vertical drain are built, spreading base
		HG-R183-01	Rehabilitation of road section Vinh Tuy-Yen Binh (DT183) (Km0+747-Km16+000)	sewers across the route, vertical drains are built, spreading base, covering all with asphalt (the beginning part of the route Km 0+474 ~ Km 5).
		HG-R183-02	Rehabilitation of road section Vinh Tuy-Yen Binh (DT183) (Km16+000-Km36+300)	sewers across the route, vertical drains are built, spreading base, covering all with asphalt
4	Tuyen Quang	TQ-R187-01	TQ-R187-01 Rehabilitation of PR 187 section 187 km 0+000- km 12+953	vertical drains under construction, covering all with asphalt, setting up warning signs
		TQ-R189-01	Rehabilitation of PR 189 (km2+500 – km26+000), Tuyen Quang Province	, vertical drain and sewers across the route are built, spreading base and covering all with asphalt
		TQ-R189-02	Rehabilitation of PR189 (Km26+000 – Km41+500), Tuyen Quang Province	vertical drains and spillway under construction, covering all with asphalt, setting up warning signs
		TQ-R189-03	Rehabilitation of PR189 (Km41+500 – Km56+914), Tuyen Quang Province	route are adjusted, talus on site under canvas, roadbeds, vertical drains and sewers across the route are built, spreading base
5	Yen Bai	YB-R163-01	Yen Bai – Khe Sang Road Construction, Section Yen Bai – Trai Hut, Yen Bai Province (Km4+303.14m – Km23+500m)	Vertical drains and corrugated steel plate balustrade are completed
		YB-R163-02	Yen Bai – Khe Sang Road Construction, Section Yen Bai – Trai Hut, Yen Bai Province, (PR 163) section Km23+500 + Km49+00	Vertical drains, corrugated steel plate balustrade are completed spreading base, covering asphalt the part from Dong Cuong to Trai Hut
		YB-R163-03	Yen Bai – Khe Sang Road Construction, Section Yen Bai – Trai Hut, Yen Bai Province, 5 bridges	Nga Quan bridge: Done and activities for sanitizing bridge, stream Nghia Phuong bridge: Done Viet Thanh bridge: Done, activities for sanitizing bridge, stream Yên Hưng bridge: Done, activities for sanitizing bridge, stream Trang bridge: Done, activities for sanitizing bridge, stream Ngoi Hop bridge: approach bridge, flat of bridge, beams under construction
6	Lao Cai	LC-	Rehabilitation of	Vertical drains under construction, spreading

No.	Province	Contract package	Name of contract	Construction circumstance
		R156-01	PR156 (Bac Cuong – Ta Phoi – Hop Thanh) Km0+00-Km3+175 and Km6 – Km12+647	base and covering all with asphalt the part Km 0 - Km 1 and Km2-Km 12+647
		LC-R154-01	LC-R154-01 Rehabilitation of PR 154 (km 0+000- km 13+000)	concreting the road (Km0 –Km 0+700), spread base, vertical drains are built, talus on site under canvas, covering road with asphalt. Treating sliding part Km 0 – Km 0+700. The remaining part: vertical drains under construction, covering all with asphalt
		LC-R151B-01	Rehabilitation of PR151B (Vo Lao – Nam Rang – Hoa Mac)	slopes are lowered, route are adjusted, talus on site under canvas, roadbeds and sewers across the route are built. Km 9- km10, beams, piers, flat of bridge, approach bridge (Chan Stream) under construction
		LC-R151-01	Rehabilitation of PR151 (Tan An – Khe Sang)	Ba Xa bridge: bridge done, Khe Quat Bridge: bridge done, Khe Hong bridge: bridge done, Khe Sang spillway: bridge done .
		LC-R160-01	Rehabilitation of PR160	Pho Rang bridge: flat of bridge, approach bridge under construction spreading base, covering asphalt the part Km6+... Embanking the part Km 4+...

II.2. Current status of total suspended particulates (TSP)

The monitoring of ambient air quality was conducted in the period from 25-30/6/2015 to 15/7/2015 at 50 points (monitoring results are presented in detail in Appendix 2).

According to the approved monitoring plan, there are twelve roads which are sampled in this stage including R163 (Yen Bai), R160, R156, R154, R151, R151B (Lao Cai) R187 and R189 (Tuyen Quang) and R183 and R176 A (Ha Giang), R202 (Cao Bang), R255 (Bac Kan).

TSP concentrations at the monitoring locations are shown in Figure II-2.1. to Figure II-2.6. as below:

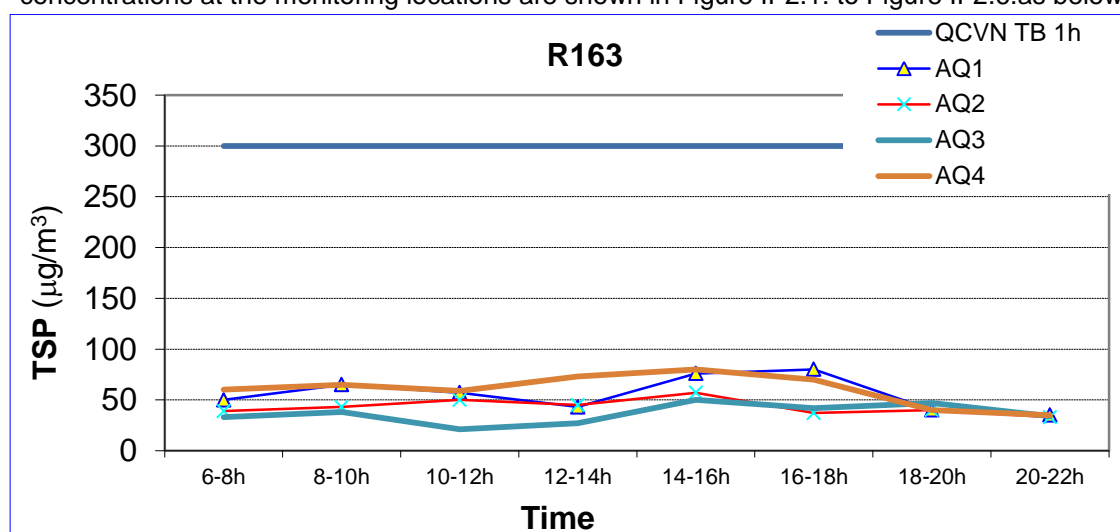
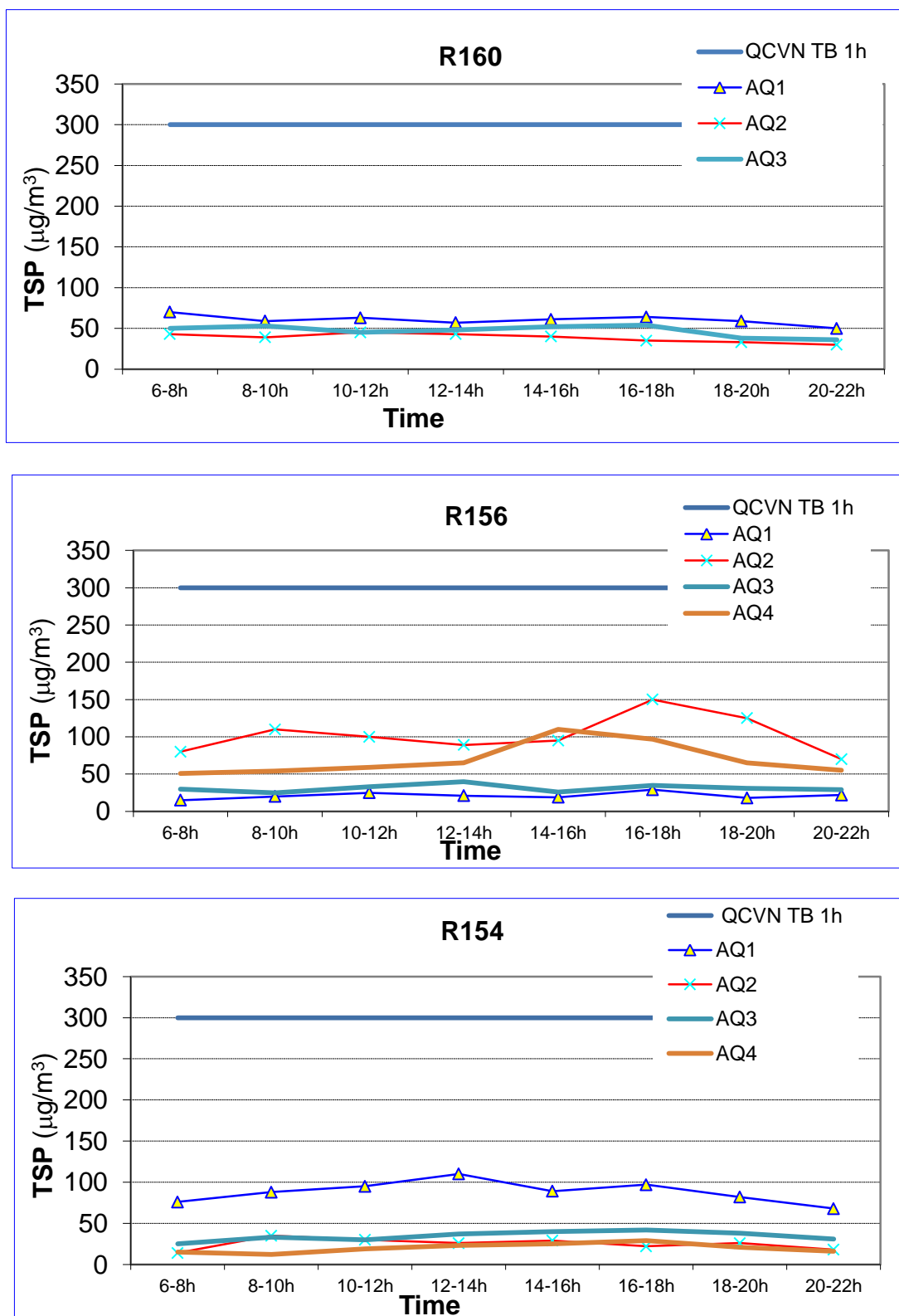


Figure II-2.1. TSP concentrations measured at the road in Yen Bai in different periods of day

At R163 in Yen Bai province, TSP values measured of 4 monitoring points are represented in the graph Figure II-2.1. The graph shows that at the positions of R163-AQ1, R163-AQ2, R163-AQ3, R163-AQ4, TSP concentrations are much lower than $300 \mu\text{g}/\text{m}^3$, permitted limitation of QCVN 05:2013/BTNMT, even not over $100 \mu\text{g}/\text{m}^3$.



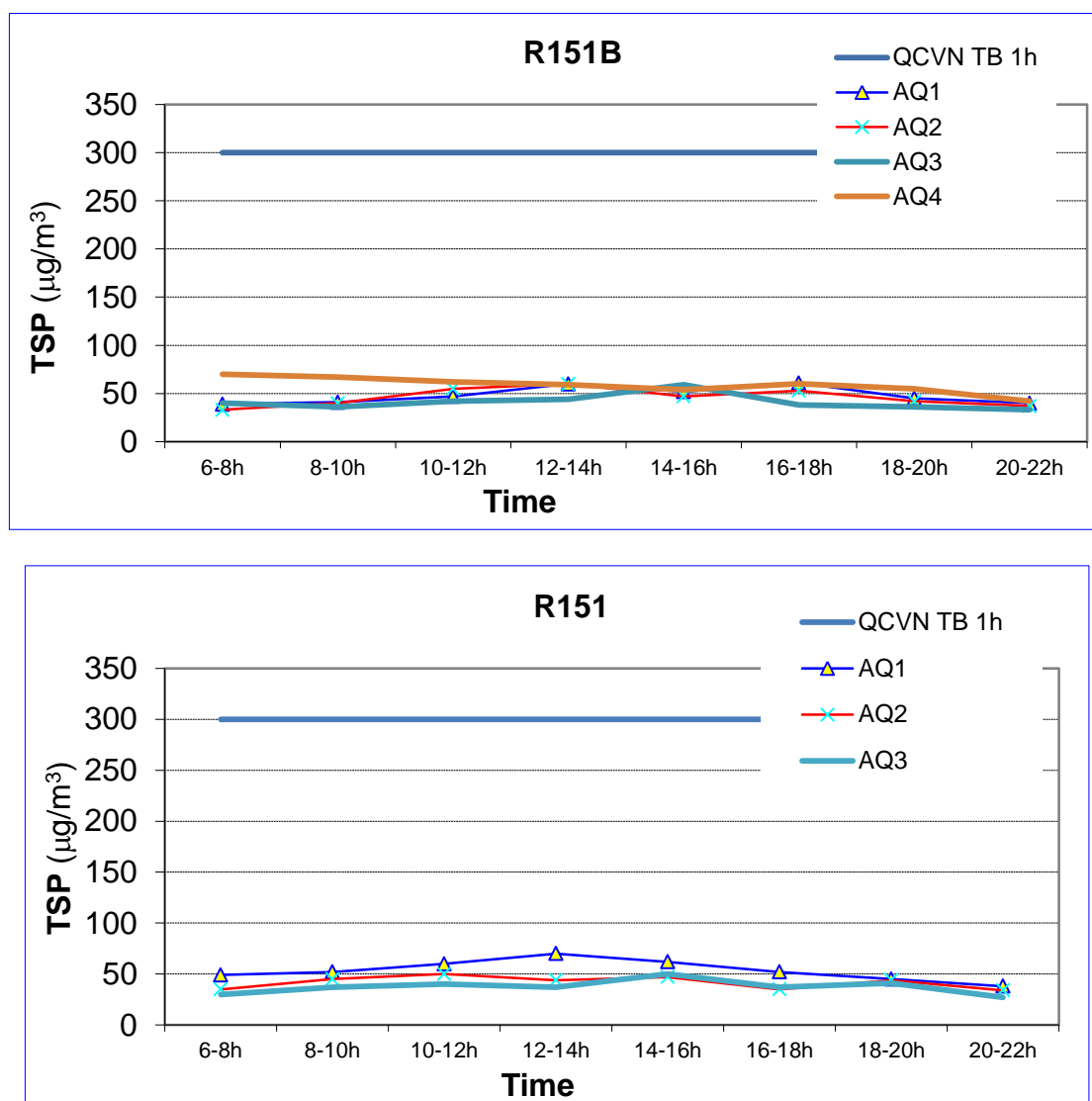


Figure II-2.2. TSP concentrations measured at five roads in Lao Cai in different periods of day

According to the monitoring plan, the roads of Lao Cai are R151, R151B, R154, R156 and R160, the graphs in Figure II- 2.2 show that the values of TSP concentrations measured in days at almost roads are less than 100 $\mu\text{g}/\text{m}^3$, under the permitted standards (QCVN 05:2013/BTNMT). The remarkable positions includes: R156-AQ2 (Duong Mo, Nam Cuong ward, Lao Cai), R154- AQ1 (Vang Xa, Muong Khuong town, Lao Cai).

+ R156-AQ2, TSP concentrations are relatively high, fluctuating around the value of 100 $\mu\text{g}/\text{m}^3$, especially at 16h-18h the obtained values is 150 $\mu\text{g}/\text{m}^3$. TSP concentrations measured at different periods here are higher than those at other positions which on the same road R156 or other roads in Lao Cai area. It can be resulted from the ore transportation, particularly in the afternoon here.

+ R154- AQ1, the higher TSP concentrations compared to the other values monitored at the other positions of R154 were obtained, especially at 12h-14h the highest concentration is 110 $\mu\text{g}/\text{m}^3$.

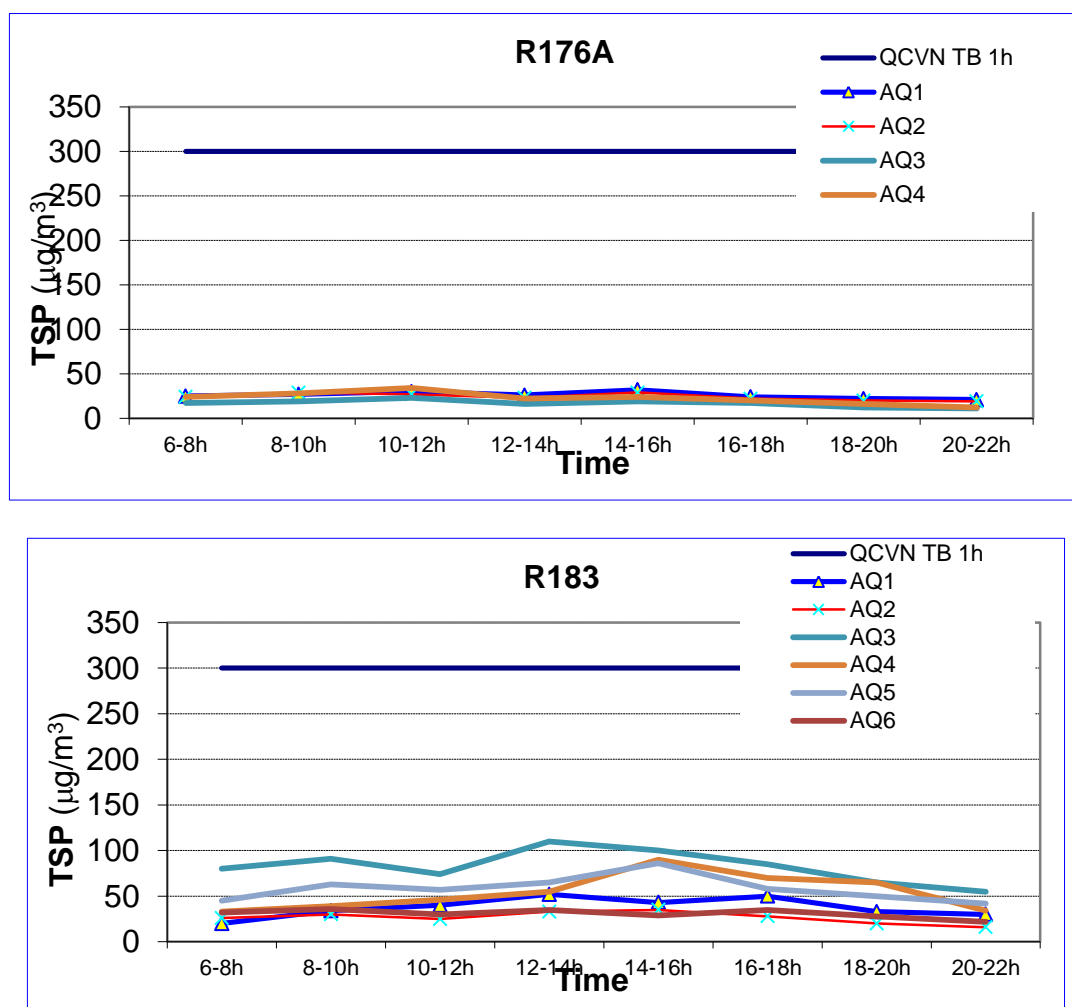
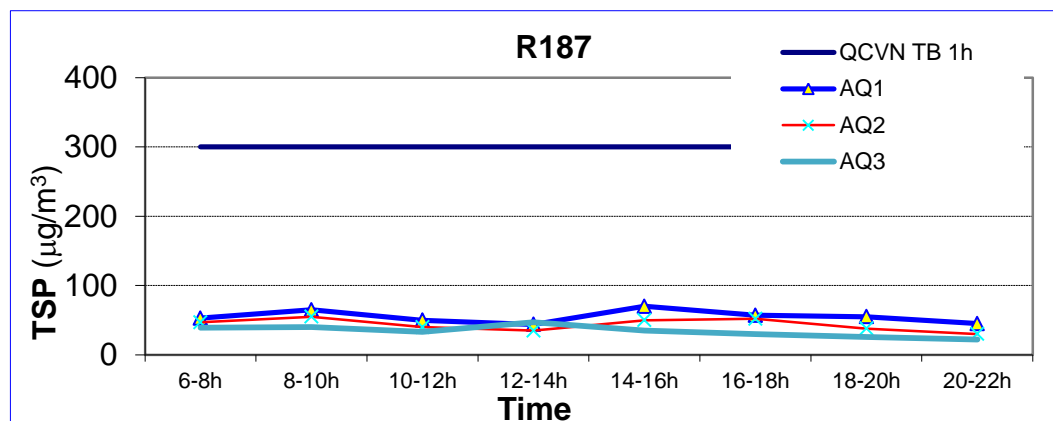


Figure II-2.3. TSP concentrations measured at two roads in Ha Giang in different periods of day

In Ha Giang province, two roads in monitoring plan are R176A and R183. The actual values of TSP concentration measured are shown on graphs in Figure II-2.3. The TSP concentrations at R176A are very low, less than $50 \mu\text{g}/\text{m}^3$. At R183-AQ3 (Dong Thanh School Km13+, Ke Nhan, Dong Yen) TSP concentrations are pretty much higher than those at other positions, the remarkable value obtained at 12-14h is $110 \mu\text{g}/\text{m}^3$.



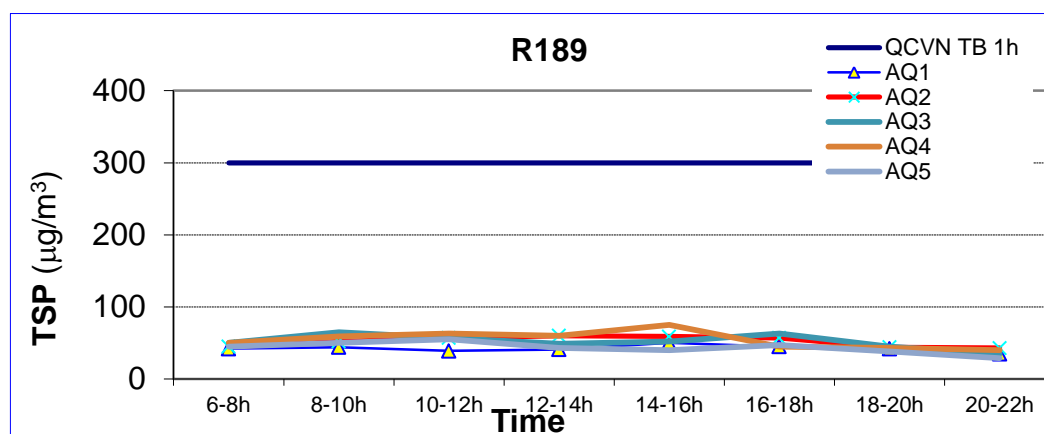


Figure II-2.4. TSP concentrations measured at two roads in Tuyen Quang in different periods of day

Two roads R187 and R189 are in Tuyen Quang province. The monitoring results of TSP are shown on the two graphs in Figure II-2.4. They represent that the TSP concentrations measured at all positions are low, fluctuating around $50 \mu\text{g}/\text{m}^3$, not exceeding $75 \mu\text{g}/\text{m}^3$.

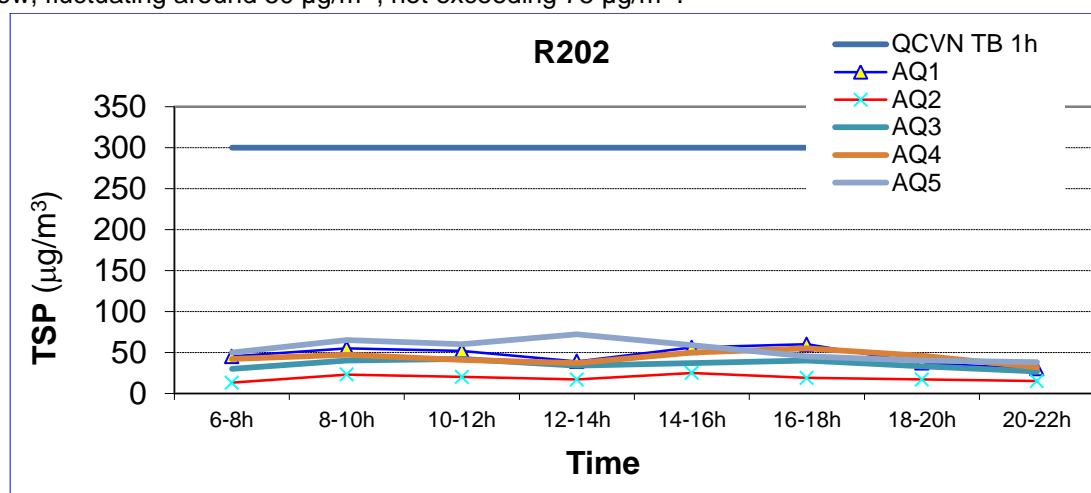


Figure II-2.5. TSP concentrations measured at the road in Cao Bang in different periods of day

Graph on Figure II-2.5 shows the results of TSP at R202 in Cao Bang province. The values monitored are much lower in comparison with permissible limitation of QCVN. most of which are less than $75 \mu\text{g}/\text{m}^3$ at all different periods.

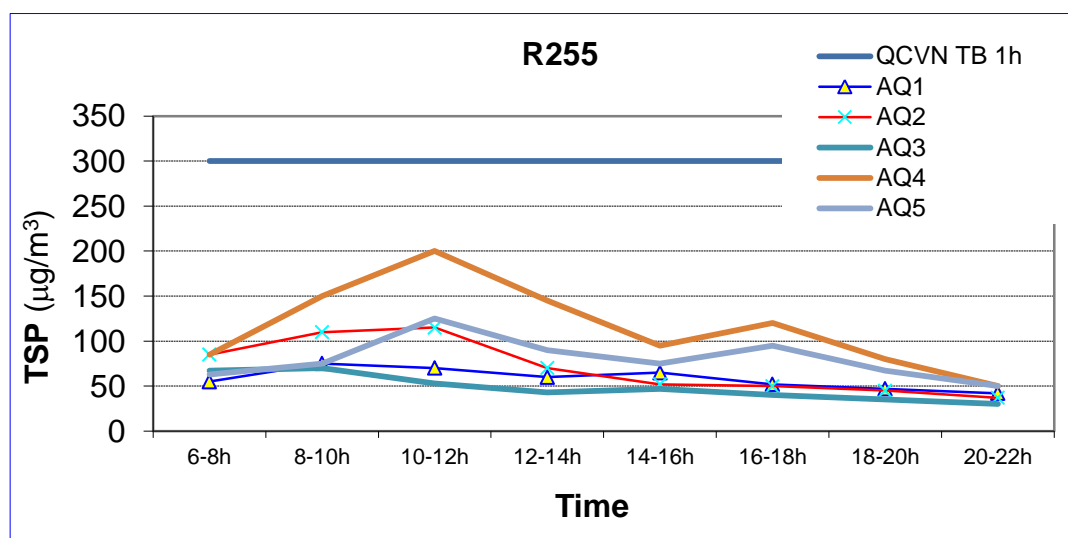


Figure II-2.6. TSP concentrations measured at the road in Bac Kan in different periods of day

TSP results monitored at R255, in Bac Kan province are presented on graph in Figure II-2.6. The TSP concentrations are quite high, most of which are under 100 µg/m³. TSP concentrations at the positions R255- AQ2 (Pac Cop, Yen Thuong, Cho Don) R255-AQ4 (Don village, Yen Thinh, Cho Don) ,R255- AQ5 (Vay village, Yen Thinh, Cho Don) fluctuate strongly, . At 10h – 12h, the remarkable values obtained are 200 µg/m³, 125 and 115 µg/m³ respectively. The TSP concentrations at R255 are higher in comparison with those at other roads, but still meets QCVN 05:2013/BTNMT.

II.3. Current Status of equivalent noise (Leq)

The measurement of noise was also conducted at 12 roads of 6 provinces in the project area, at the same points at which the TSP sample were taken. The detail results of the period from 25/6/2015 to 15/7/2015 are presented in (Appendix 2).

The equivalent noise levels at the monitoring location are shown in the graph from Figure II -3.1 to Figure II -3.5

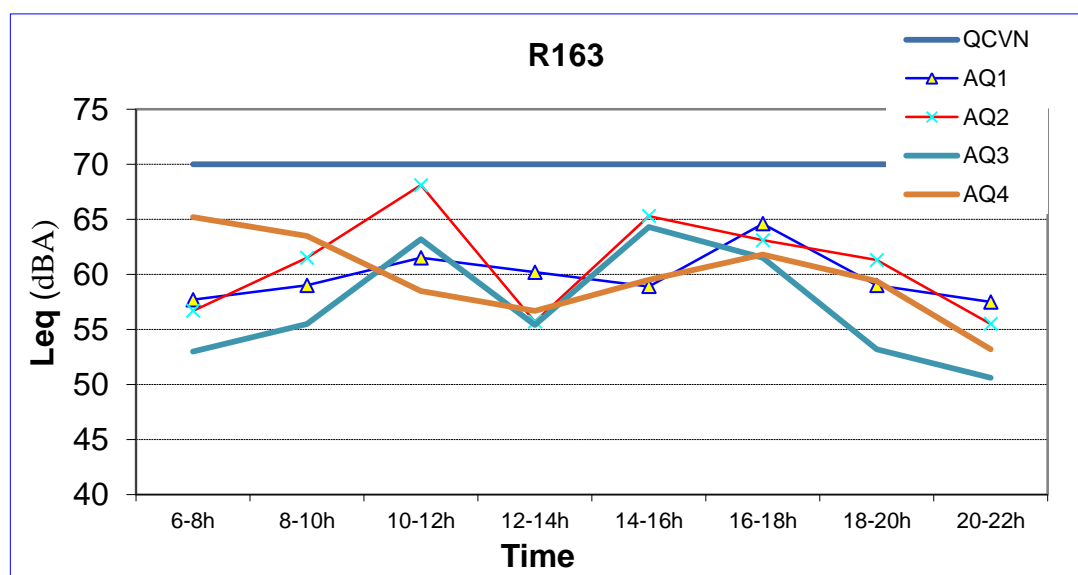
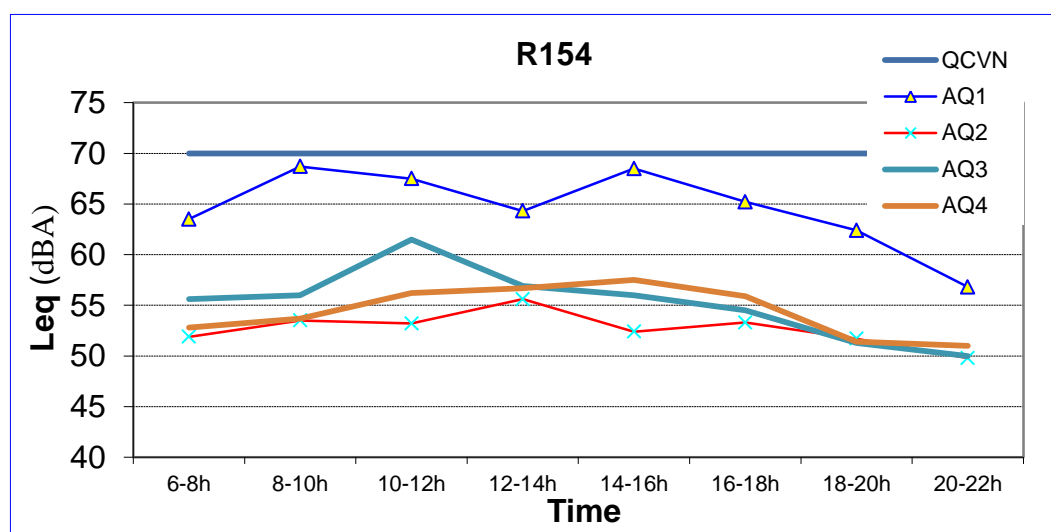
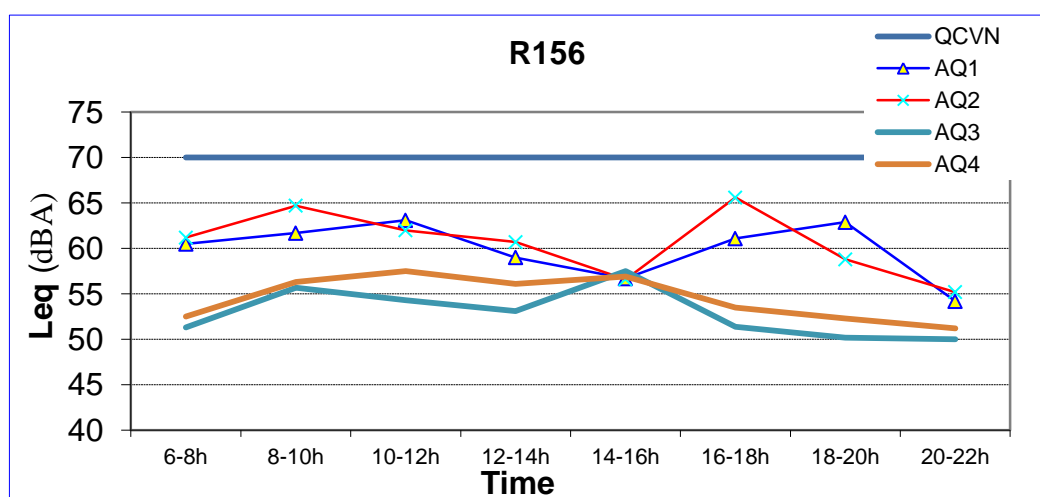
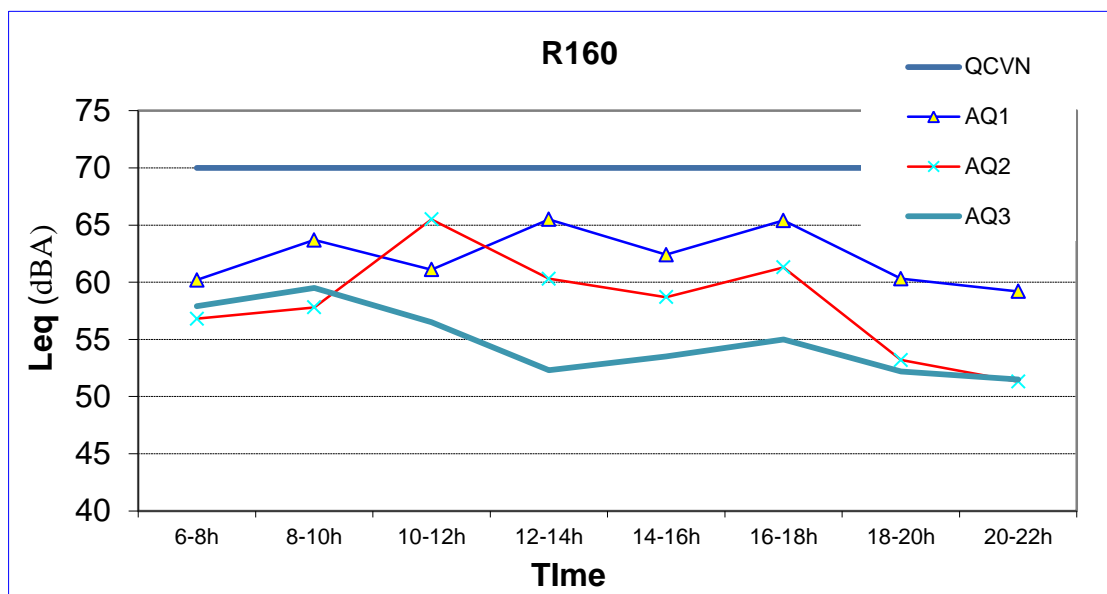


Figure II-3.1. Noise levels measured at the road in Yen Bai in different periods of day

The graph in Figure II-3.1 shows measured noise levels at R163 in Yen Bai province. The noise levels at the 4 monitoring positions AQ1, AQ2, AQ3, AQ4 are particularly high in the afternoon from 14h-18h

however, meeting the QCVN 26:2010/BTNMT (70dBA at 6-21h). At monitoring positions including R163-AQ1 (Street 2, Co Phuc, Tran Yen) and R163-AQ2 (Group 1, Mau A, Van Yen) the noise level at 20h-22h is 57,5 and 55,5 dBA. over the limitation of QCVN 26:2010/BTNMT (55dBA at 21h-6h).



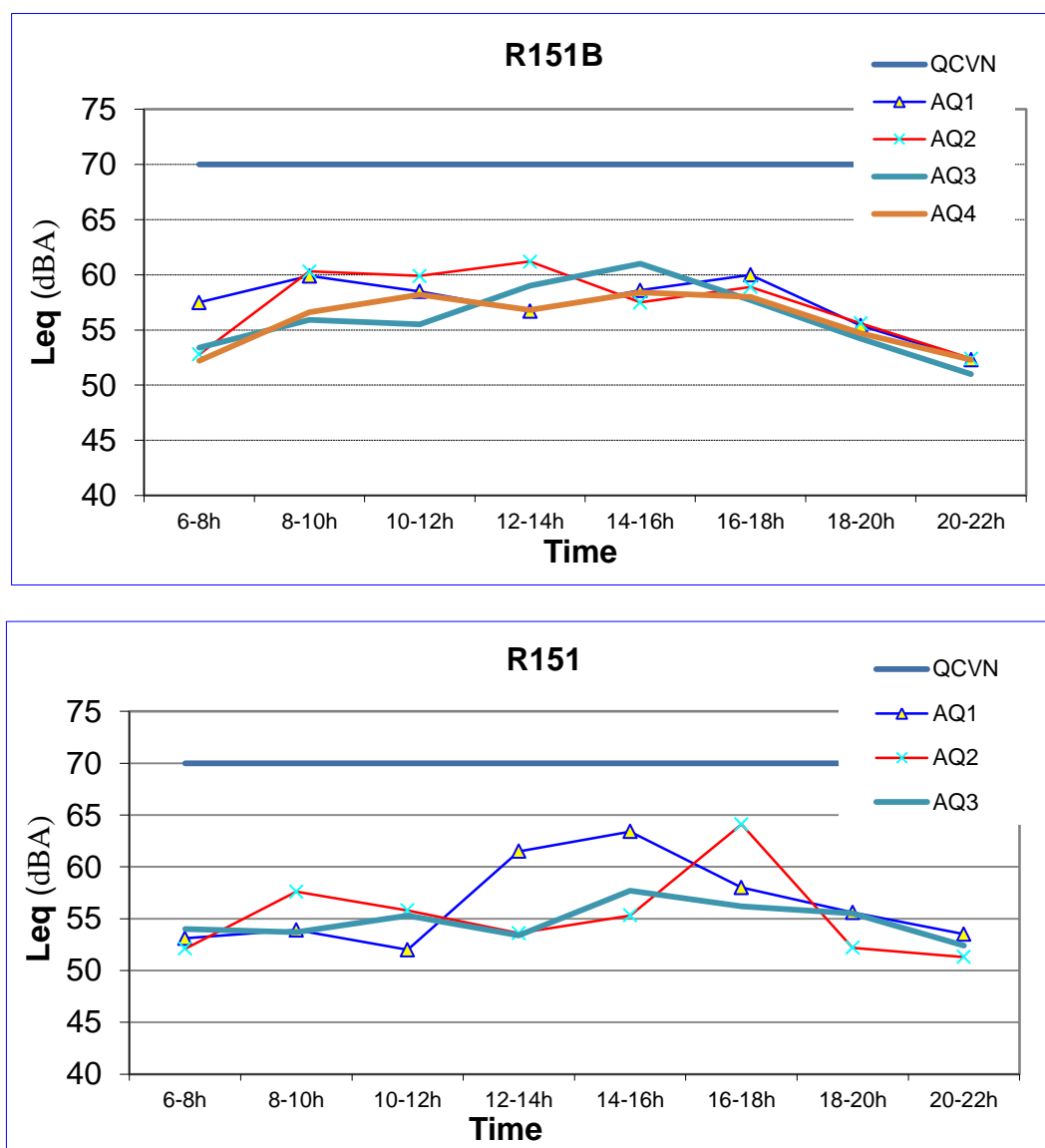


Figure II-3.2.Noise levels measured at five roads in Lao Cai in different periods of day

In Lao Cai area, the results of equivalent noise level at 5 roads are presented on the graphs in Figure II-3.2. Overall, The equivalent noise levels at the roads 151,151B, 154, 160, 156 are underlimitation of 70dBA according to QCCP (QCVN 26:2010 / BTNMT) in the period from 6-20h, As shown in the figure, from 20h to 22h, at R160-AQ1 (group 1, Pho Rang town, Bao Yen), and R154-QA1 (Vang Xa, Muong Khuong town) the noise values are 59,2 and 56,8 dBA, over the permissible limitation in the period 21h-6h (55 dBA) and at R151-AQ2, the result equals limitation. The other values meet the standard. The noise levels are high at sometimes owing to the daily manufacturing or living activities of location residents.

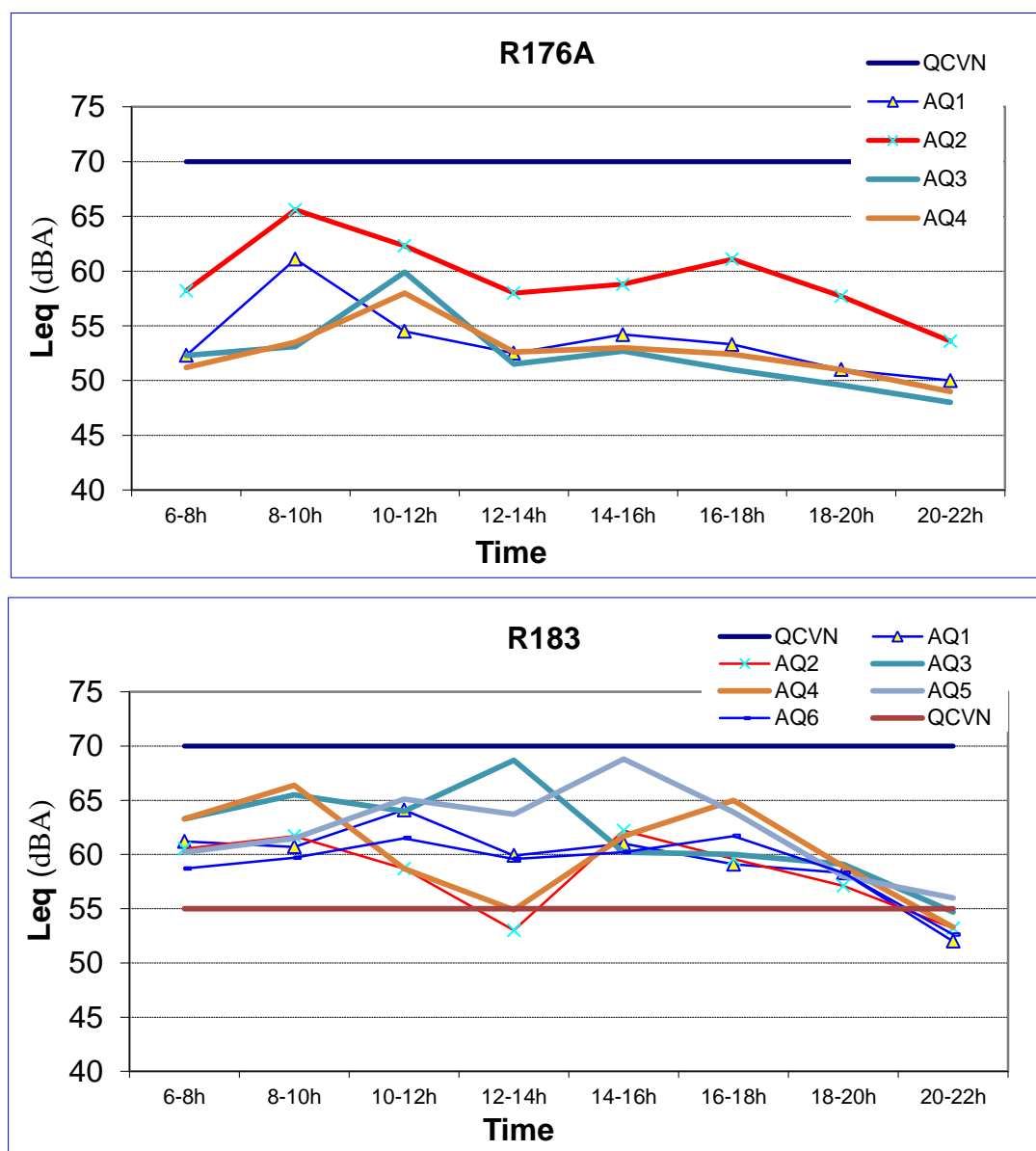


Figure II-3.3. Noise levels measured at two road in Ha Giang in different periods of day

The results of the noise level at two roads 176A and 183 in Ha Giang shown on graphs in Figure II-3.3 depict that + from 6h to 20h, the values are not over the stipulated limitation+ from 20h to 22h, the values at R183-AQ5 is of 56 dBA, over the limitation (55 dBA)

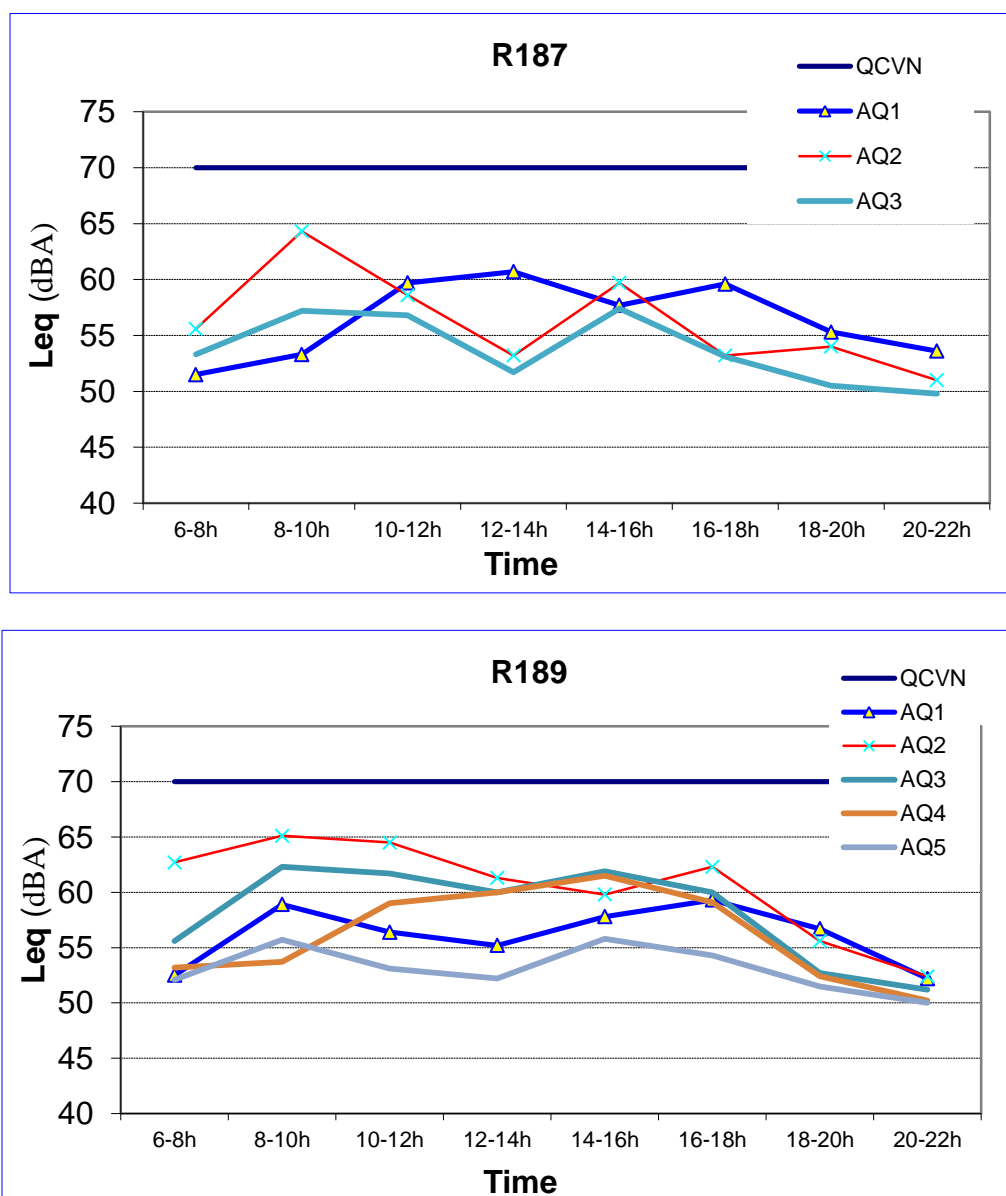


Figure II-3.4. Noise levels measured at two roads in Yen Bai in different periods of day

The noise levels measured at R187 and R189 are shown graphically in Figure II.3.4. All the obtained values meet the permissible limitation of QCVN 26:2010/BTNMT both daytime (6-21h) and nighttime (21-6h).

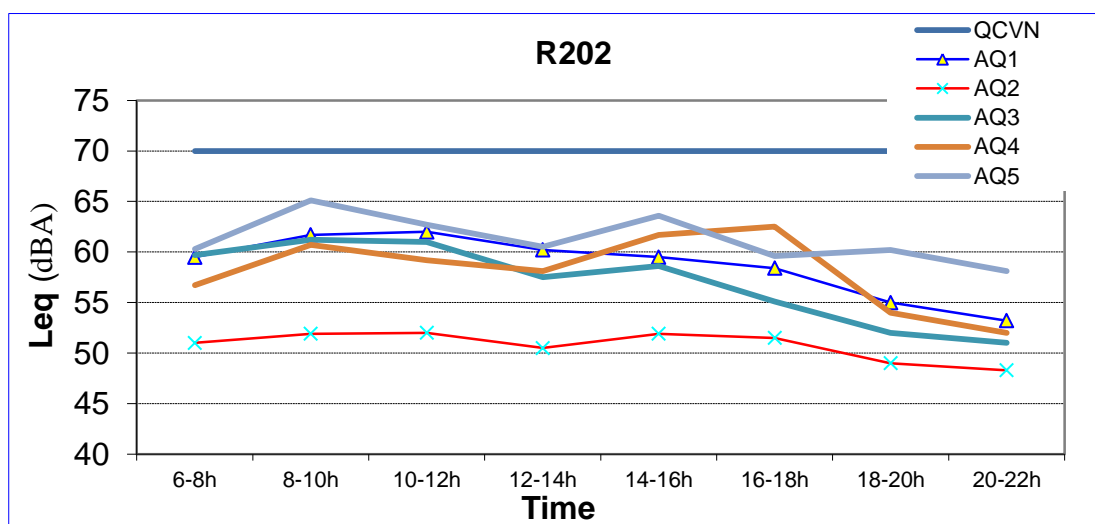


Figure II-3.5. Noise levels measured at the road in Cao Bang in different periods of day

Figure II -3.5 shows the results of equivalent noise level at R202 route in Cao Bang province. Noise levels at all 5 monitoring positions R202-AQ1, R202- AQ2, R202-AQ3, R202-AQ4, R202-AQ5 are well below permitted standards from 6h-21h especially at R202-AQ2 (Cao Lu Primary School -km 5+500) noise levels are low.

However, noise level at R202-AQ5 at 20-22h, did not satisfy the limitation of 55 dBA for 21h-6h, which is of 58,1 dBA.

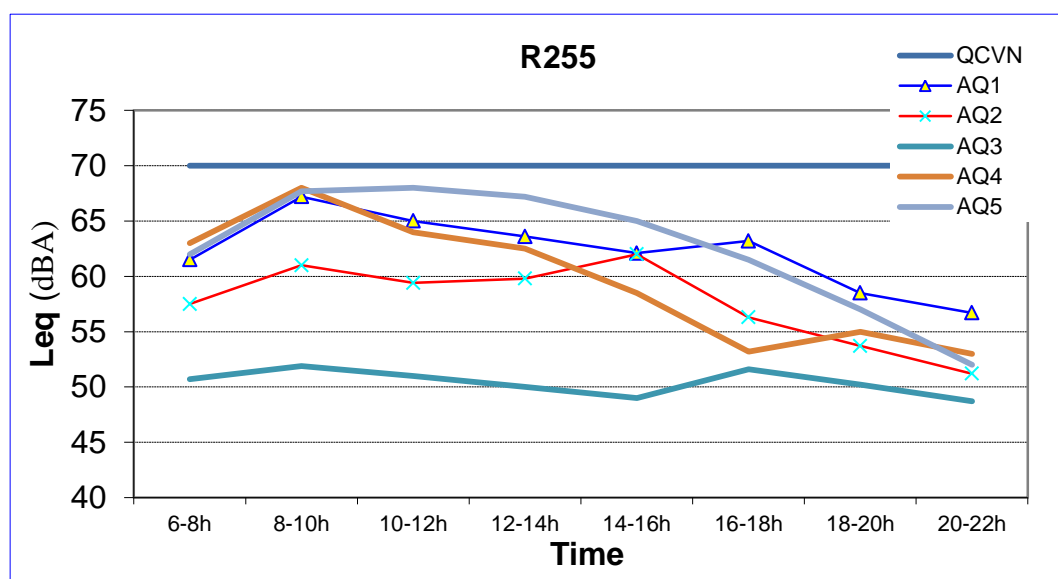


Figure II-3.6. Noise levels measured at the road in Bac Kan in different periods of day

The graph in Figure II -3.6 presented the monitoring results at 5 positions. In the period 6h-20h, all values obtained meet the permissible limitation of QCVN 26:2010/BTNMT. Noise level at R255-AQ1 (Na Tum, Ngoc Phai, Don market) at 20-22h, did not satisfy the limitation of 55 dBA for the period of 21h-6h, which is of 56,7 dBA

II.4. Current status of surface water quality

The monitoring period of surface water quality was conducted from 20/12 - 30/12/2014 at 82 points (detailed descriptions of the sampling sites are in Appendix 1; monitoring results of water quality are in Appendix 3).

Surface water quality at 82 position in 12 roads of 6 project areas was assessed through monitoring results of basic parameters including pH, temperature, turbidity, TSS, COD, BOD5, SS, DO, oil and grease, Coliform, Fecal coliform. At each monitoring point, water is sampled and monitored at two sites, one is 50 m upstream (1) and the other is 50m downstream (2). Results of water quality parameters are shown as below.

II.4.1. Temperature

The third monitoring period for construction stage is conducted in the summer. The water temperature at each monitoring position fluctuates depending on the weather of different days and at different times in day. The water temperatures upstream (1) and downstream (2) from the construction site vary inconsiderably. The actual values obtained from the monitoring positions of 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 6-7/2014 are presented on the figures from Figure II.4.1.1 to Figure 4.1.6.

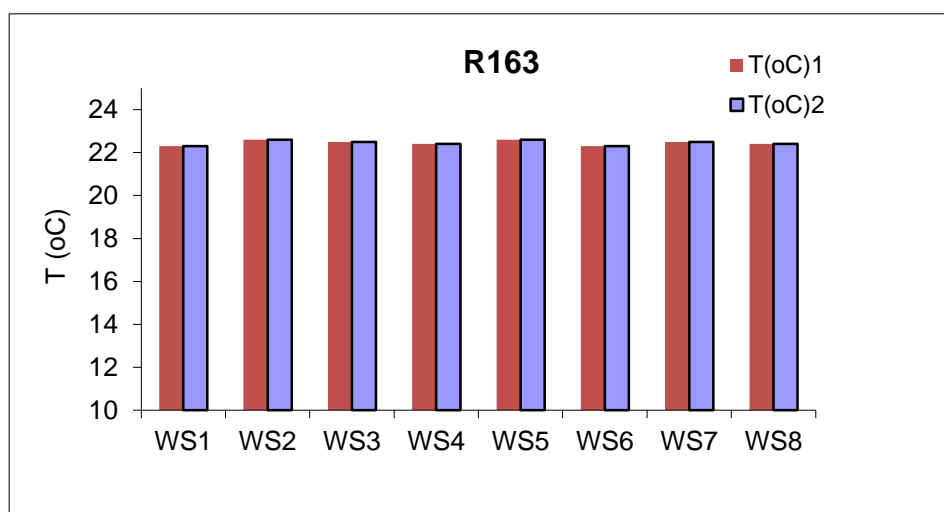
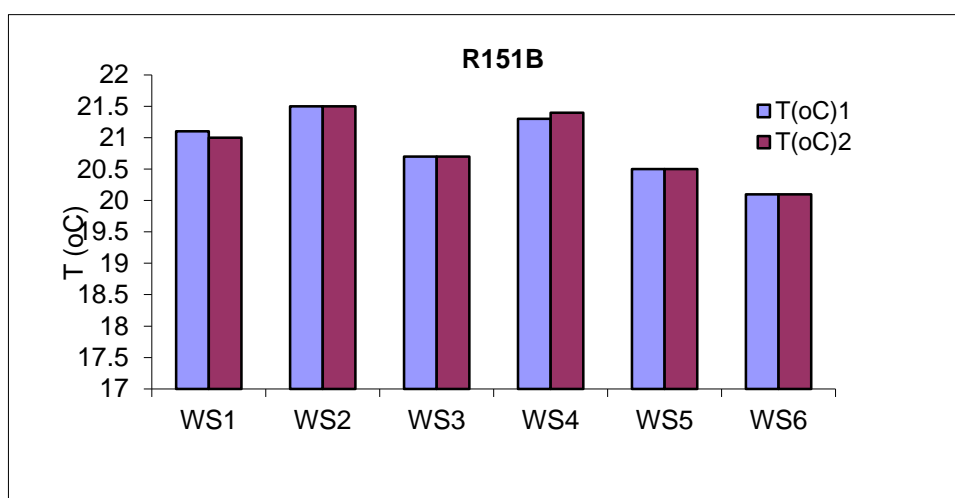
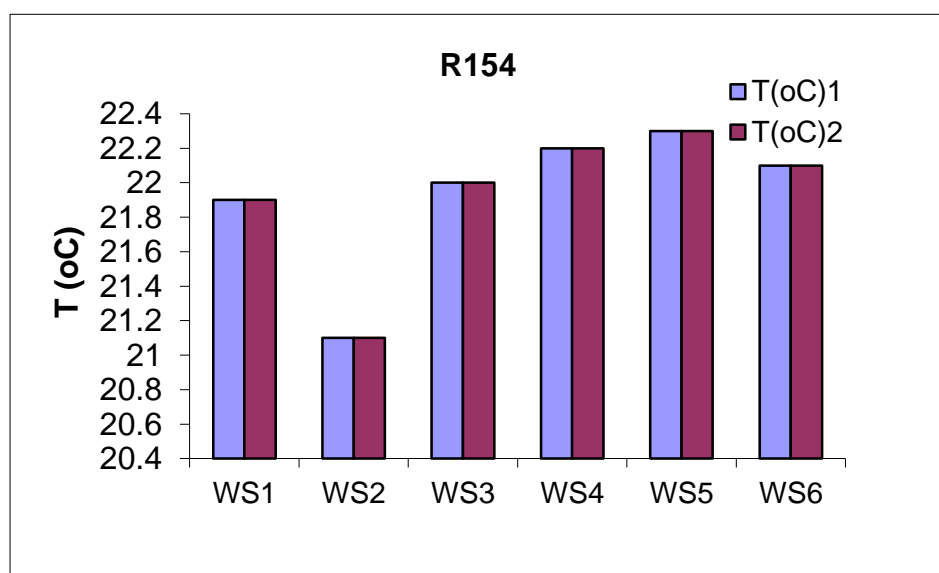
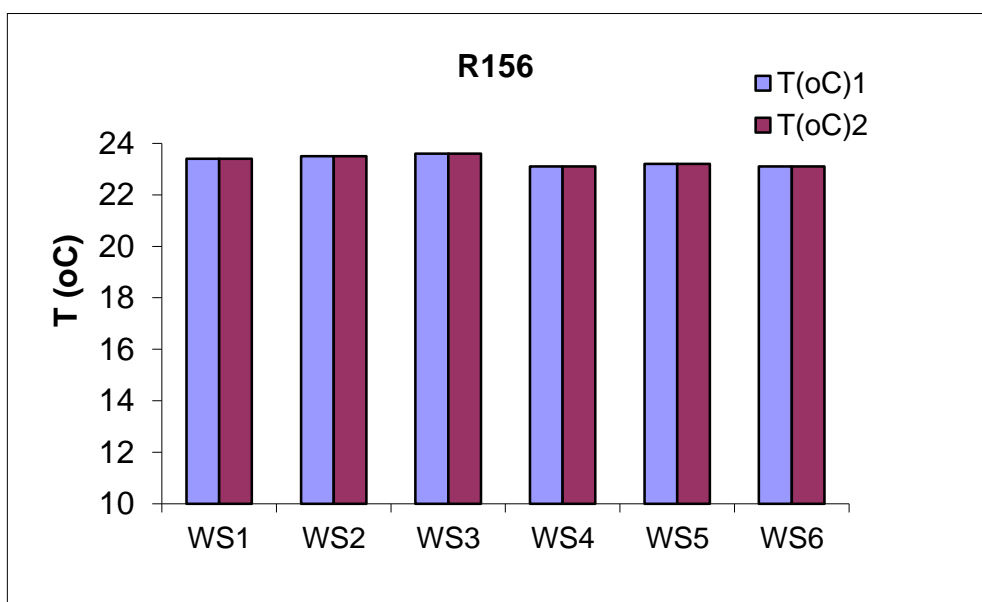
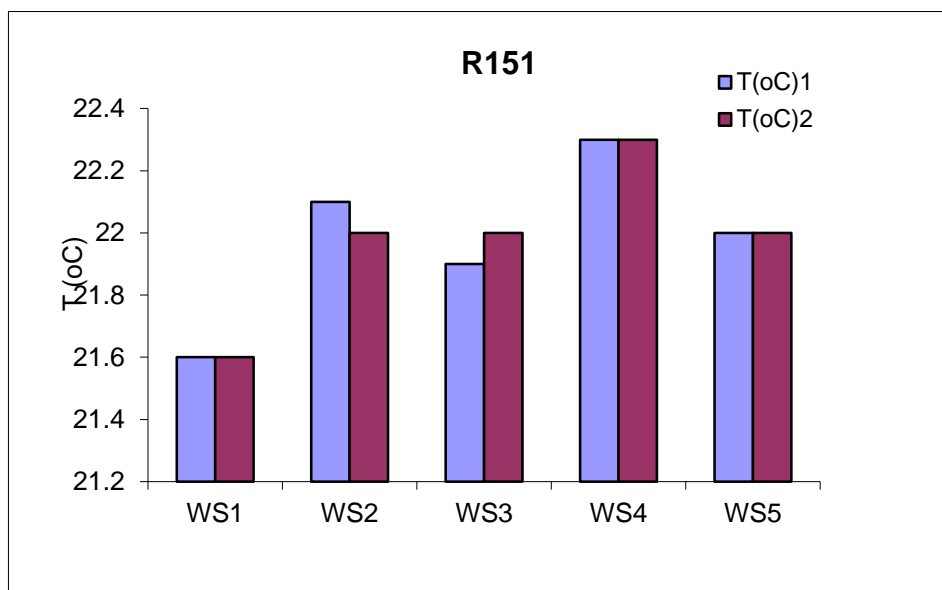


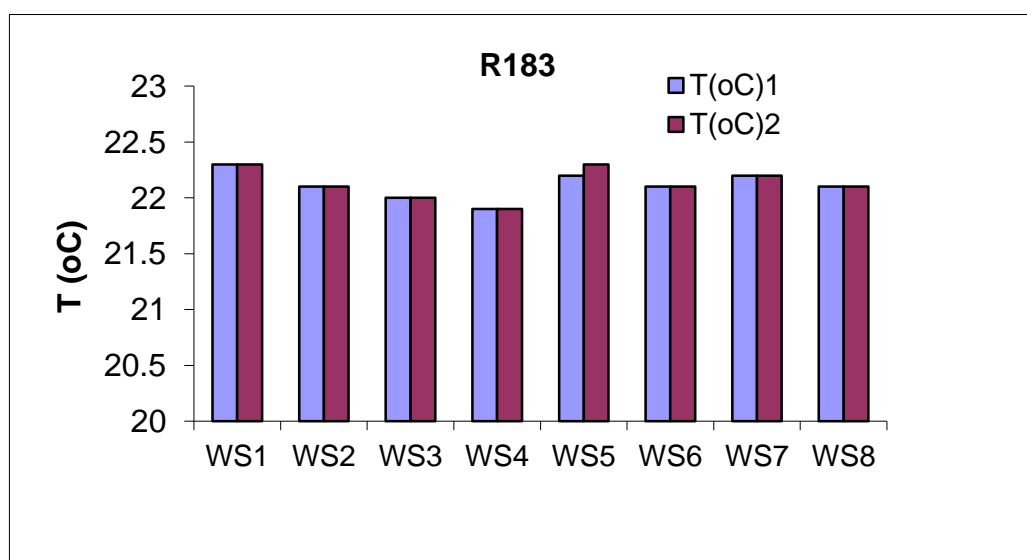
Figure II-4.1.1. Actual Temperature values of water measured in Yen Bai







FigureII-4.1.2. Actual Temperature values of water measured in Lao Cai



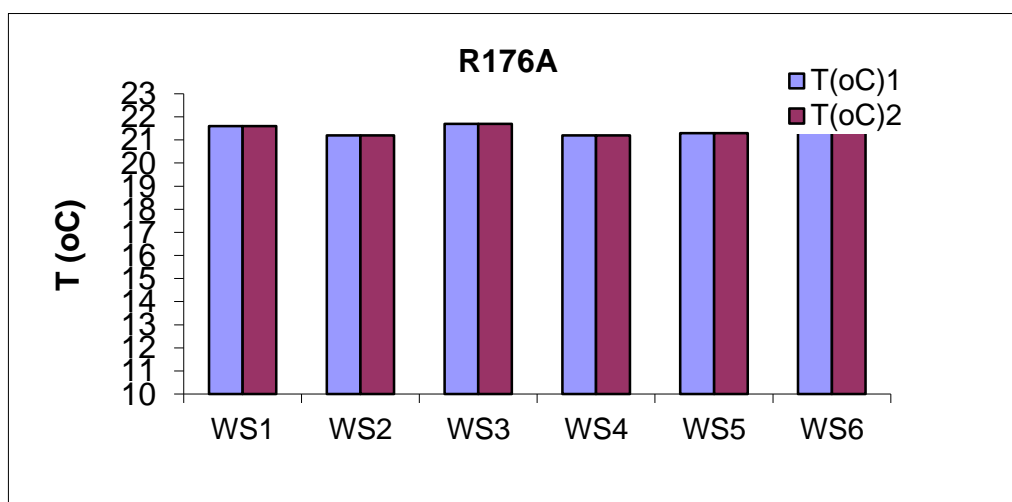


Figure II-4.1.3. Actual Temperature values of water measured in Ha Giang

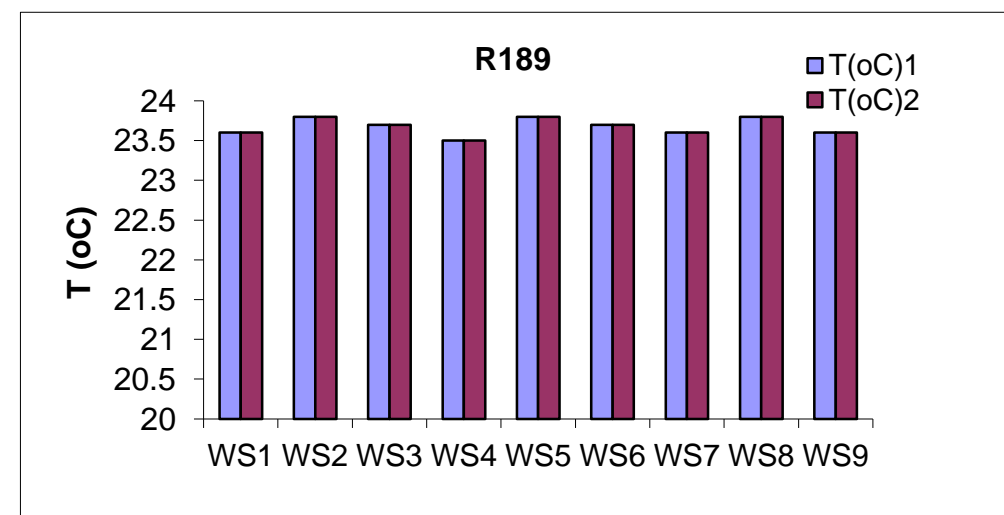
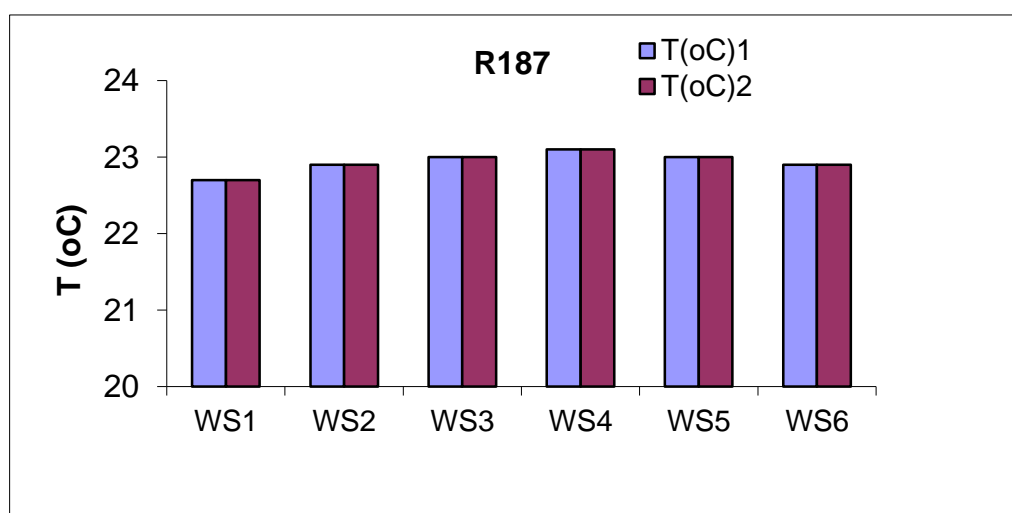


Figure II-4.1.4. Actual Temperature values of water measured in Tuyen Quang

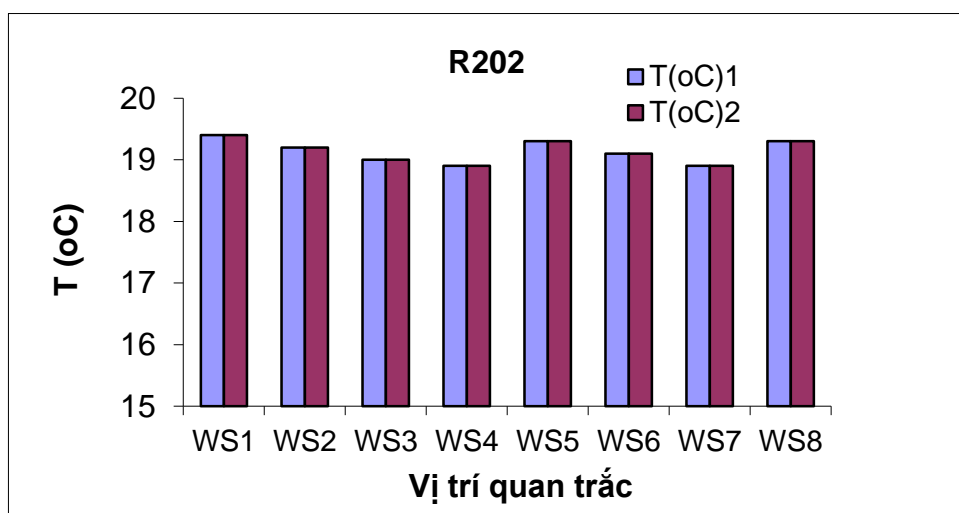


Figure II-4.1.5. Actual Temperature values of water measured in Cao Bang

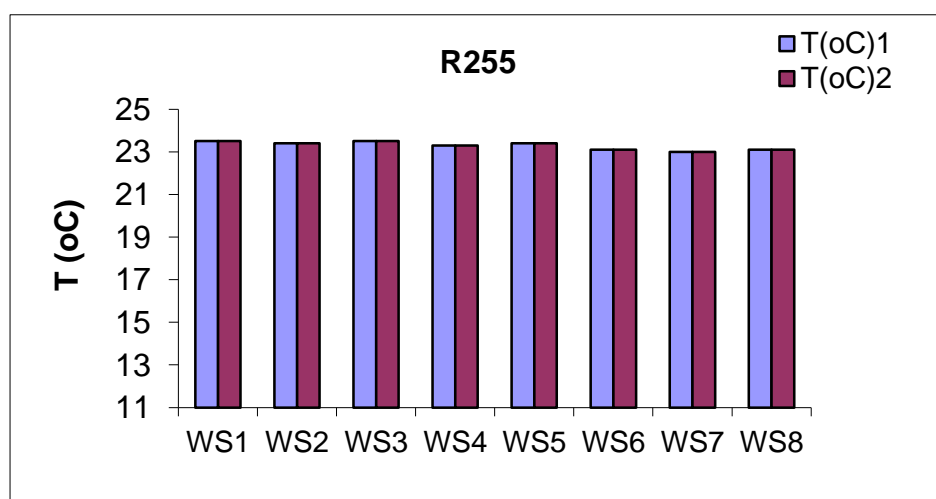


Figure II-4.1.6. Actual Temperature values of water measured in Bac Kan

II.4.2. pH

Actual pH values of each position at each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan are shown on the graph from Figure II-4.2.1 to Figure II-4.2.6. It can be seen that the pH values upstream (1) and downstream (2) at all monitoring positions are not different considerably.

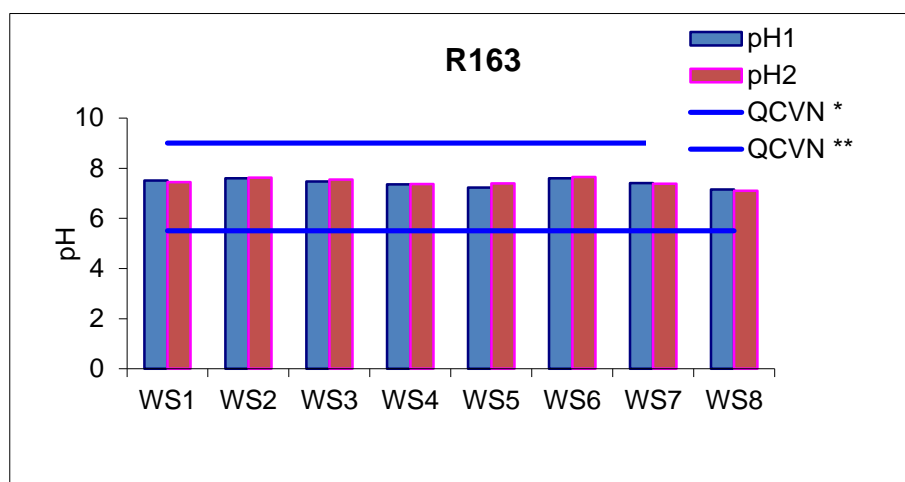
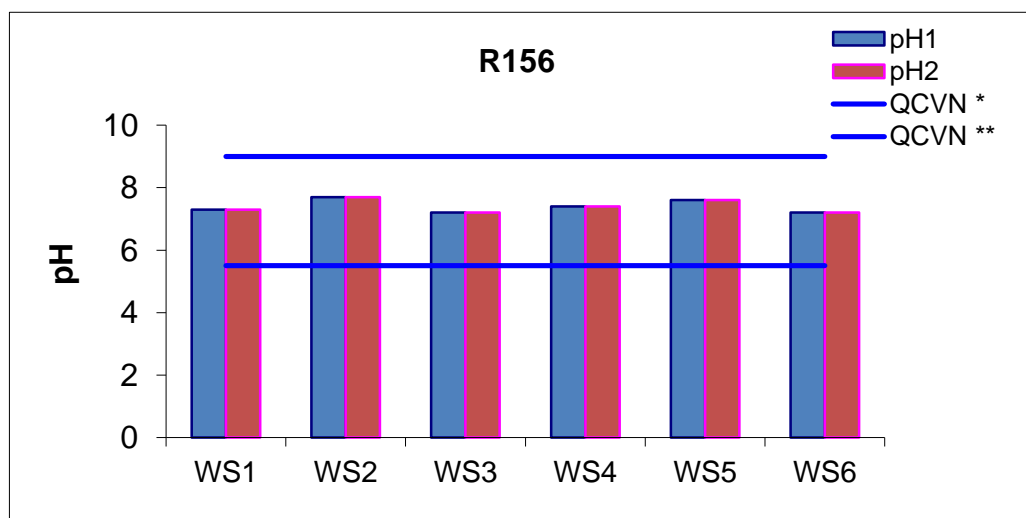
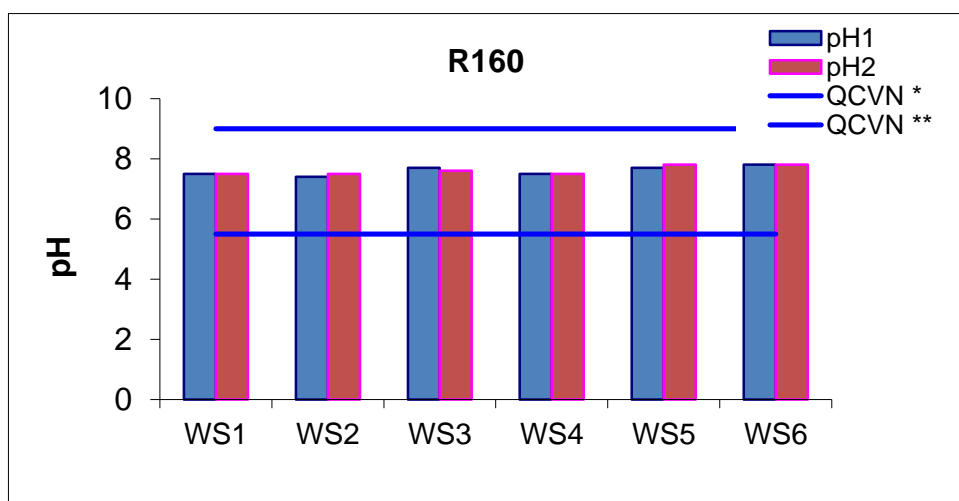


Figure II-4.2.1. Actual pH values of water in Yen Bai

It can be seen from Figure II-4.2.1 that the pH values measured at the monitoring positions along R163 in Yen Bai province are from 7,0 to 7,7. All the values are in the range of permissible limitations stipulated in QCVN 08:2008/BTNMT.



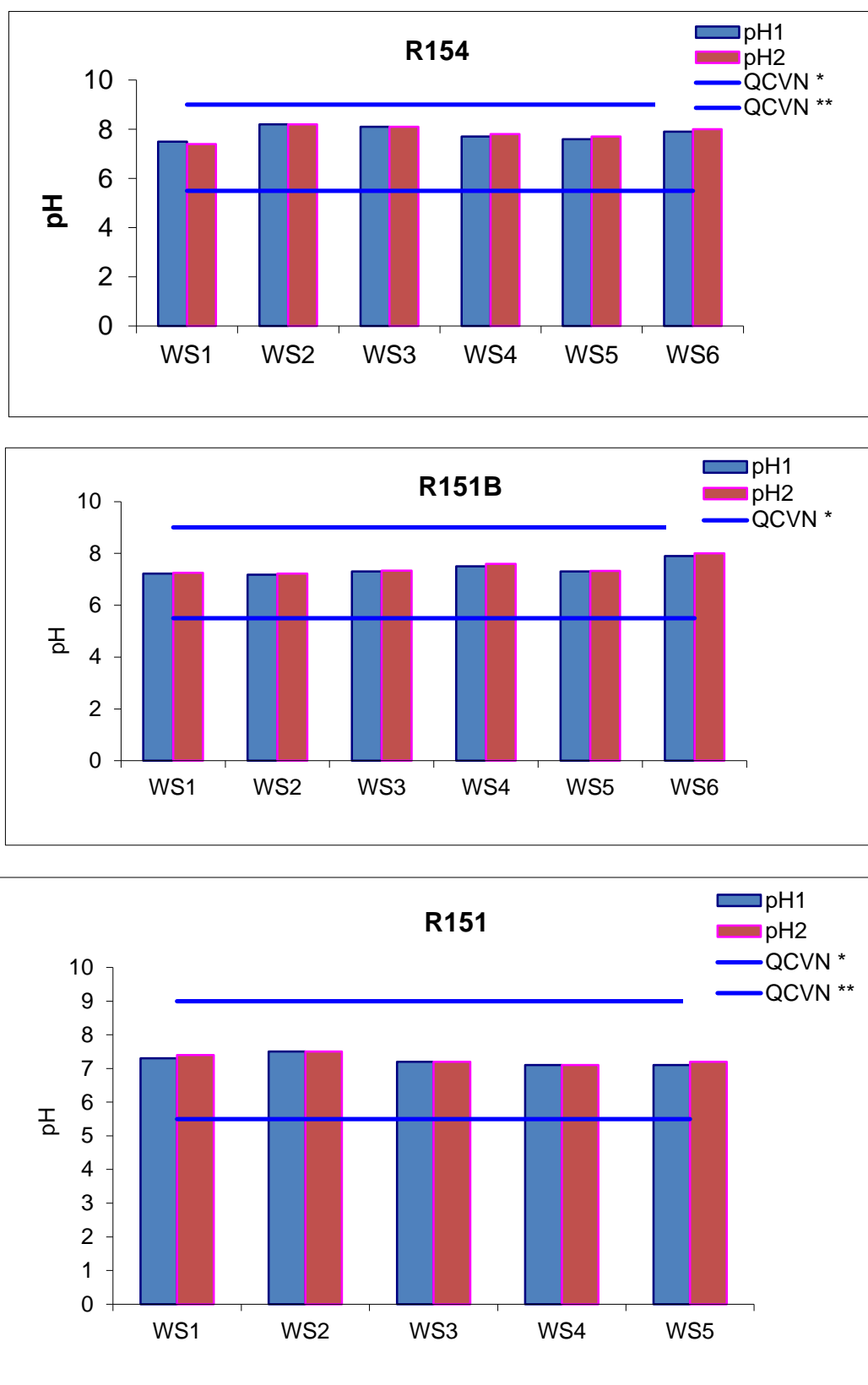


Figure II-4.2.2. Actual pH values of water in Lao Cai

All measured pH values in Lao Cai province are in the permissible range (5.5-9.0) according to QCVN 08:2008/BTNMT. It is shown on the graph Figure II-4.2.2 . The lowest pH value 7.1 is obtained at

position R151-WS4 (Xuan Sang village, Tan An commune, Van Ban, Lao Cai) and the highest pH value 8.2 is obtained at position R154-WS2 (Vang Xa, Muong Khuong town).

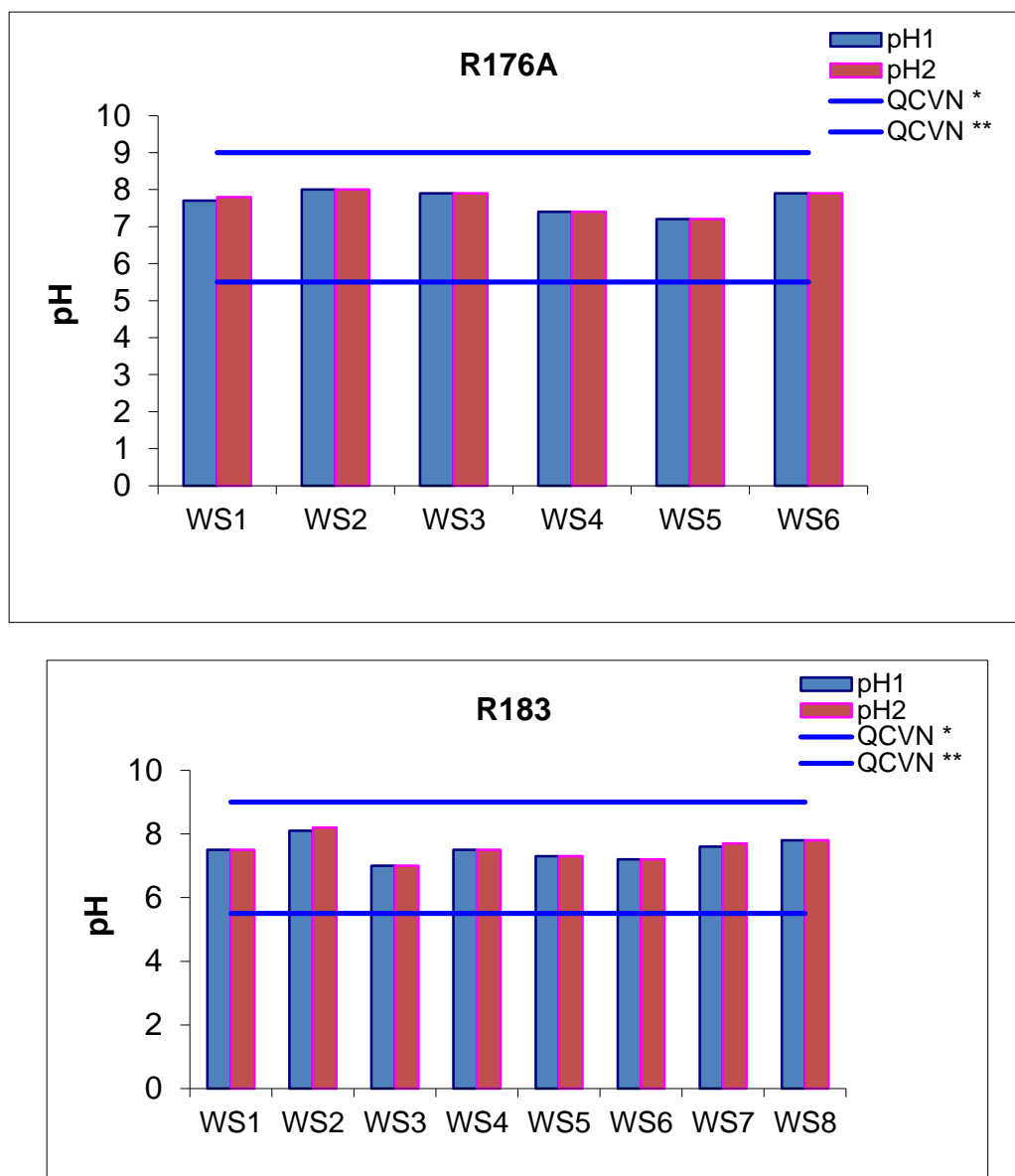


Figure II-4.2.3. Actual pH values of water in Ha Giang

Figure II-4.2.3 shows that pH values measured at the positions along R176A and R183 in Ha Giang are from 7.0 to 8.2 meeting the stipulated standard.

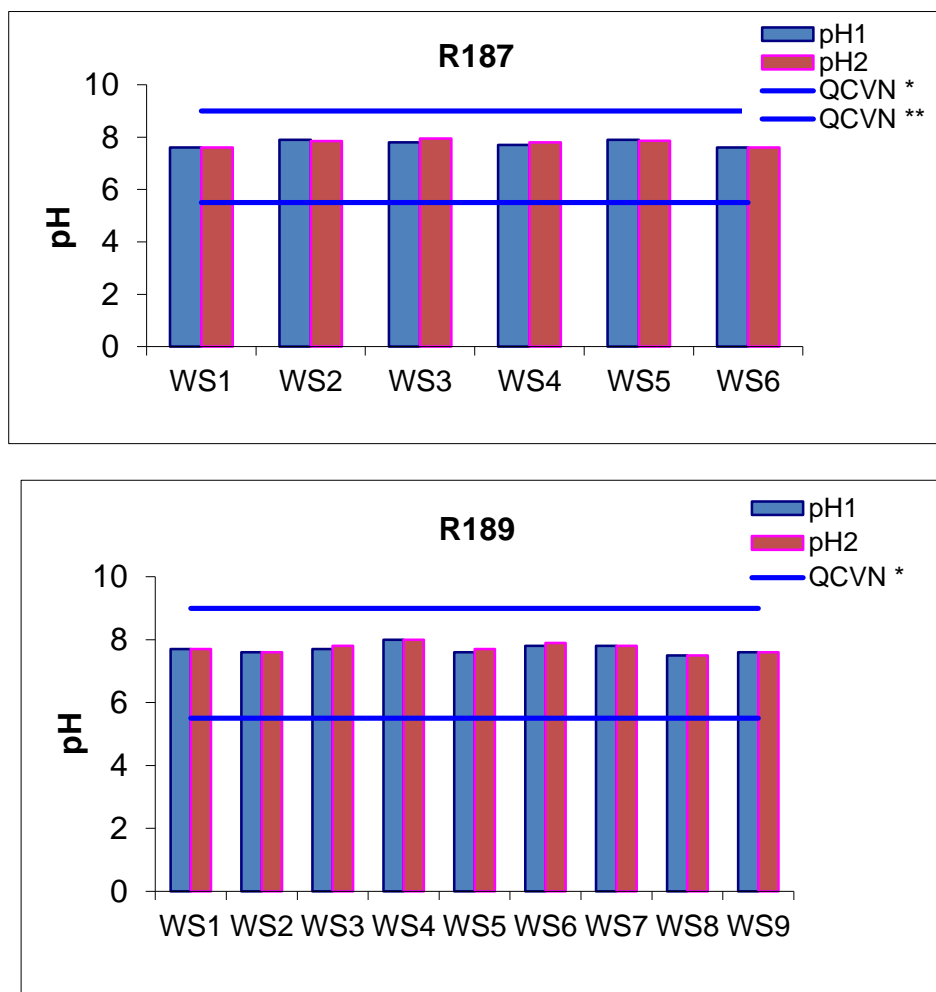


Figure II-4.2.4. Actual pH values of water in Tuyen Quang

The pH values at monitoring positions along R187 and R189 in Tuyen Quang province shown on Figure II-4.2.4 depict that the pH upstream and downstream values are not different significantly, ranging from 7.5 to 8.0, satisfying the permissible range of QCVN.

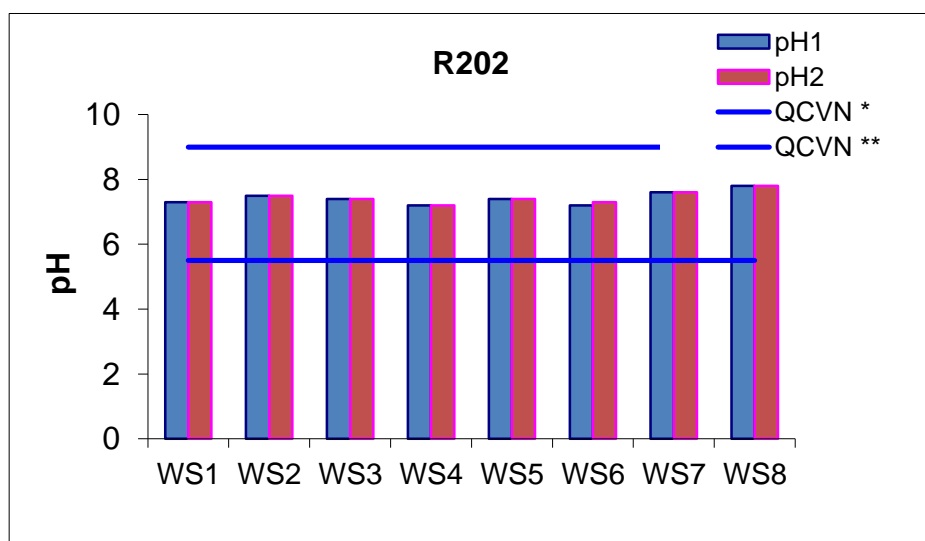


Figure II-4.2.5. Actual pH values of water in Cao Bang

Figure II-4.2.5 the measured pH value at monitoring positions along R202. The pH values monitored in this period meet QCCP and ranging from 7.2 to 7.8.

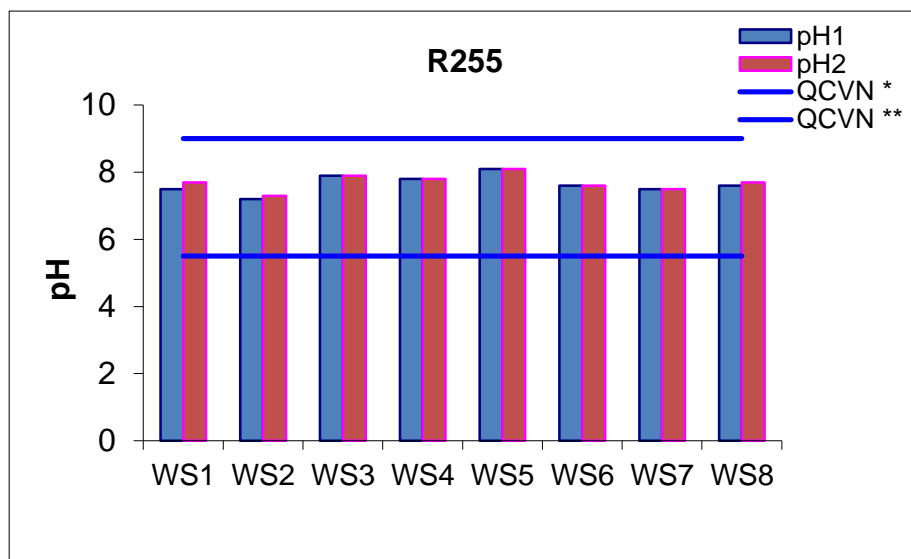


Figure II-4.2.6. Actual pH values of water in Bac Kan

Figure II-4.2.6 represents the results of pH values measured at R255, the lowest pH values 7.2 is obtained at the monitoring position R255-WS2-1 (Coc Thu village, Ngoc Phai, Cho Don) and the highest 8.1 is obtained at the monitoring position R255-WS5 (Khuoi Diec, Na Khot village, Yen Thuong, Cho Don). There are no pH values which is over the limitation of QCVN.

II.4.3. Turbidity

The figures from Figure II-4.3.1 to Figure II.4.3.6 demonstrate measured turbidity values of water at each positions in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 6-7/2015.

The turbidity values at upstream (1) and downstream (2) position have no significant difference.

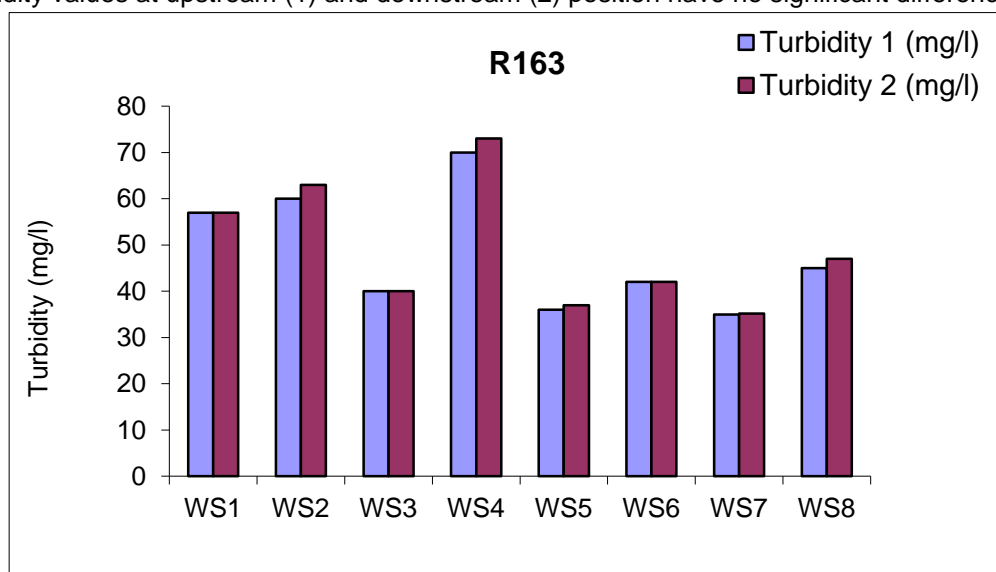
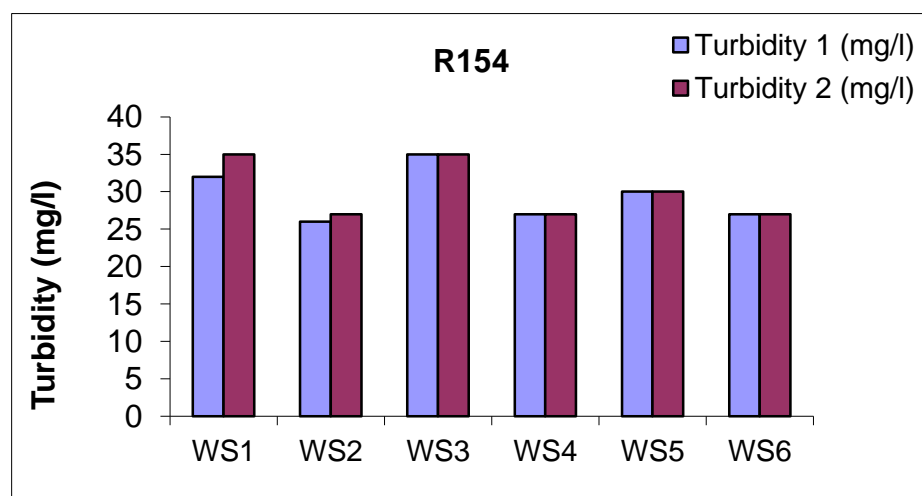
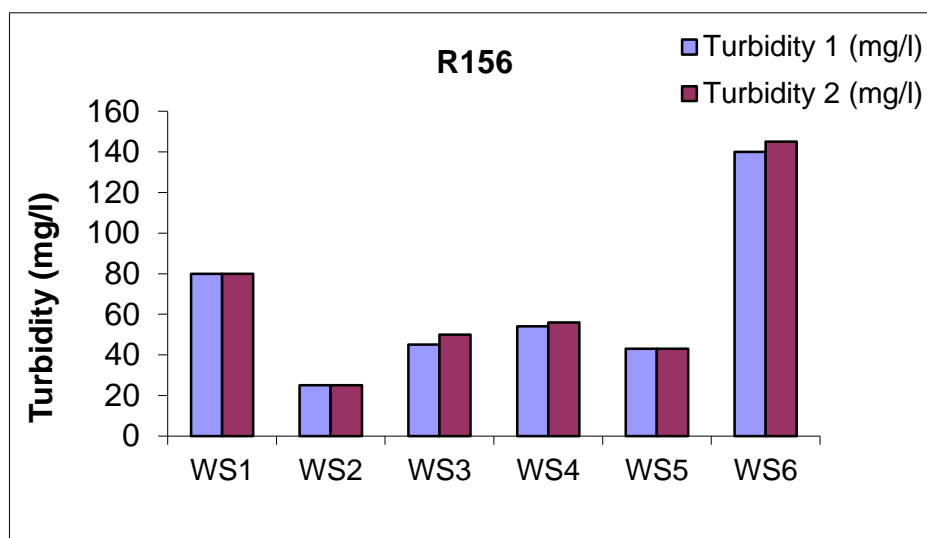
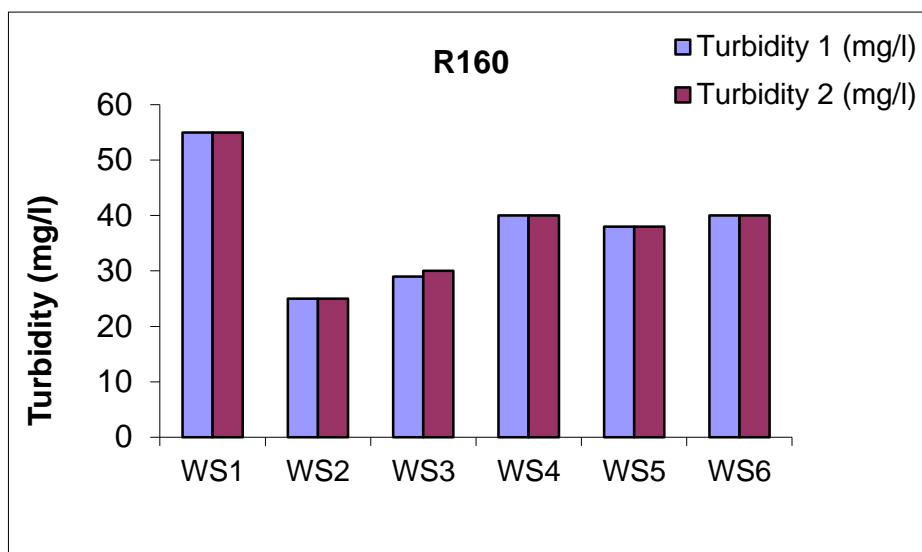


Figure II-4.3.1. Actual Turbidity values of water in Yen Bai

Generally, at the monitoring positions along R163 in Yen Bai province, turbidity values are quite high. At position R163-WS4-2 (Ngoi Hop village, Bao Dap commune, Tran Yen), the highest 73 mg/l is obtained

and the lowest 36 mg/l is obtained at position R163-WS5 (Yen Hung village, Yen Hung commune, Van Yen) (Figure II-4.3.1).



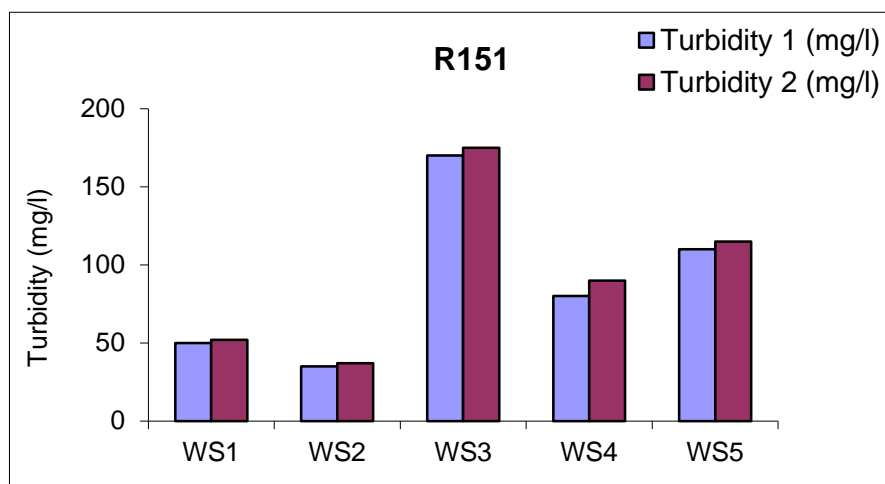
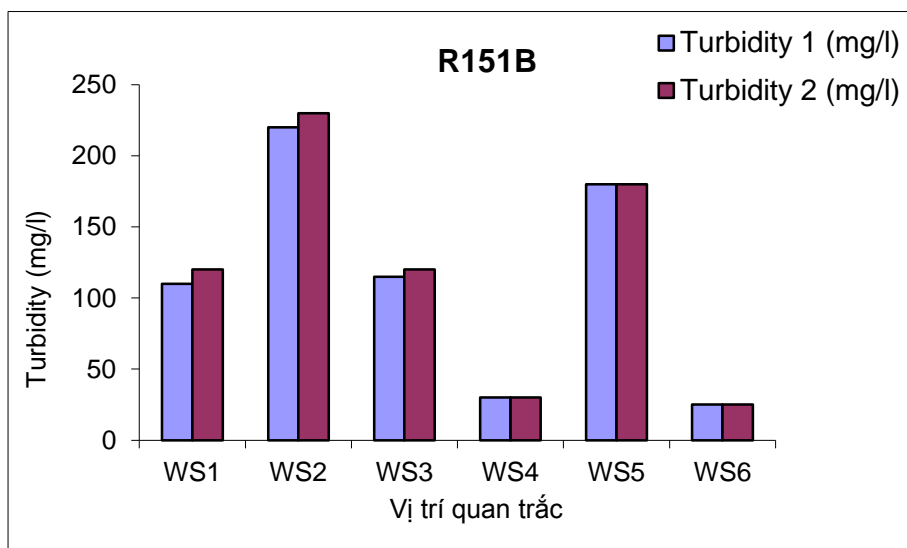
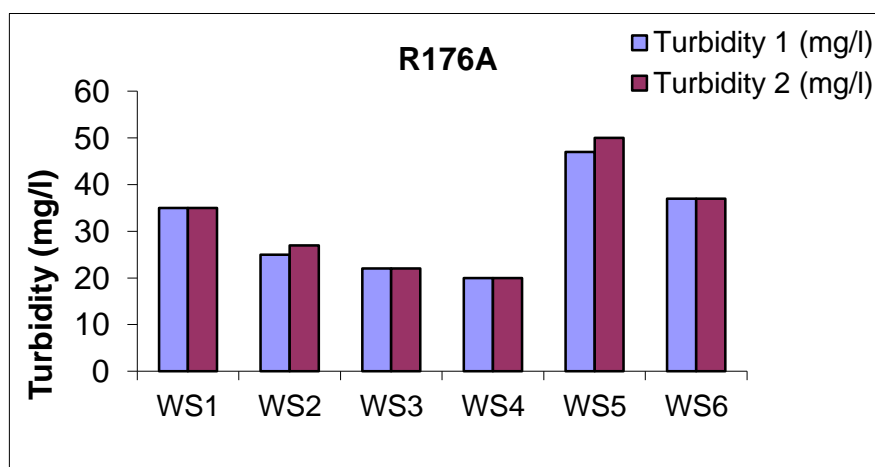


Figure VI-4.3.2. Actual Turbidity values of water in Lao Cai

In Lao Cai province, Turbidity values at R151B are high, the highest is 230 mg/l obtained at R151B-WS2-2. , the values obtained at R151, R156 are relative high (Figure II- 4.3.2), at other positions, turbidity values are under 50 mg/l.



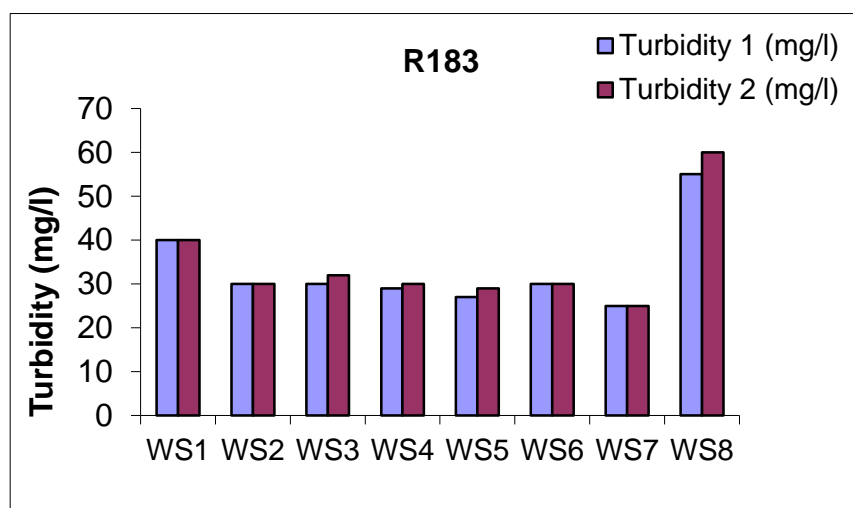


Figure II-4.3.3. Actual turbidity values of water in Ha Giang

Almost of the turbidity values of water at the monitoring positions along 176A and 183 are low, in range of 20-50 mg/l. at R183-WS8, the turbidity are remarkably higher with the values of 55 and 60 mg/l(Figure II.4.3.3).

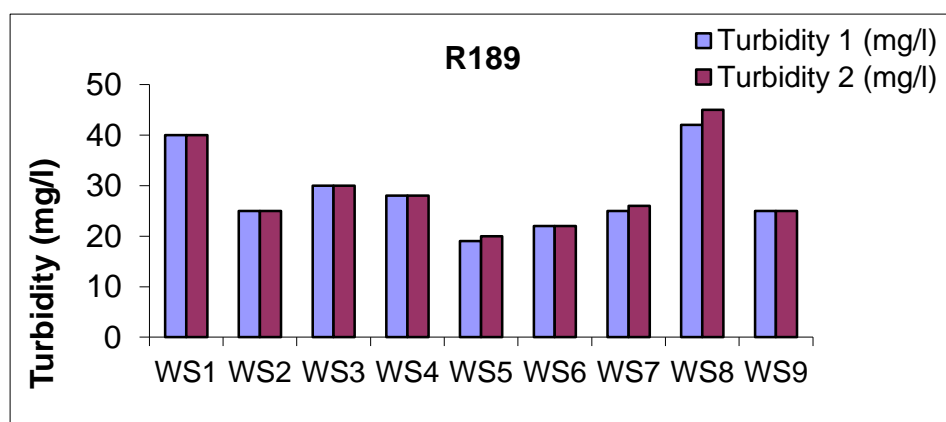
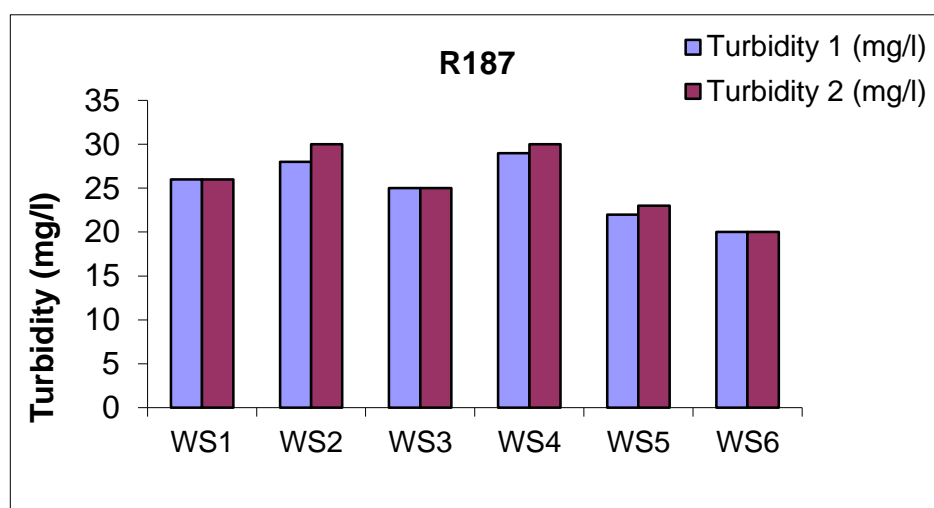


Figure II-4.3.4. Actual turbidity values of water in Tuyen Quang

The turbidity at the positions along R187, R189 in Tuyen Quang depicted in Figure II-4.3.4 are not high, ranging from 20 to 45 mg/l,

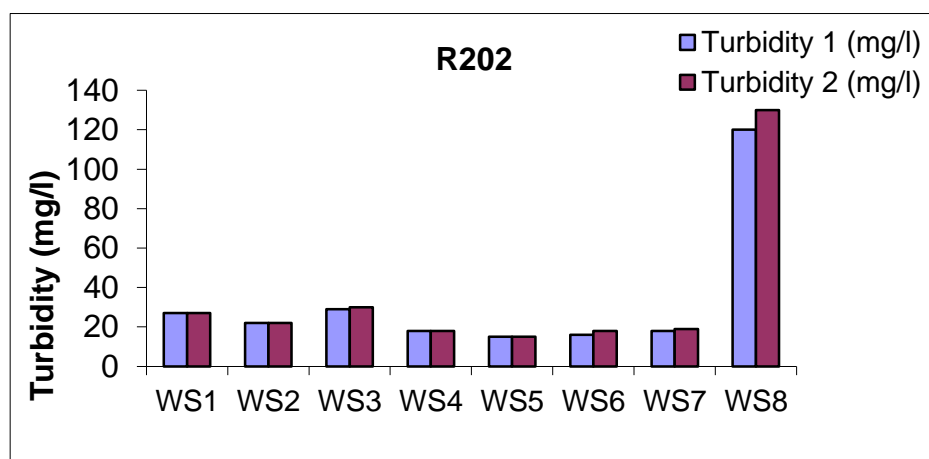


Figure II-4.3.5. Actual Turbidity values of water in Cao Bang

Turbidity values at the monitoring positions along R202 in Cao Bang are shown in Figure II- 2.3.5. The noticeable values 130 mg/l is obtained at R202-WS8. Almost values measured are not high in the range of 15-30 mg/l, the highest is obtained at R202-WS3 (Luong Sung village, Yen Lac commune, Bao Lac) and the lowest is obtained at R202-WS5 (underground stream Km 12, Nam Pap village, Dinh Phung commune, Bao Lac).

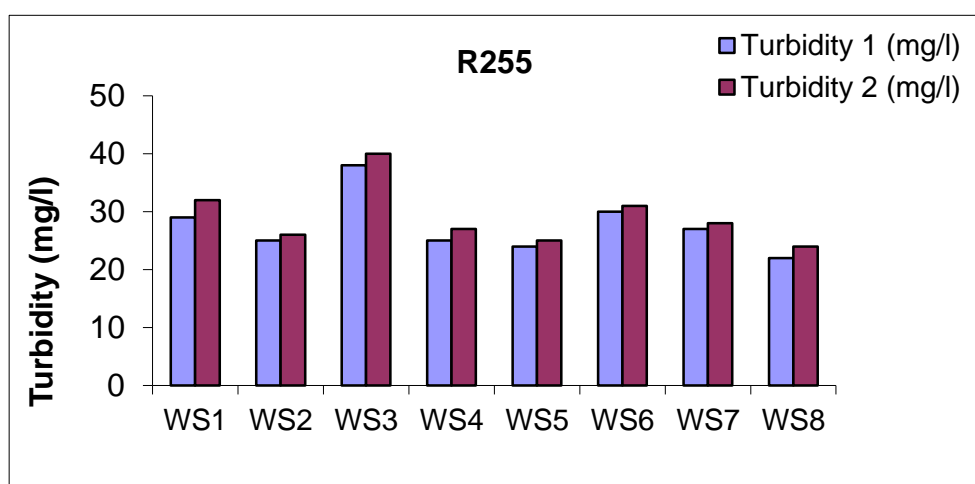


Figure II-4.3.6. Actual Turbidity values of water in Bac Kan

Turbidity values at the monitoring positions along R255 in Bac Kan are demonstrated on the graph in Figure II- 4.3.6. Turbidity concentrations fluctuate in the range from 24 to 40 mg/l.

II.4.4. TSS

The Figures from Figure II- 4.4.1 to Figure II- 4.4.2 represent TSS values of each positions along each specific road of 6 areas: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 6-7/2015. Upstream(1) and downstream(2) TSS value at some monitoring positions have inconsiderable difference.

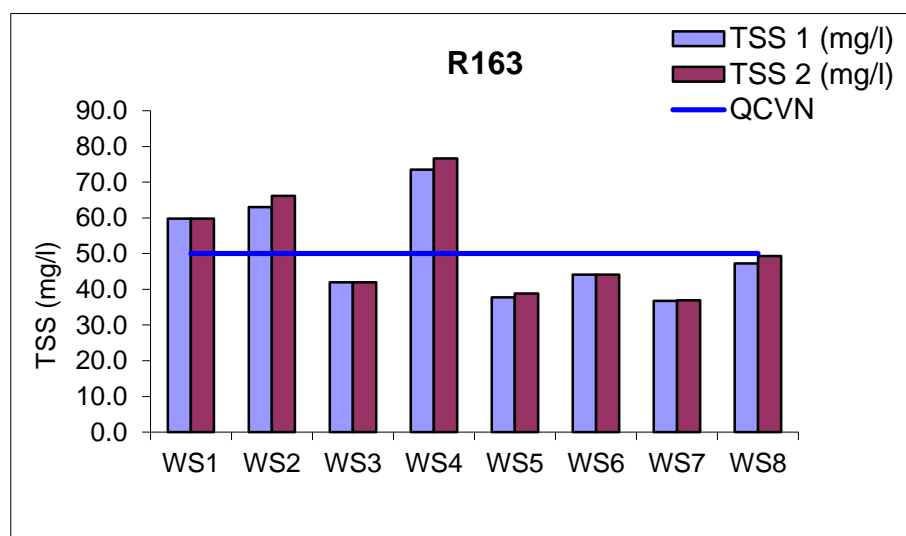
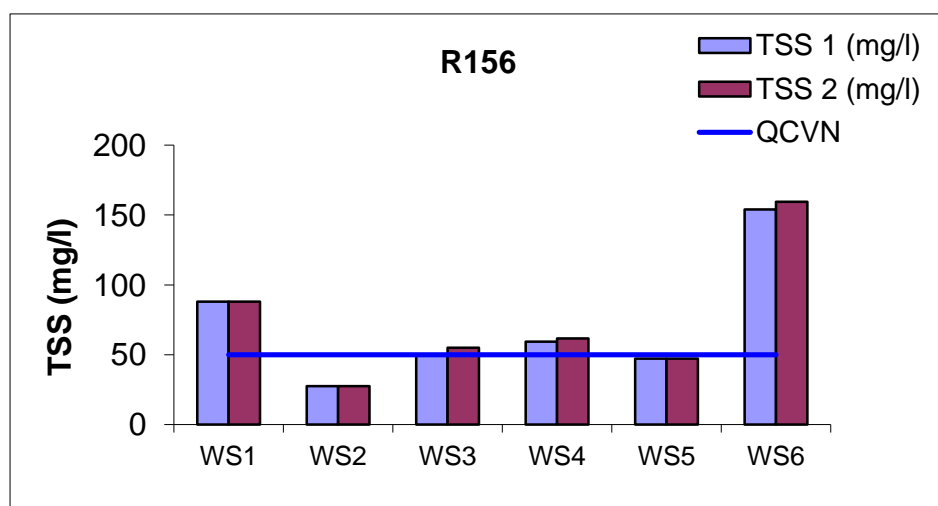
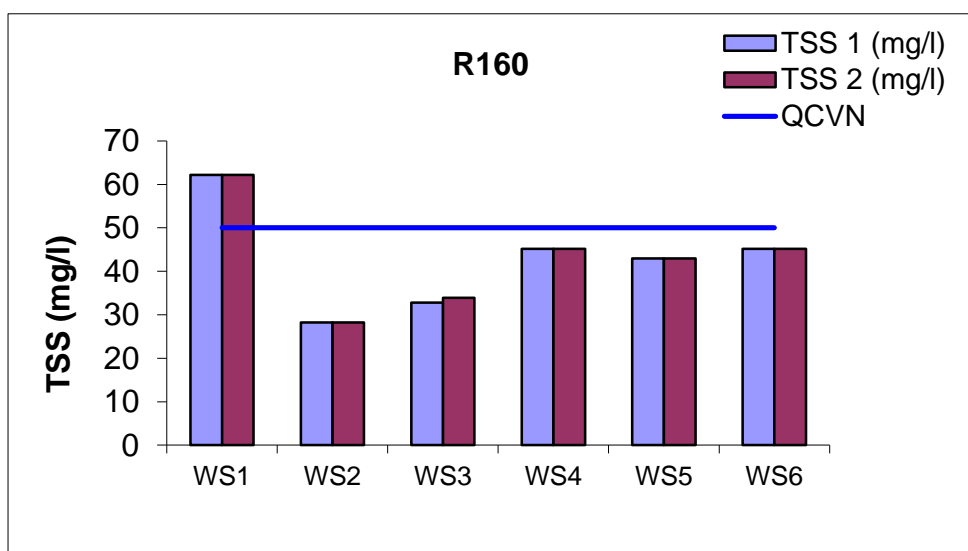


Figure II-4.4.1. Actual TSS values of water in Yen Bai

At the monitoring positions along R163 in Yen Bai province, excepting the TSS concentration at R163-WS1, R163-WS2, R163-WS3 over the permissible limitation, (Figure II-4.4.1) the others meet the standard of column B1 (QCVN 08:2008/BTNMT).



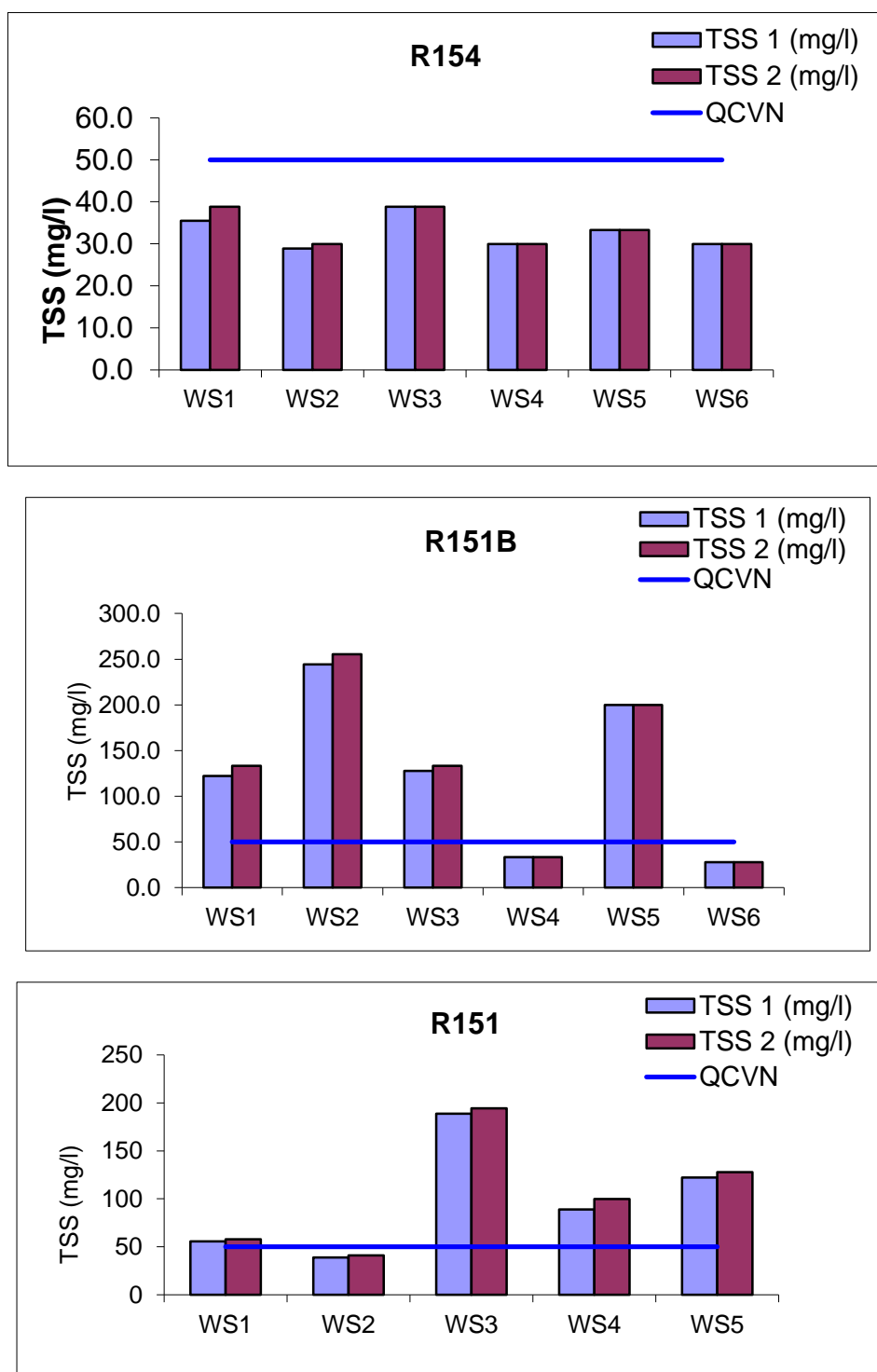


Figure II-4.4.2. Actual TSS values of water in Lao Cai

Based on Figure II-4.4.2, it can be found that in Lao Cai province, TSS values at monitoring positions at R154 are below the permissible limitation of QCVN 08:2008/BTNMT (column B1), ranging from 28,9 mg/l to 38,9 mg/l. At the other routes, TSS values are relatively high. The positions at which TSS values over permissible limitation include: vị trí R156-WS1, R156-WS3, R156-WS4, R156-WS6, R160-WS1, R151B-WS1, R151B-WS2, R151B-WS3, R151B-WS5, R151-WS3, R151-WS4, R151-WS5.

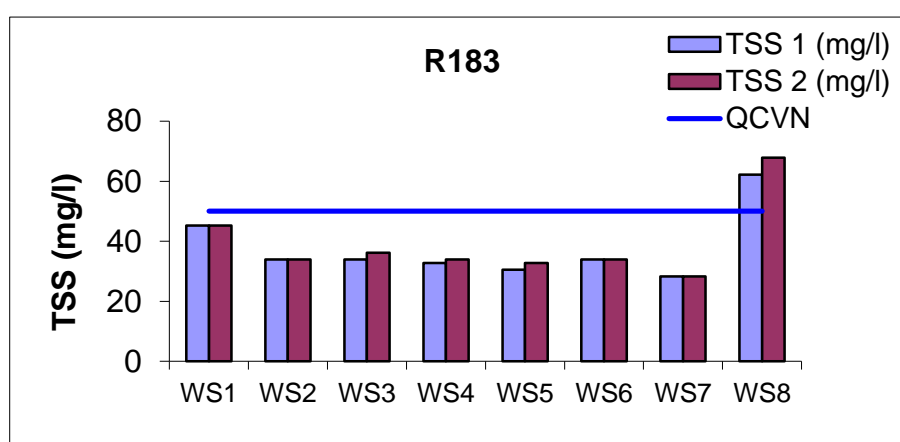
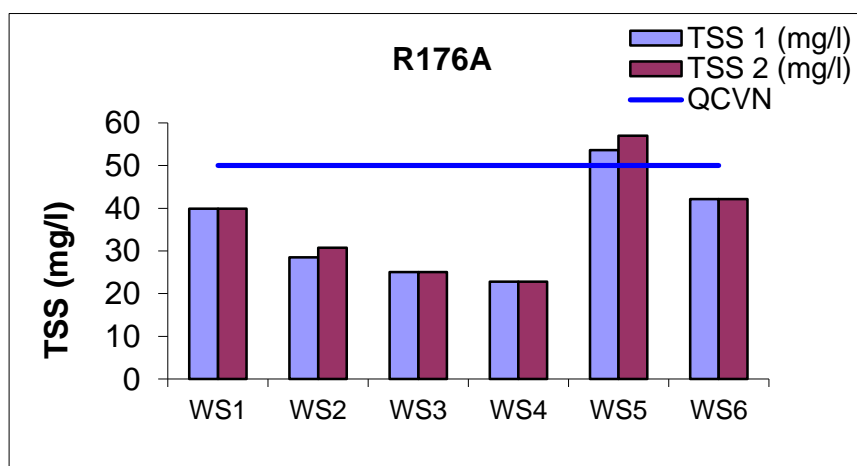
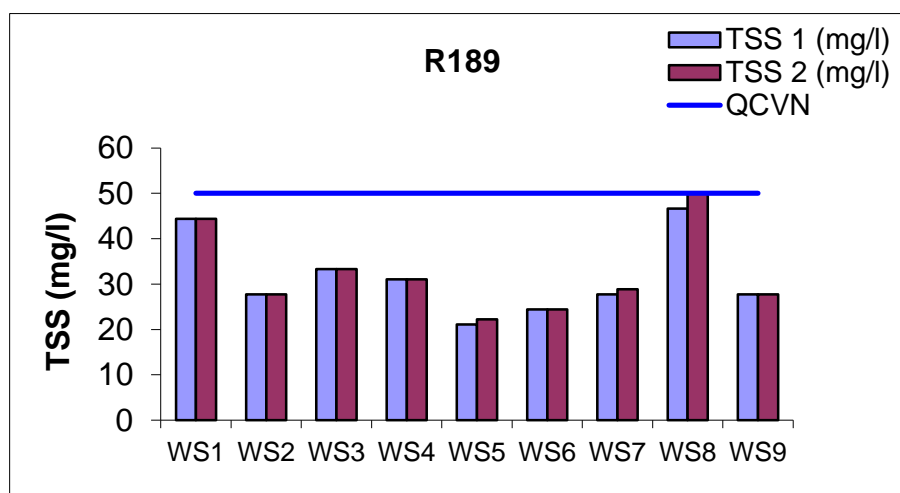


Figure II-4.4.3. Actual TSS values of water in Ha Giang

TSS values at the monitoring positions along R176A are high at 2 monitoring positions R176A-WS5, R183-WS8, turbidity values are higher the permissible limitation of QCVN (Figure II-4.4.3). TSS concentration at the other positions in the range of 23 -45 mg/l, not exceeding 50 mg/l- the permissible limitation of B1 column (TCVN 08:2008/BTNMT).



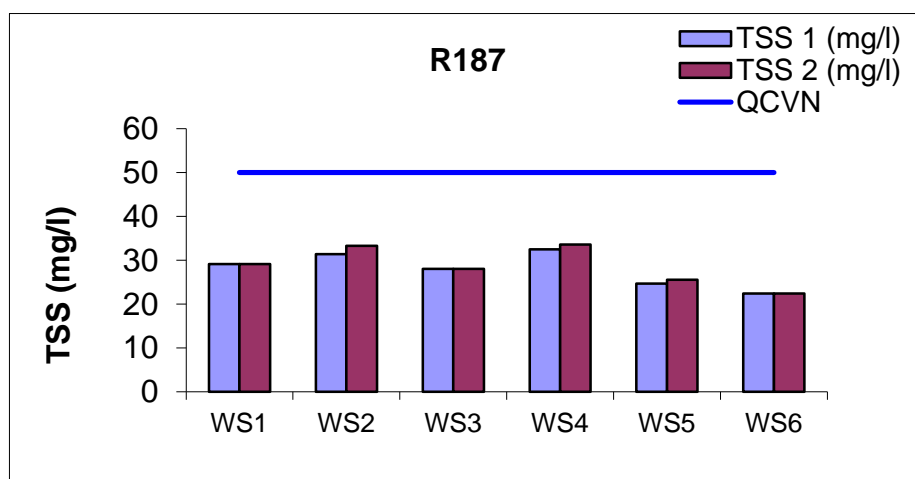


Figure II-4.4.4. Actual TSS values of water in Tuyen Quang

Figure II- 4.4.4 presents TSS values of water of the locations along two roads R187 and R189 in Tuyen Quang. The remarkable TSS value found at R189-WS8 (Tan Thinh village, Yen Thuan, Ham Yen) reaches the stipulated limitation of QCVN 08:2008/BTNMT. TSS values of water at the other positions are from 22 to 44 mg/l meeting the standard of B1 column.

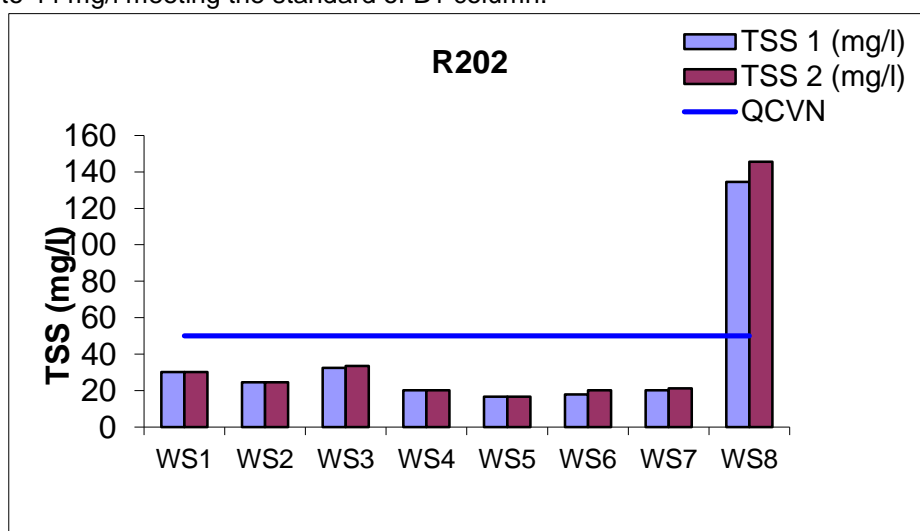


Figure II-4.4.5. Actual TSS values of water in Cao Bang

Figure II- 4.4.5 shows TSS values monitored at the positions along R202 in Cao Bang. The noticeable TSS value at R202-WS8 (Mo Din village, Huy Giap commune, Bao Lac) is nearly 3 times as high as the permissible limitation B1 of QCVN. The other TSS values are under the limitation of QCVN, the lowest is of 16,8 mg/l at R202- WS5 (underground stream Km15, Nam Pap village, Dinh Phung commune).

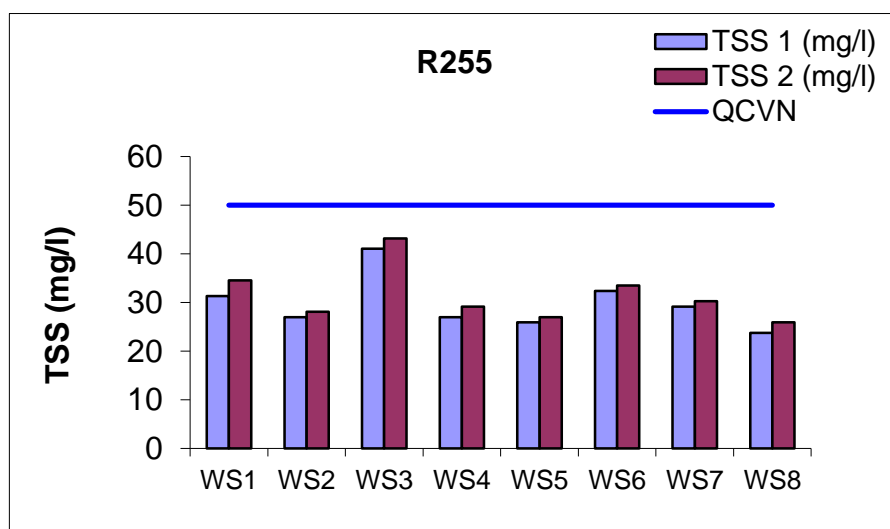


Figure VI-4.4.6. Actual TSS values of water in Bac Kan

TSS values monitored at the monitoring positions along R255 in Bac Kan are presented on the graph in Figure II- 4.4.6.

The low TSS concentrations are below QCCP and fluctuate in the range from 24 mg/l to 43- mg/l.

II.4.5. DO

The actual DO values of each position on each road of 6 areas: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in -6-7/2015 are shown on the graphs from Figure II- 4.5.1 to Figure II- 4.5.6, DO measurements upstream (1) and downstream (2) from the construction site at each monitoring location have no significant differences.

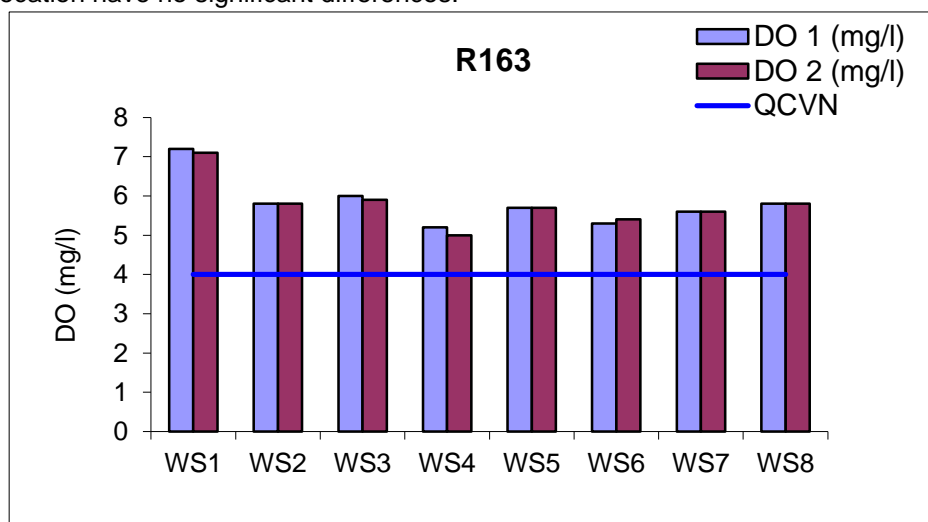
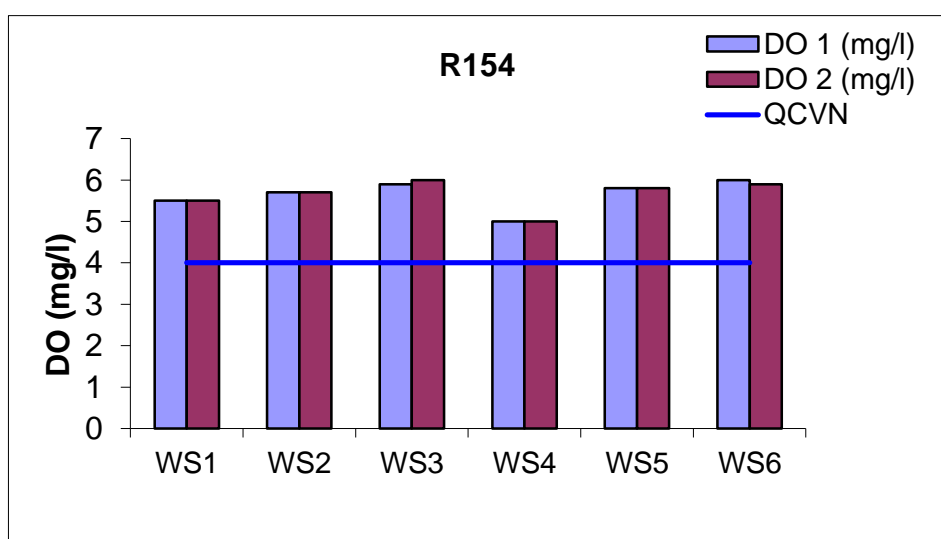
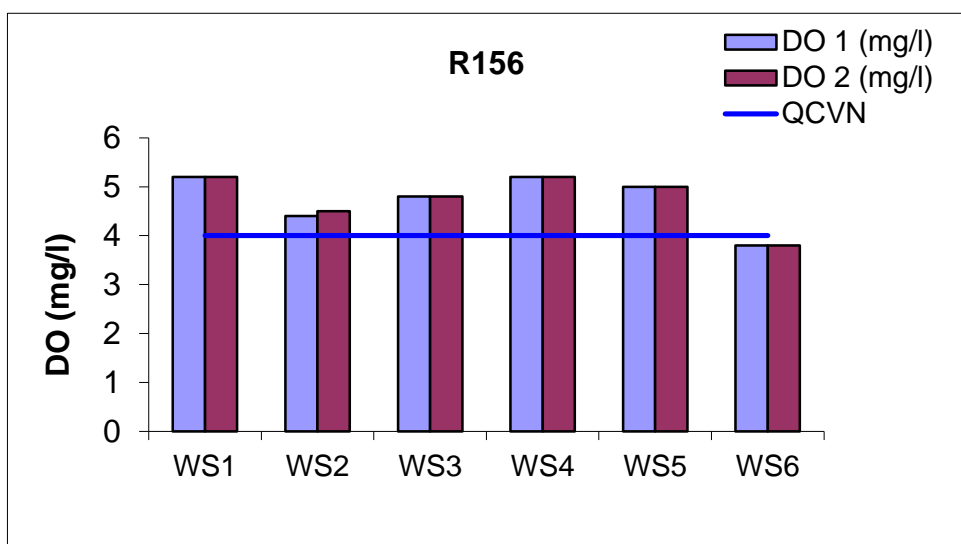
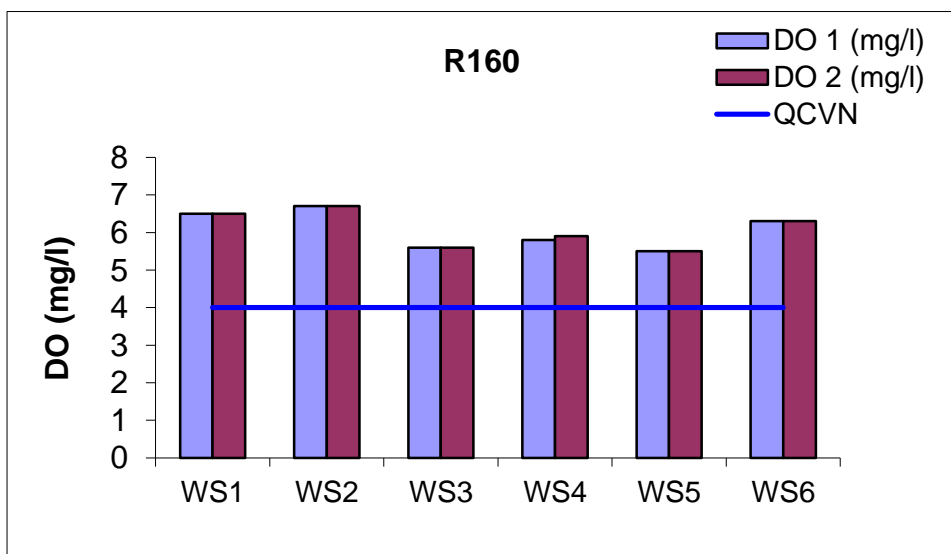
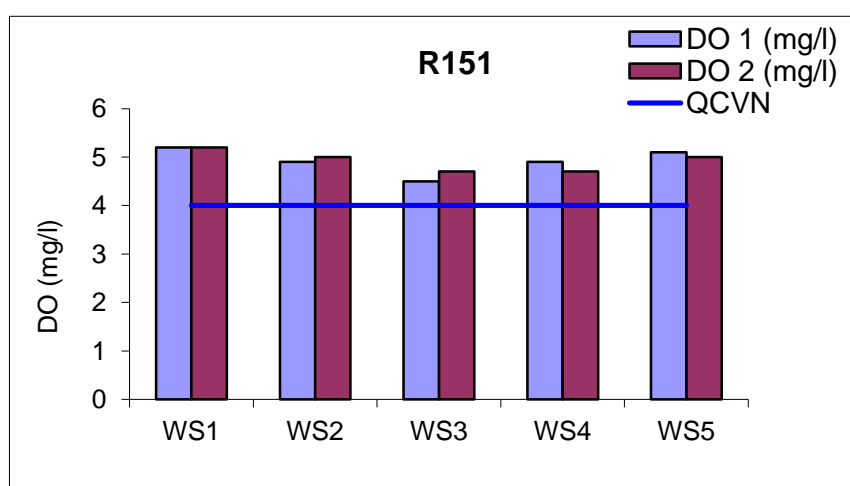
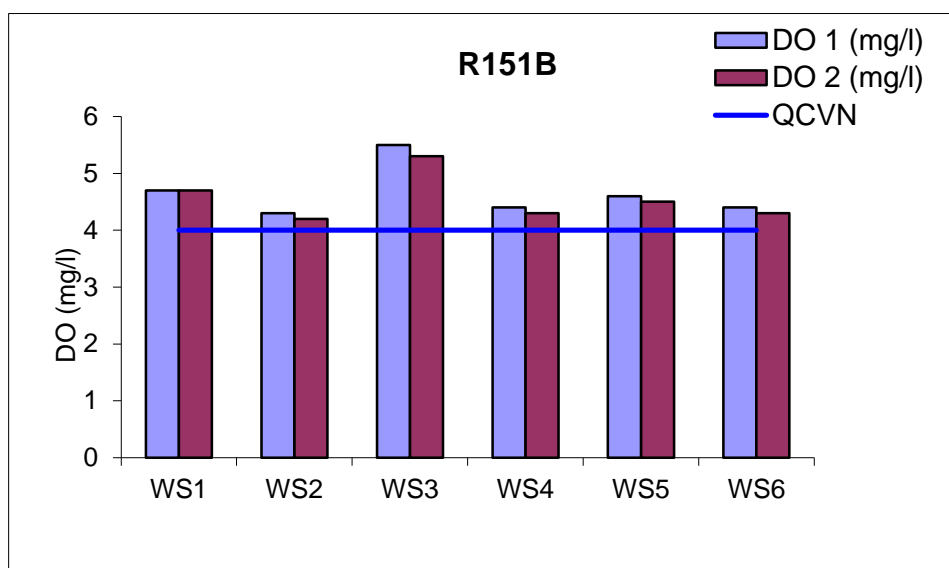


Figure II-4.5.1. Actual DO concentrations of water in Yen Bai

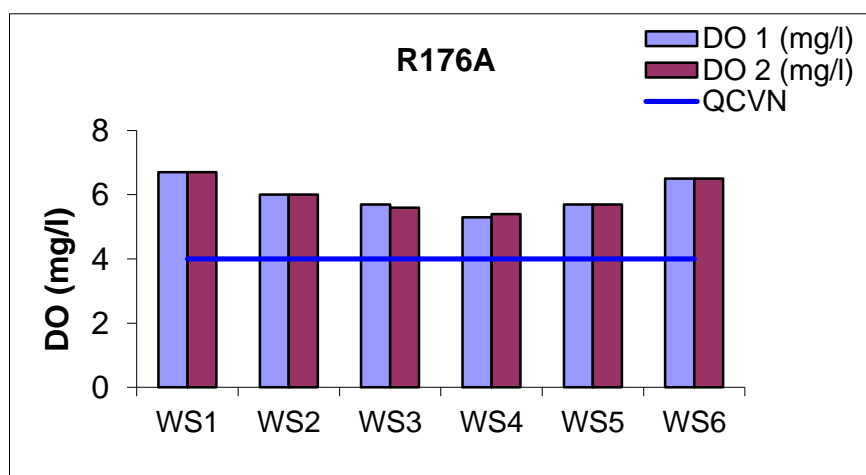
All DO measured values at the positions along R163 in Yen Bai meet the limits of QCVN 08:2008/BTNMT. Range of values is from 5.0 mg/l to 7.2 mg/l (Figure II- 4.5.1).

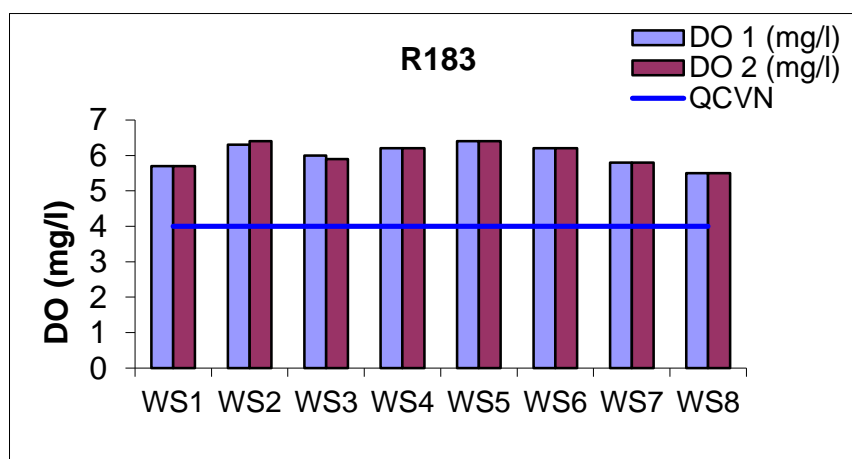




FigureII-4.5.2. Actual DO concentrations of water in Lao Cai

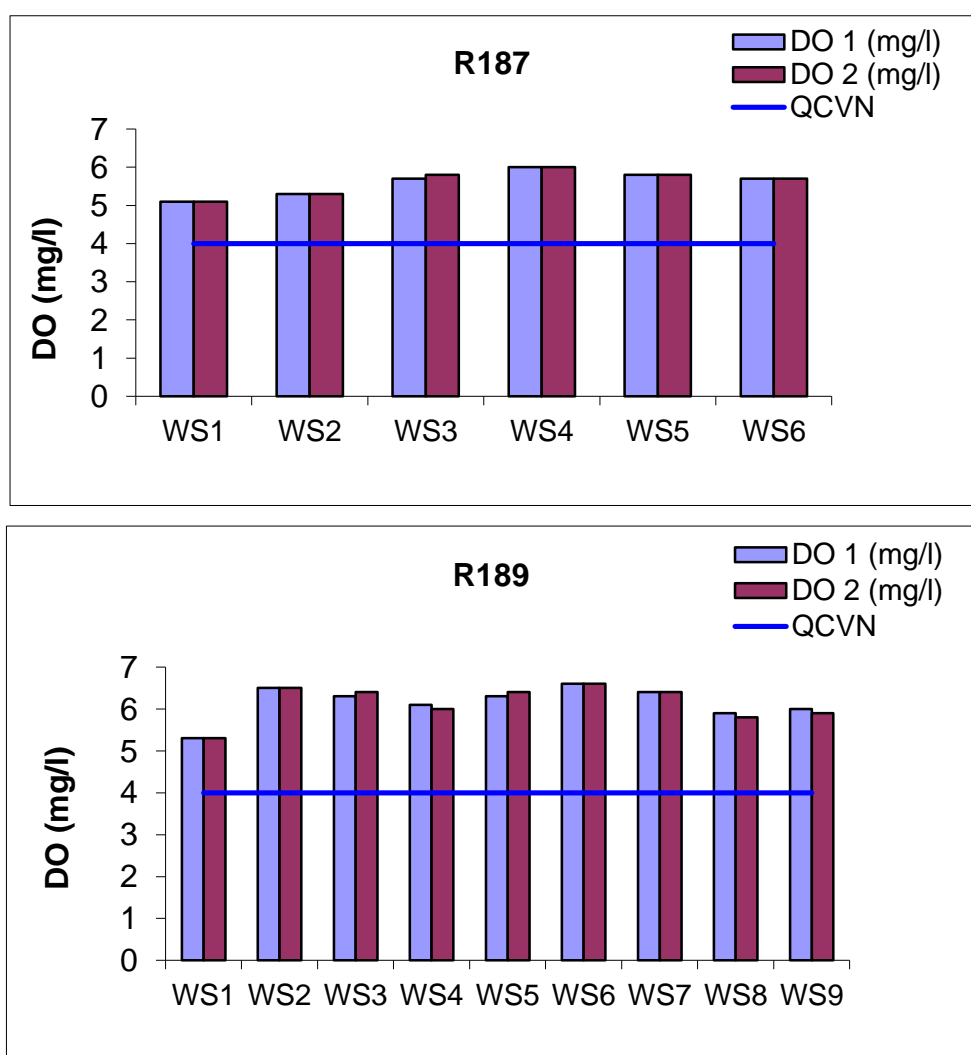
Figure II- 4.5.2 presents the graphs of the measured DO values at the monitoring positions along 5 roads R151, R151B, R154, R156 and R160 in Lao Cai area. Most of the values above the limitation 4 mg/l of column B1 of QCVN 08:2008/BTNMT. Particularly, DO concentrations at the position R156-WS6 does not meet the QCVN 08:2008/BTNMT (B1), is of 3,8 mg/l.





FigureII-4.5.3. Actual DO concentrations of water in Ha Giang

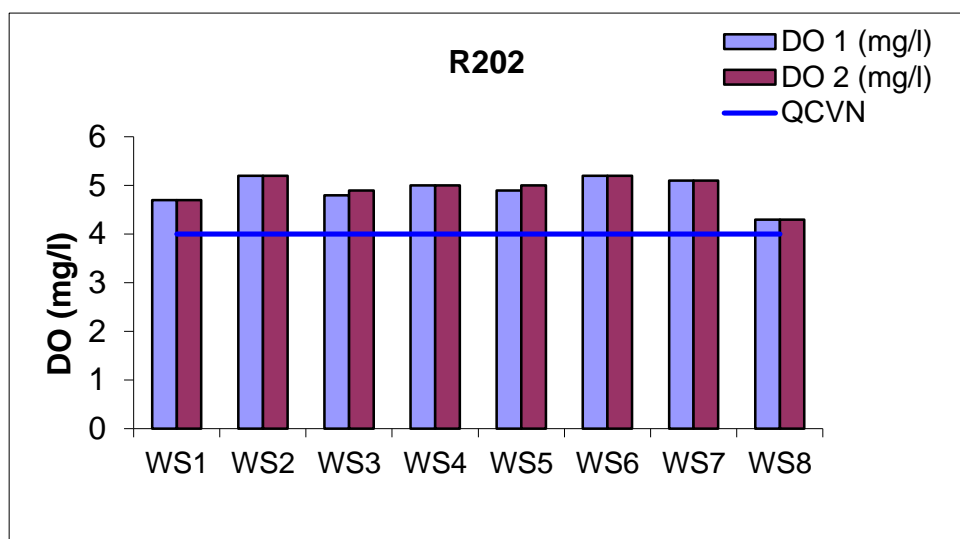
Figure II- 4.5.3 displays graphs of the DO results of the water bodies along the two roads R176A and R183 in Ha Giang. All values fluctuating in the range of 5,3 – 6,7 mg/l, satisfy the permissible limit of QCVN 08:2008/BTNMT.



FigureII-4.5.4. Actual DO concentrations of water in Tuyen Quang

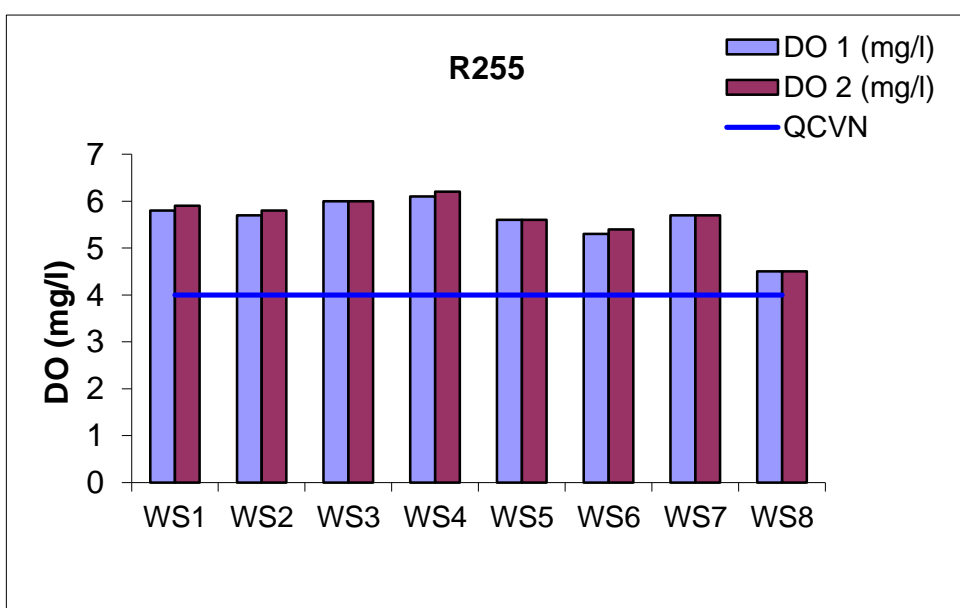
Figure II- 4.5.4 shows the DO concentrations at the monitoring positions along R187 and R189 in Tuyen Quang province. All values here meet well QCVN for DO. DO obtains at R187-WS1(Dai Thi village,

Yen Lap, Chiem Hoa) is the lowest, 5.1 mg/l and DO obtained at R189-WS6 (Kem village, Phu Luu, Ham Yen) is the highest, 6.6 mg/l



FigureII-4.5.5. Actual DO concentrations of water in Cao Bang

The obtained DO results at location along R202 in Cao Bang province are presented in Figure II- 4.5.5. All DO values satisfy QCVN 08:2008/BTNMT, fluctuating from 4.3 to 5.2 mg/l.



FigureII-4.5.6. Actual DO concentrations of water in Bac Kan

DO results at the monitoring positions along R255 in Bac Kan province are shown on Figure II- 4.5.6. DO values at all positions are above the permissible limitation of QCVN 08:2008/BTNMT and range from 4.5 mg/l to 6.2 mg/l.

II.4.6. BOD5

Actual BOD5 values of each position along each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 6-7//2015 are shown on the graphs from Figure II- 4.6.1 to Figure II-4.6.6.

BOD5 values upstream (1) and downstream (2) from the construction site at each monitoring location have no significant differences.

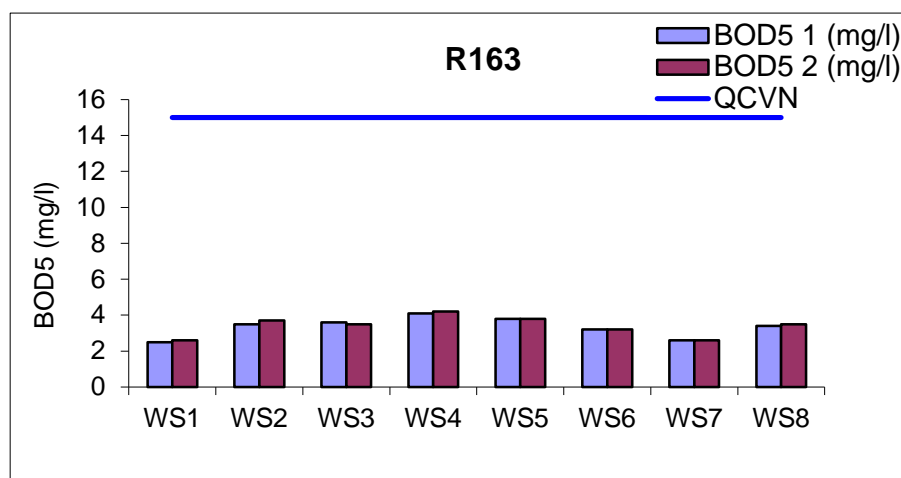
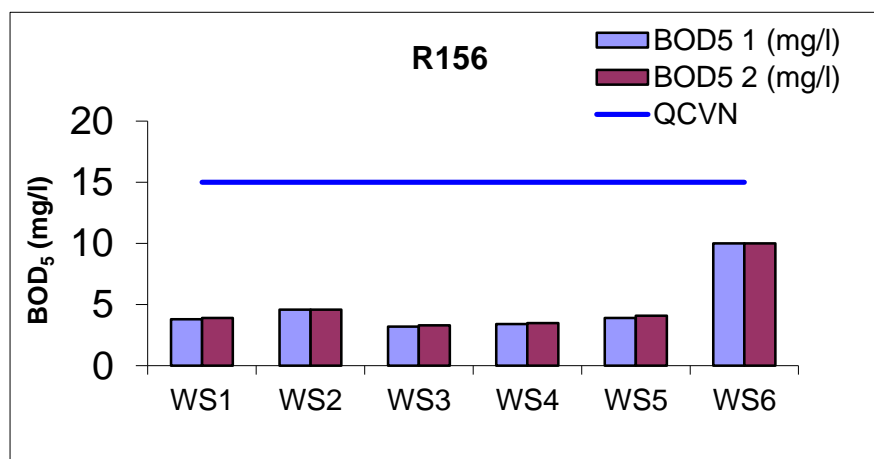
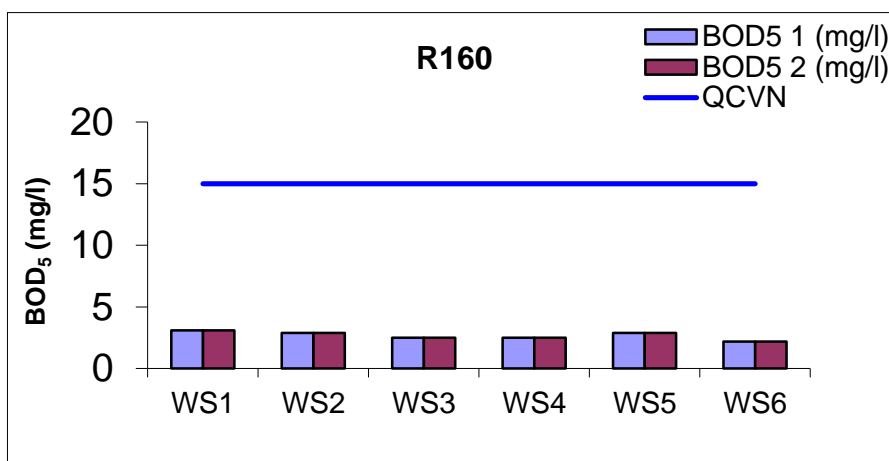


Figure II-4.6.1. BOD5 concentrations of water in Yen Bai

The BOD5 values of the water body along R163 ranging from 2.5 to 4.8 mg/l are lower than limitation of QCVN 08:2008/BTNMT. It can be seen that pollution level respect to BOD5 is insignificant. (, excepting BOD5 at R163-WS4 the values at the other positions meet the standard of column A1 (4mg/l) for domestic water supply.



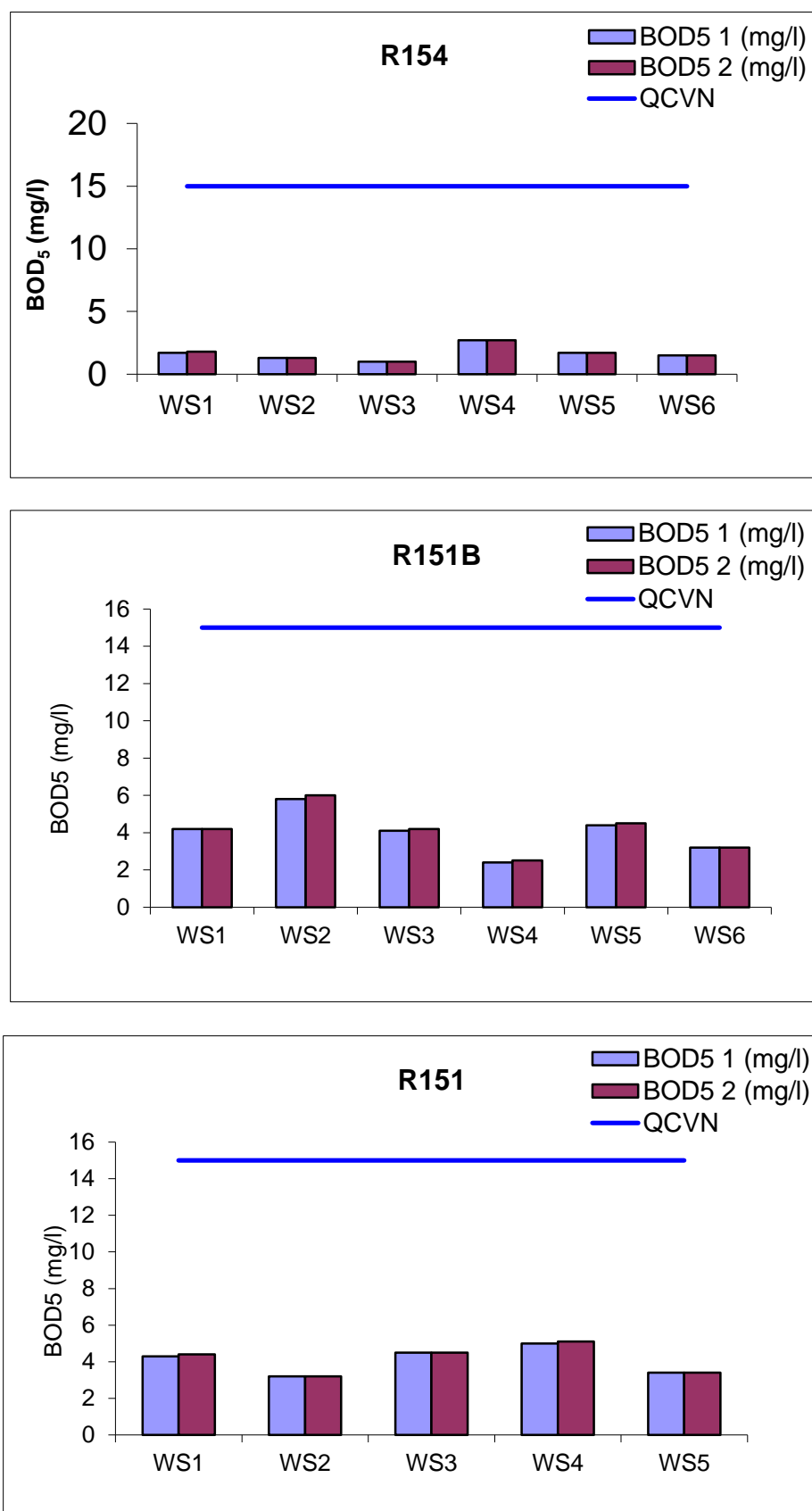


Figure II-4.1.1. BOD5 concentrations of water in Lao Cai

Figure II-4.1.1 displays the graphs of the measured BOD5 values at the positions along 5 roads R151, R151B, R154, R156 and R160 in Lao Cai province. None of the measured BOD5 values of the water

bodies do not meet the standard of column B1 of QCVN 08:2008/BTNMT. All values obtained at the positions of R160, R154 even meet the standard of column A1 (4mg/l). It is noticed that BOD₅ values at R156-WS6 (Phoi village, Ta Phoi commune, Lao Cai) are relative high, 10 mg/l.

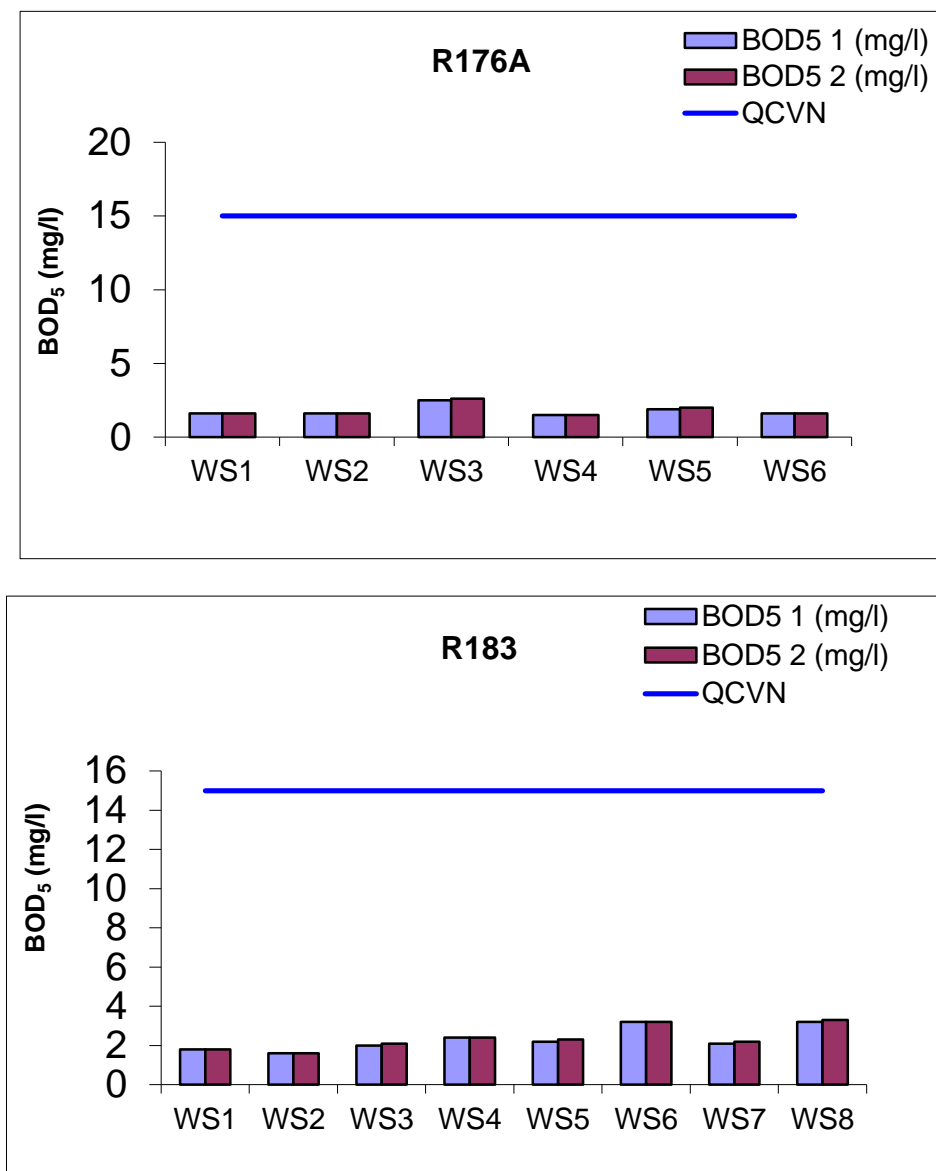


Figure II-4.6.3. BOD₅ concentrations of water in Ha Giang

The actual BOD₅ values at the monitoring positions along two roads in Ha Giang province are presented in Figure II- 4.6.3. The pollution level with respect to BOD₅ is low, values range from 1.6 to 3.3 mg/l, lower than the standard of column A1 (QCVN 08:2008/BTNMT).

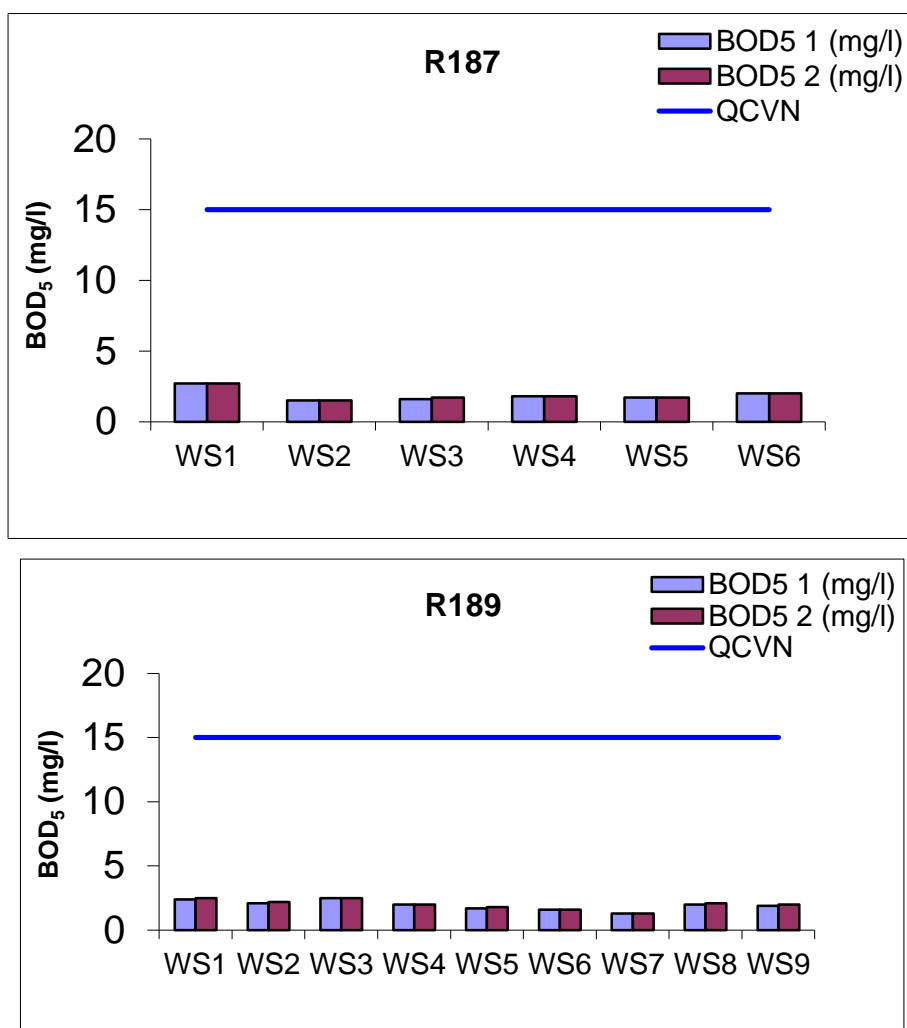


Figure II-4.6.4. BOD5 concentrations of water in Tuyen Quang

Project area in Tuyen Quang includes two roads R187 and R189. The BOD5 values are represented graphically in Figure II- 4.6.4. The pollution level with respect to BOD5 is low, actual values fluctuated from 1.3 to 2.7 mg/l, lower than the limit of column A1 (QCVN 08:2008/BTNMT).

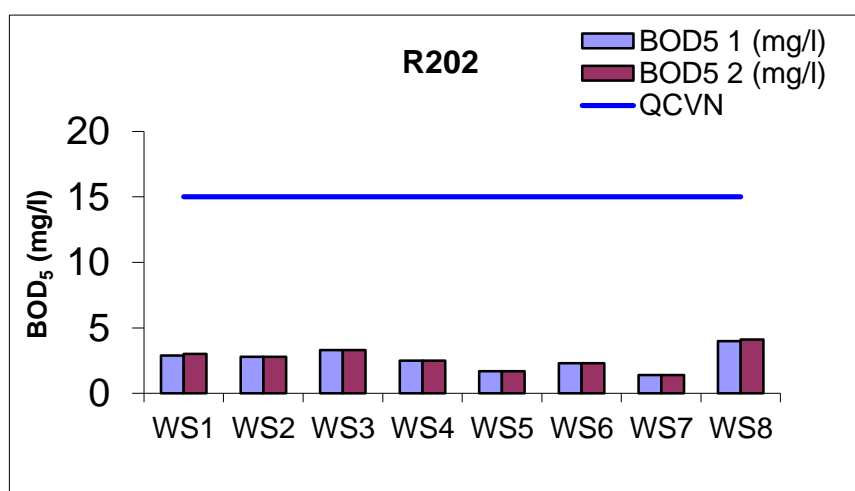


Figure II-4.6.5. BOD5 concentrations of water in Cao Bang

The BOD₅ values at the positions along R202 in Cao Bang ranging from 1.4 mg/l to 4.1 mg/l, are under the limitation of column A1 of QCVN 08:2008/BTNMT. Based on Figure II-4.6.5. the lowest BOD₅ is obtained at R202-WS7 (, Lung Vai village, Dinh Phung commune, Bao Lac).

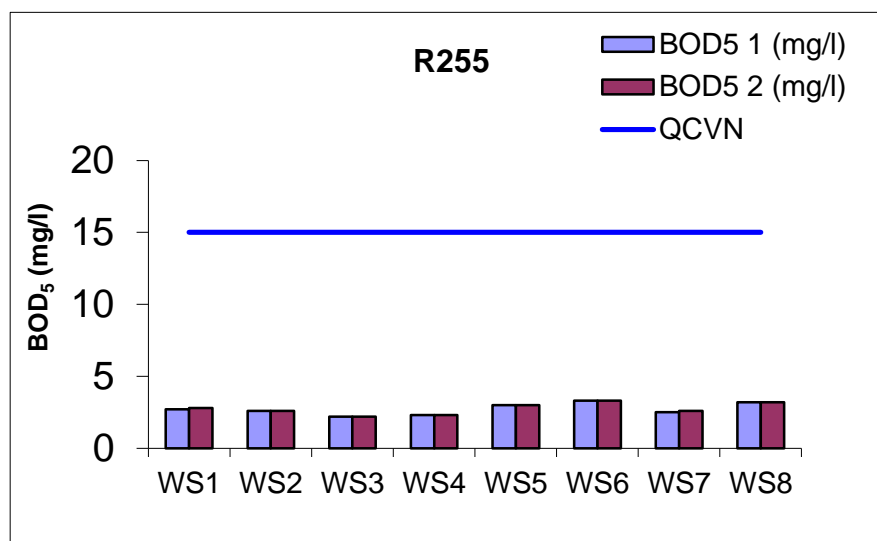


Figure II-4.6.6. BOD₅ concentrations of water in Bac Kan

Figure II-4.6.6 shows that all BOD₅ values monitored at the locations along R255 are below the limitation of A1 column (4mg/l), ranging from 2.2 – 3.3 mg/l..

II.4.7. COD

Actual COD values at each position on each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in 6-7/2015 are shown on the graphs from Figure II-2.7.1 to Figure II-2.7.6

COD values upstream (1) and downstream (2) from the construction site at each monitoring location have no significant differences.

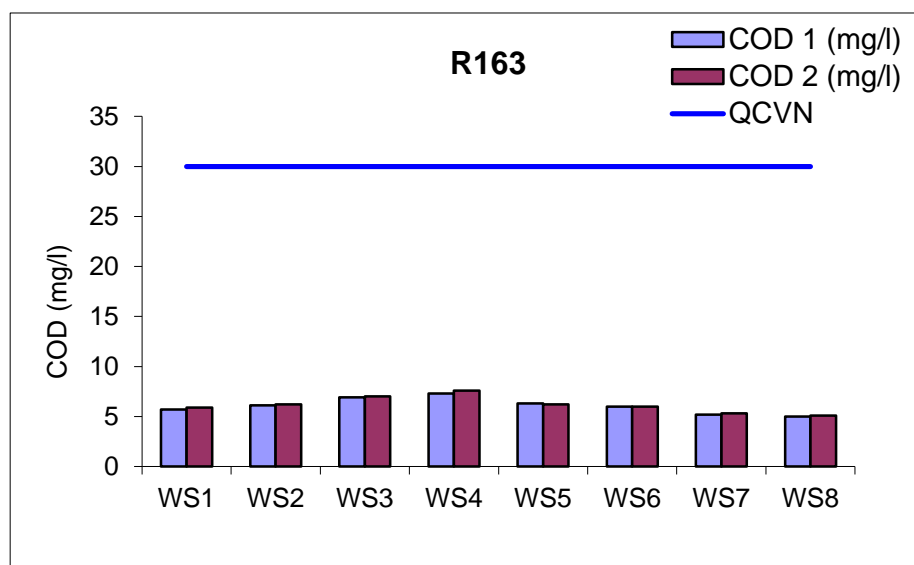
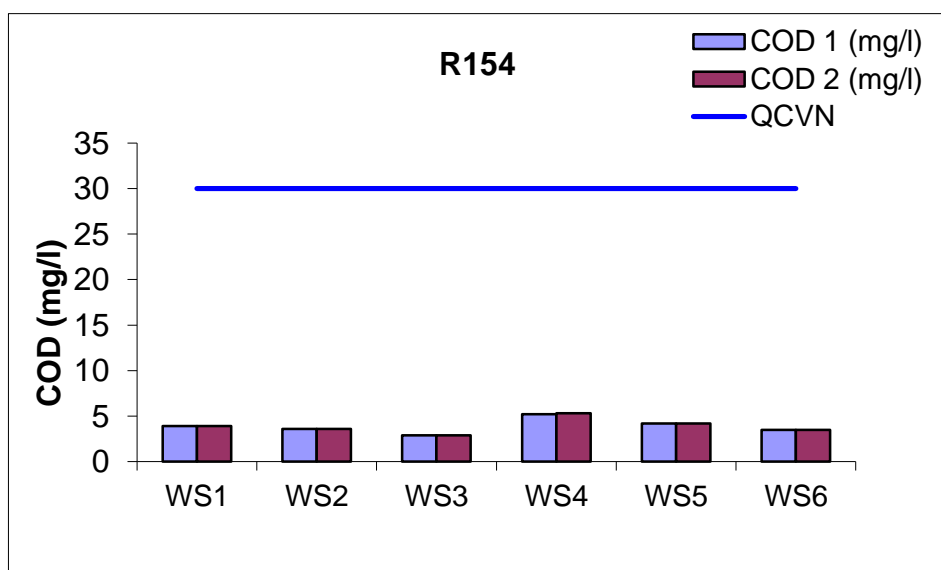
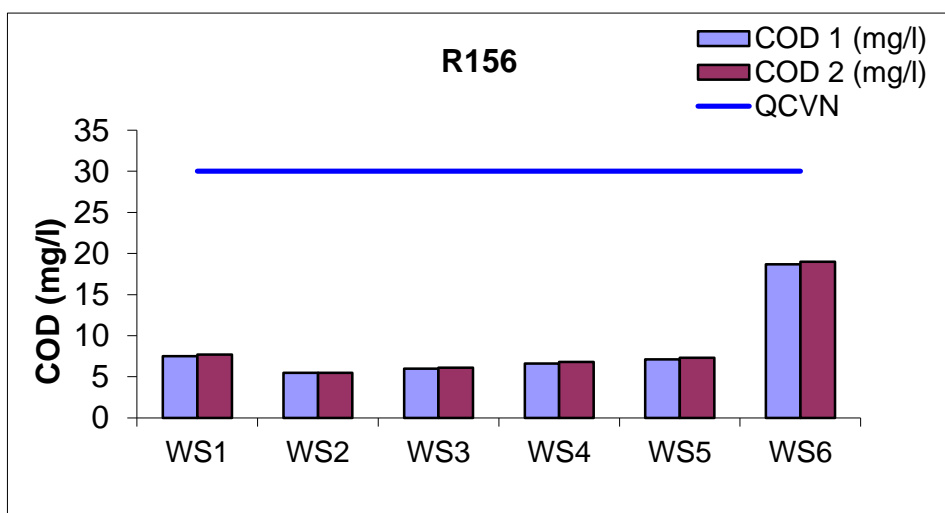
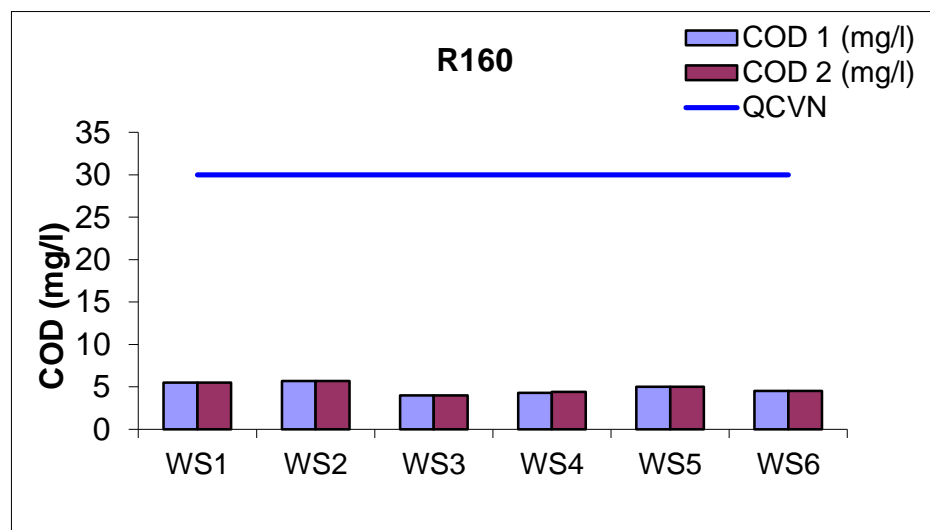


Figure II-4.7.1. COD concentrations of water in Yen Bai

The COD values at the monitoring positions along R163 ranging from 5,0 to 7,6 mg/l are lower than QCVN 08:2008/ BTNMT column A1 (10mg/l). It can be seen that pollution level respect to COD here are insignificant. Figure II-4.7.1.



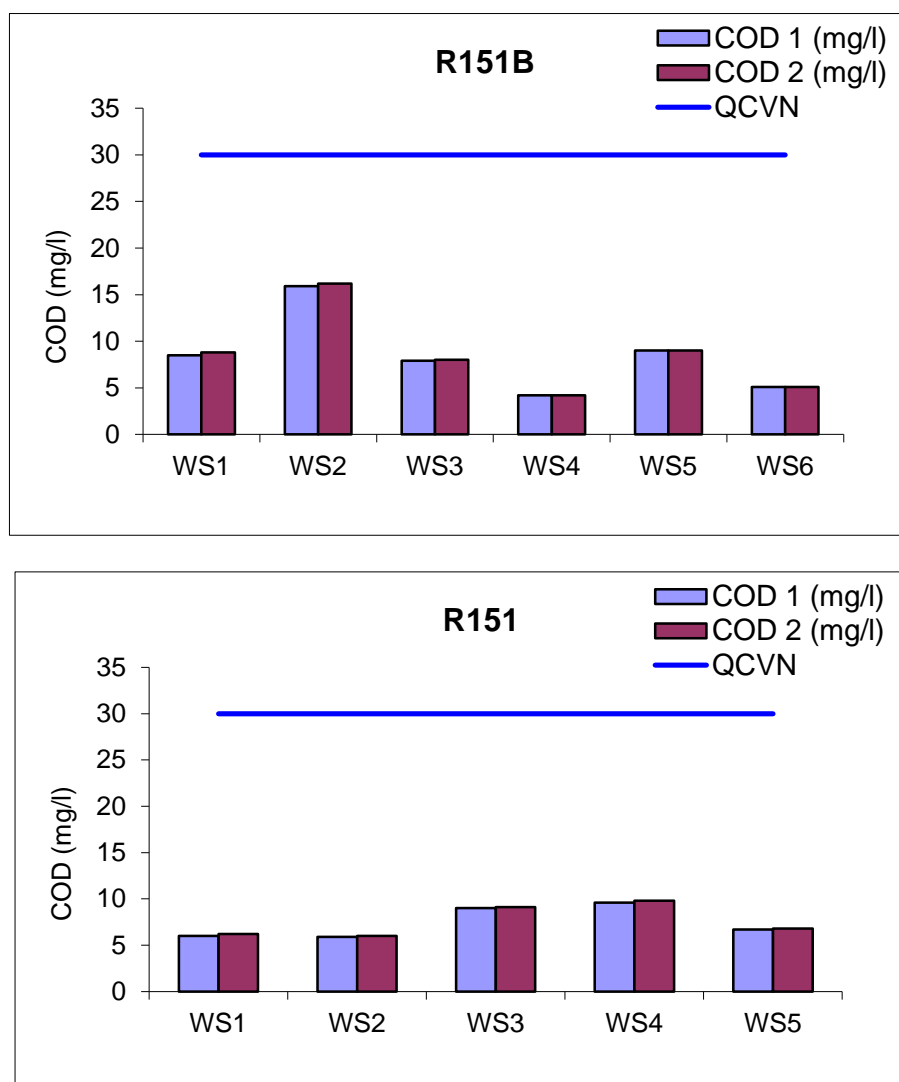


Figure II-4.7.2. COD concentrations of water in Lao Cai

Figure II-4.7.2. displays the graphs of the measured COD values at the monitoring position along 5 roads R151, R151B, R154, R156 and R160 in Lao Cai province. All actual COD values are below the limitation of column B1 of QCVN 08:2008/BTNMT, some even meet the limitation of column A1(10mg/l), including those obtained at R151, R154, R160. The lowest COD values obtained at position R154-WS3, (water source Sa Lung Phin, Nam Chay, Muong Khuong) are 2.9 mg/l. 2 positions at which COD values are relatively higher, are R151B-WS2 (Lu village, Vo Lao commune, Van Ban), R156- WS6 (Phoi village, Ta Phoi commune, Lao Cai), with COD values are 16.2 and 19.0 mg/l, respectively. .

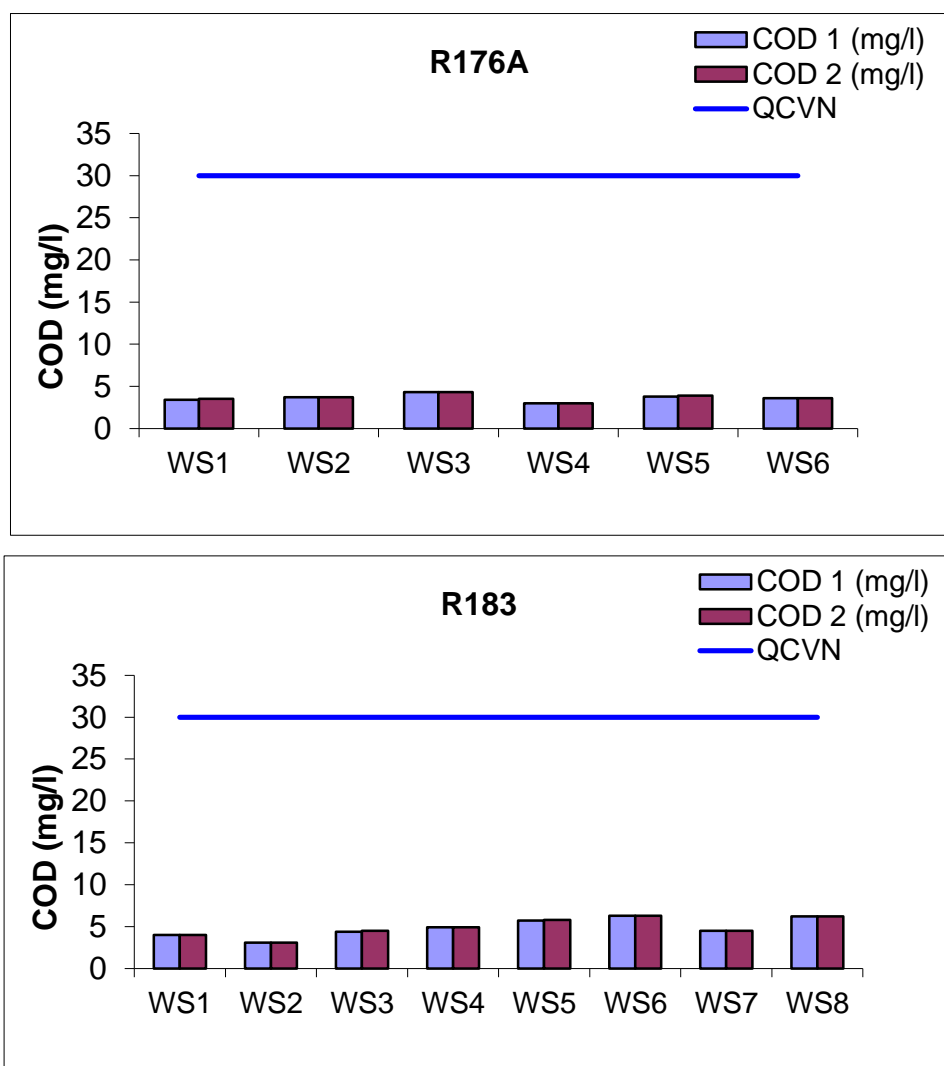
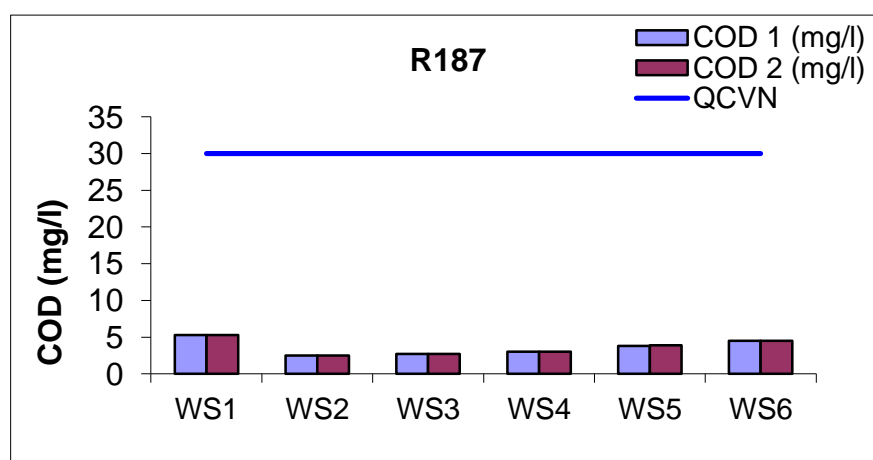


Figure II-4.7.3. COD concentrations of water in Ha Giang

The actual COD values at the positions along two roads in Ha Giang province are presented in Figure II-4.7.3. The pollution level with respect to COD is low, lower than permissible limit, the values range from 3.0 to 6.3 mg/l satisfying the limitation of column A1 (10mg/l) of QCVN 08:2008/BTNMT.



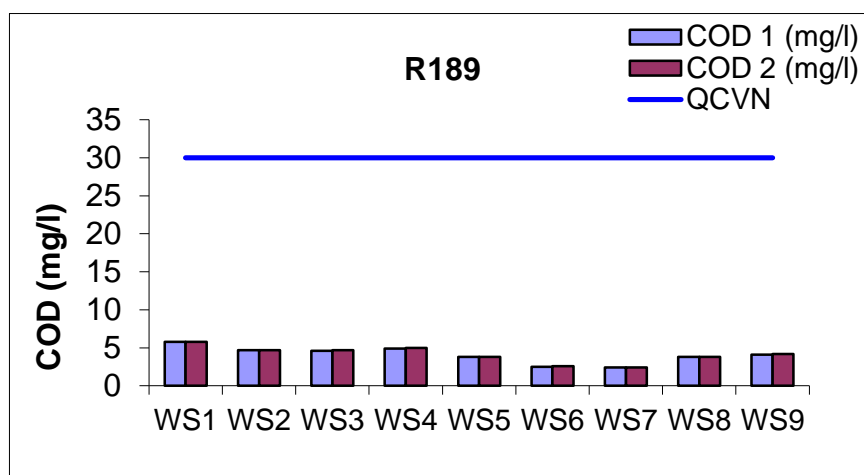


Figure II-4.7.4. COD concentrations of water in Tuyen Quang

Project area in Tuyen Quang includes two roads R187 and R189. The COD values are presented graphically in Figure II-4.7.4. It can be found that the pollution level respect to COD is low, actual values fluctuate from 2.4 to 5.8 mg/l, are much lower than QCVN 08:2008/BTNMT column B1, even meet limitation column A1.

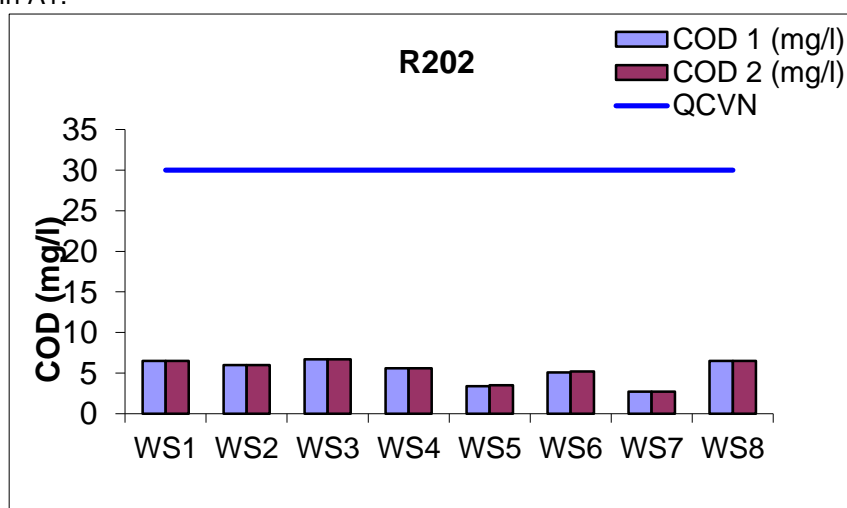


Figure II-4.7.5. COD concentrations of water in Cao Bang

The COD values at the positions along R202 in Cao Bang are much lower than the limitation value in column B1, the range of values from 2.7 to 6.7mg/l (Figure II-4.7.5). The highest COD is obtained at R202- WS3 (Ban Bay village, Yen Thuong, Cho Don).

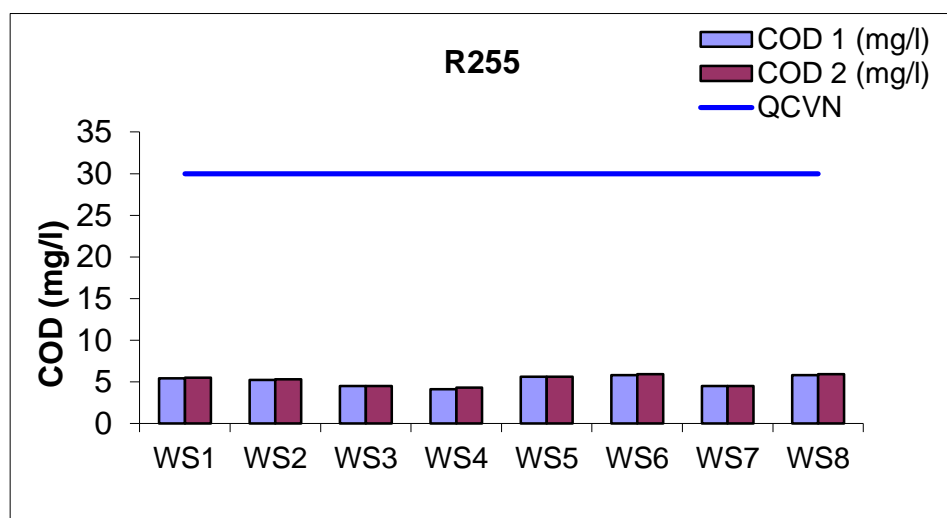


Figure II-4.7.6. COD concentrations of water in Bac Kan

Figure II-4.7.6 shows the COD values monitored at the monitoring positions along R255. It can be seen that most values fluctuated in the range from 4.1 to 5.9 mg/l are below the permissible limit (column A1), QCVN 08:2008/BTNMT.

II.4.8. Oil and grease

Observed grease value at each position on each specific road of 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan are shown on the graphs from Figure II-4.8.1 to Figure II-4.8.6 in 6-7/2015.

Generally, at almost areas along the routes in the project plan, Ggrease concentrations measured upstream (1) and downstream (2) from the construction site at each monitoring location have no other significant differences.

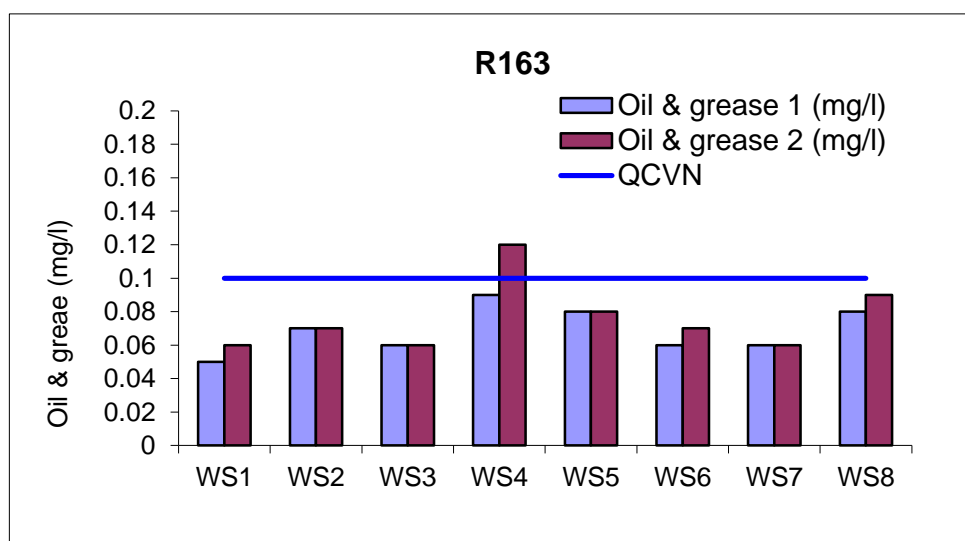
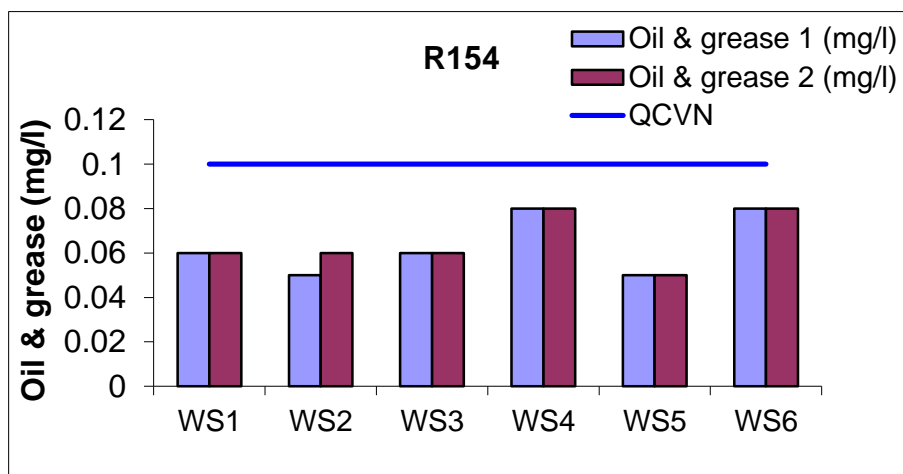
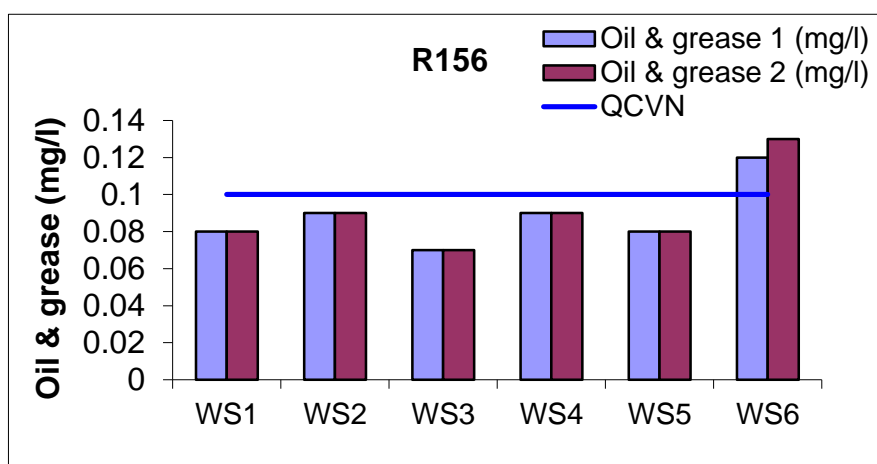
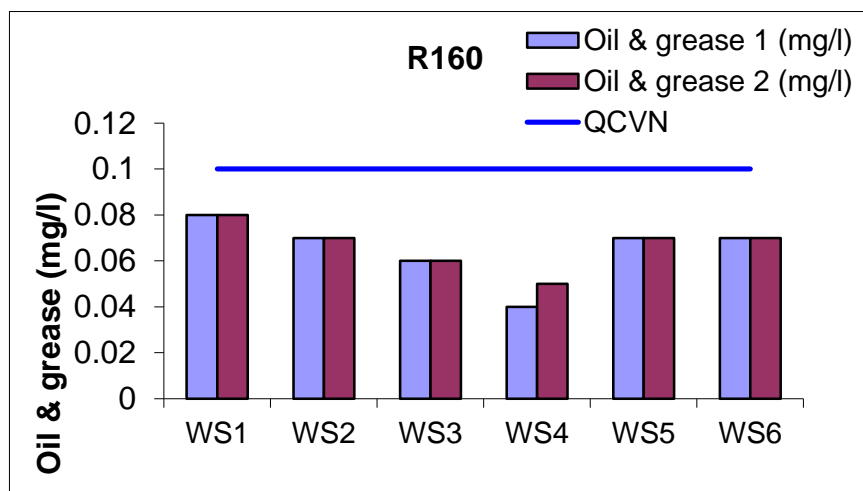


Figure II-4.8.1. Oil/grease concentrations of water in Yen Bai

The position at which oil/grease concentrations exceeds the limitation of QCVN 08:2008/BTNMT B1 column is: R163-WS4-2 (Ngoi Hop village, Bao Dap commune, Tran Yen) with the value of 0.12 mg/l (Figure II-4.8.1). It is noticed that there is difference between the values obtained at 2 positions upstream and downstream from the construction site of R163-WS4.



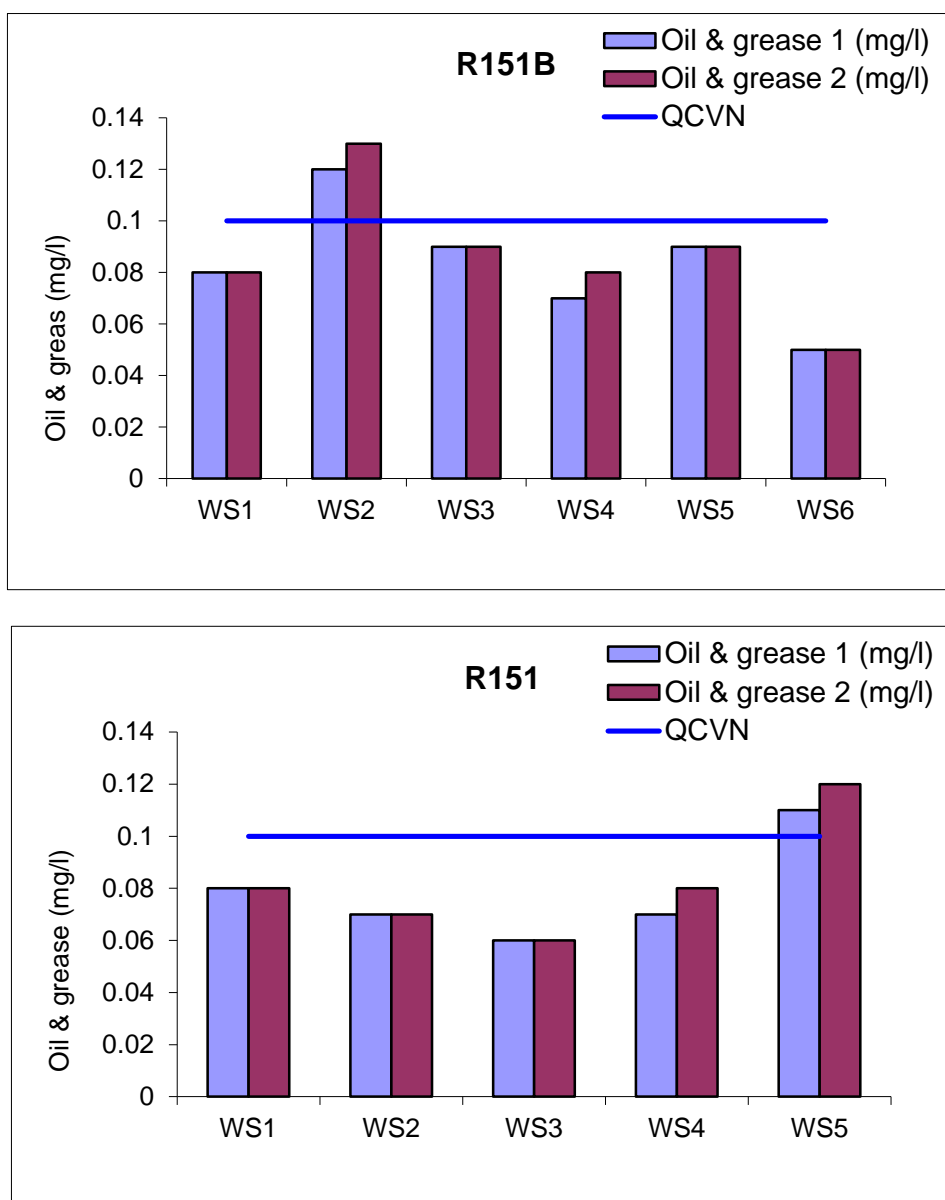
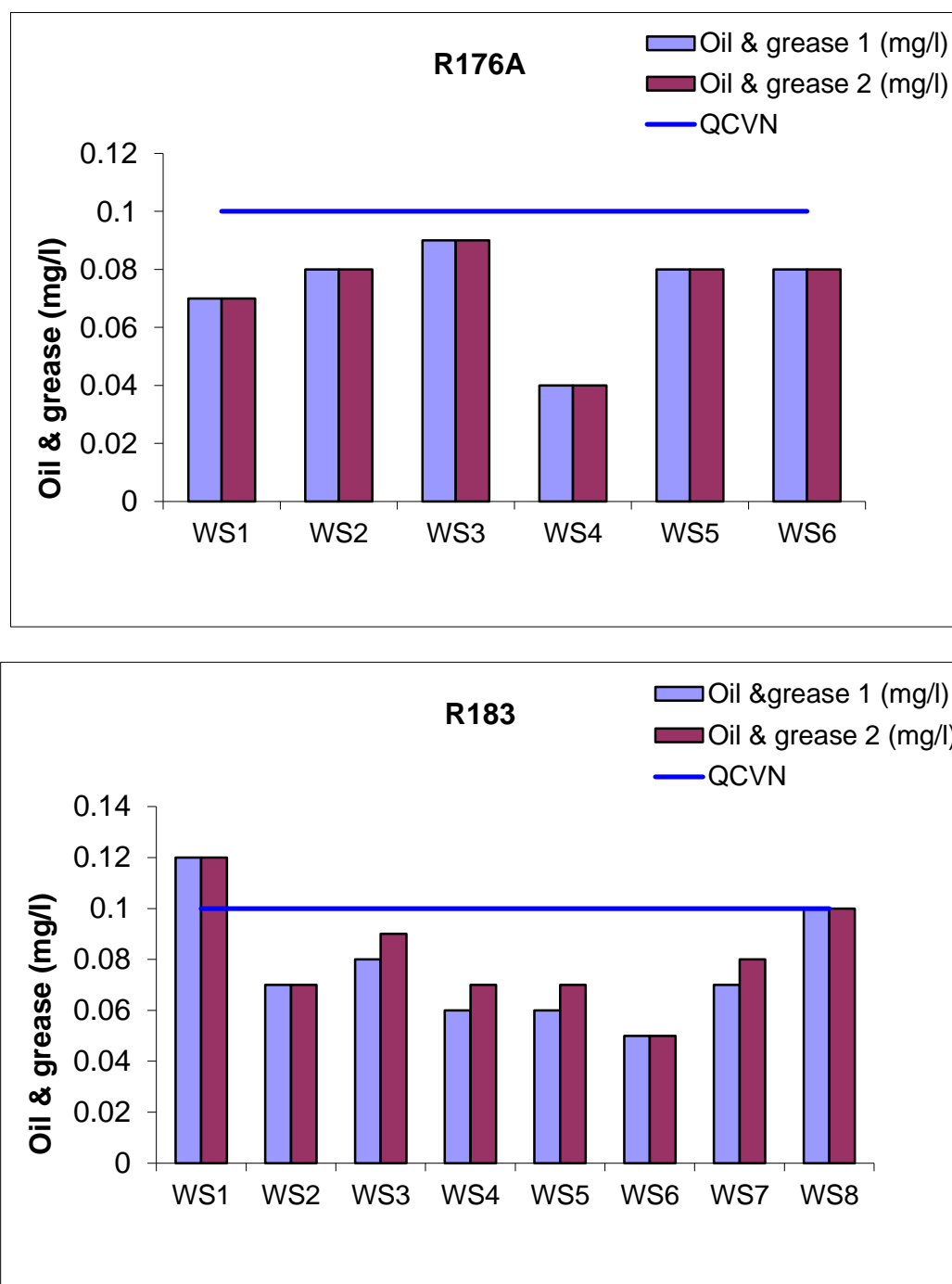


Figure II-4.8.2. Oil/grease concentrations of water in Lao Cai

Figure II-4.8.2 is the graph presenting the oil/grease values measured at the monitoring positions at 5 roads R151, R151B, R154, R156 and R160 in Lao Cai province. Most of the values measured are below permissible limitation B1 of QCVN 08:2008/BTNMT. At the positions R151-WS5(Khe Sang village, Tan An, Van Ban) R151B-WS2 (Lu village, Vo Lao commune, Van Ban), R156-WS6 (Phoi village, Ta Phoi commune) oil and grease concentrations are over the limitation



FigureII-4.8.3. Oil/grease concentrations of water in Ha Giang

The oil/grease concentrations measured at the positions along two roads R176A and R183 in Ha Giang province are shown on graphs in **Error! Reference source not found.**. In this area, at R183-WS1, monitoring positions at which oil/grease contents was over the limitation B1 of QCVN 08:2008/BTNMT , while at R183-WS8 (Xuân Chang village, Xuân Giang, Quang Binh) the values reached the limitation

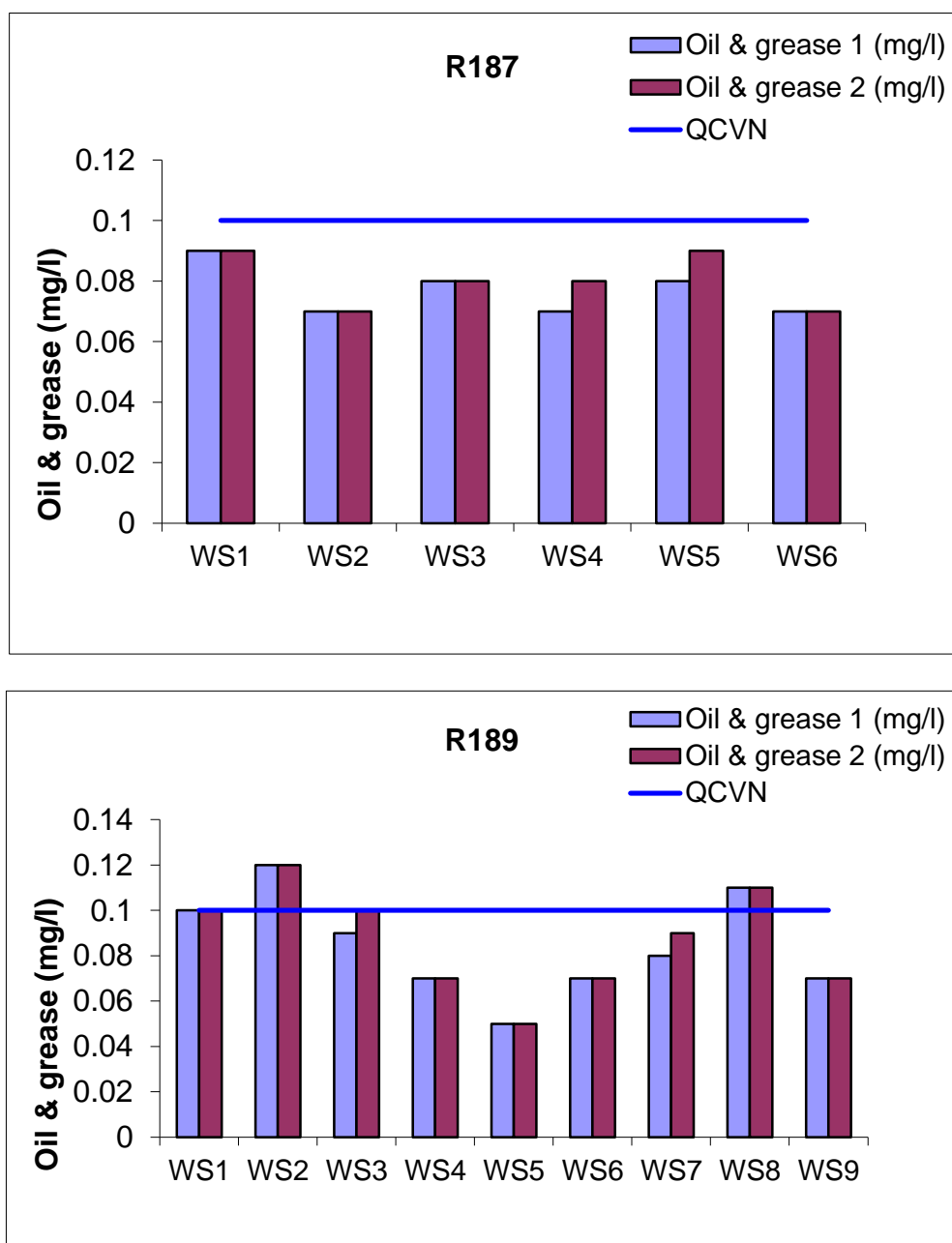


Figure II-4.8.4. Oil/grease concentrations of water in Tuyen Quang

The oil/grease values at the monitoring position along R187 and R189 (Tuyen Quang province) are presented graphically in Figure II-4.8.4.. The only position at which the measured value exceeds the limitation of QCVN is R189-WS2(Village 3, Viet Thanh, Tan Thanh, Ham Yen). R189-WS8 (Lang En village, Bach Xa, Ham Yen). In addition the values obtained at R189-WS1 (Ninh Binh, Binh Xa, Ham Yen) and at R189- WS3-2 (village 1, Tan Thanh, Ham Yen) reach the limitation of QCVN.

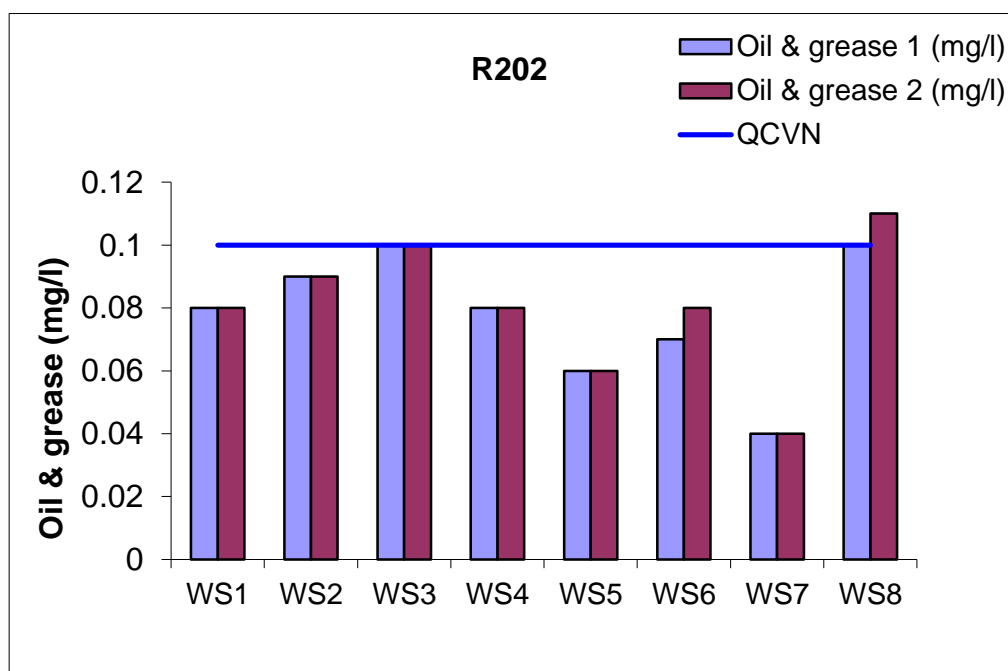
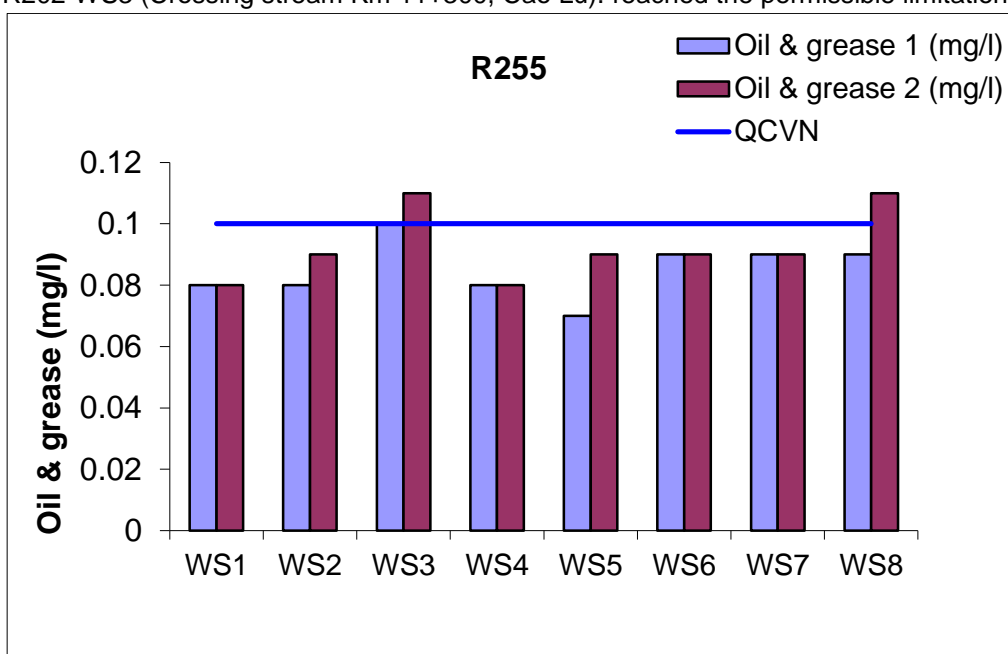


Figure II-4.8.5. Oil/grease concentrations of water in Cao Bang

As shown In Figure II-4.8.5, the positions at which oil/grease concentrations was over the limitation of column B1 of QCVN 08:2008/BTNMT are R202- WS8-2(Strema Km 26, Mo Din village, Huy Giap), the value at R202-WS3 (Crossing stream Km 11+300, Cao Lu). reached the permissible limitation.



FigureII-4.8.6. Oil/grease concentrations of water in Bac Kan

Graph in FigureII-4.8.6. shows the latively high oil/grease values at R255. There are 2 positions at which measured values exceed the limitation of column B1 of QCVN08:2008/BTNMT are R255- WS3-2 (Stream Sm 9+900, Ban Bay village), and R255-WS8-2 (Vay village, Km 22+350). .

II.4.9. Coliform

The graphs from Figure II-4.9.1. to Figure II-4.9.6. demonstrate coliform concentrations measured for each position at each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang and Bac Kan in 6-7/2015.

Coliform values upstream (1) and downstream (2) from the construction site at the monitoring positions have no significant difference.

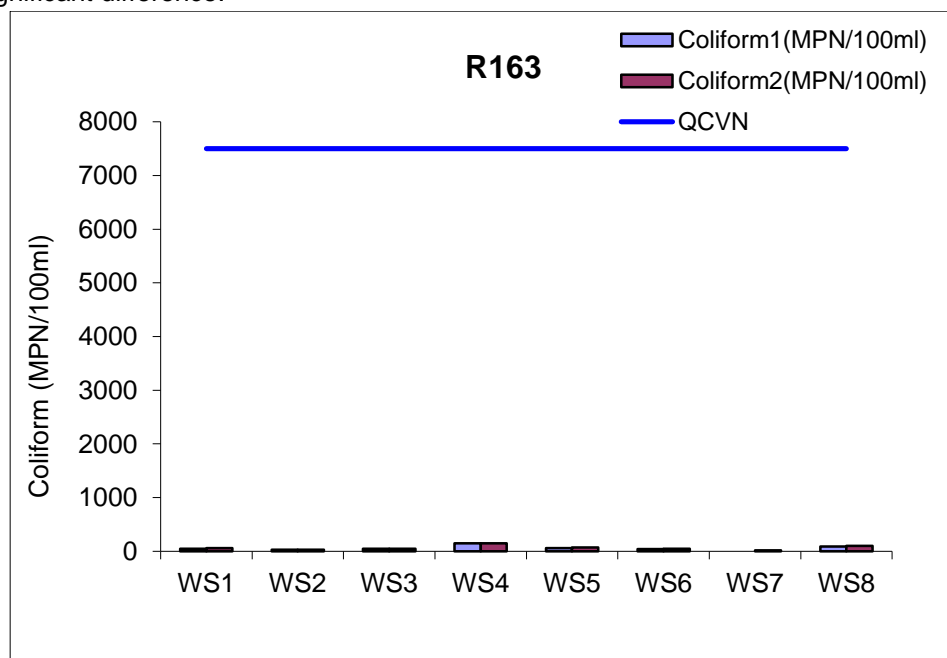
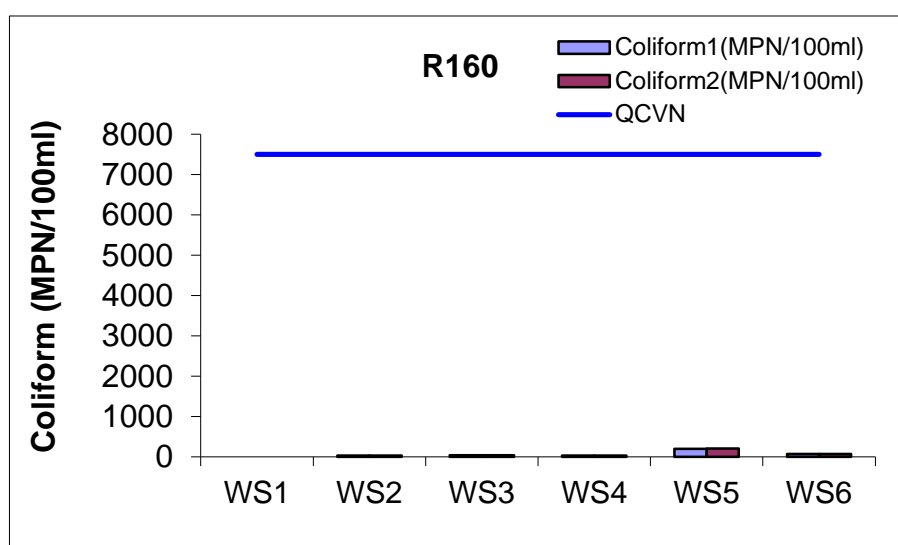
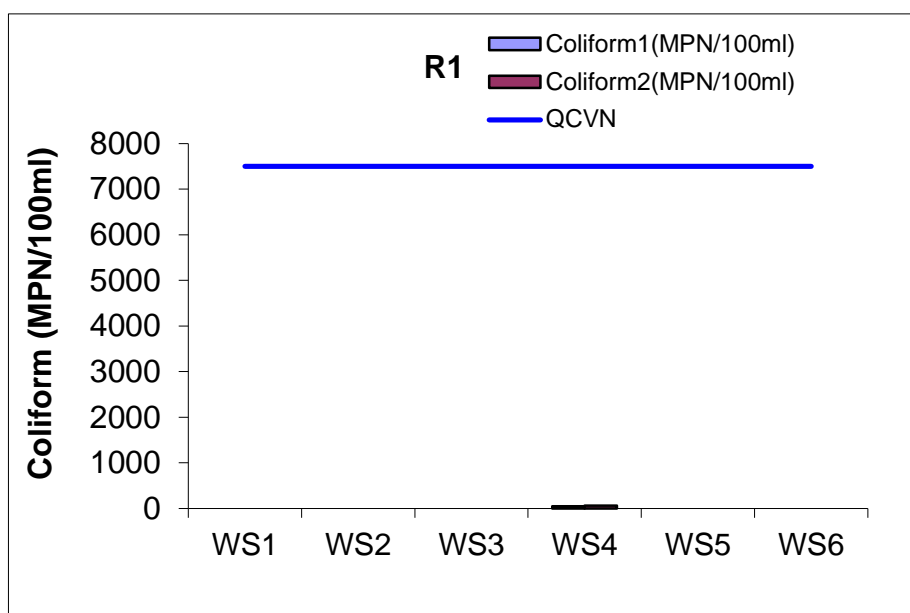
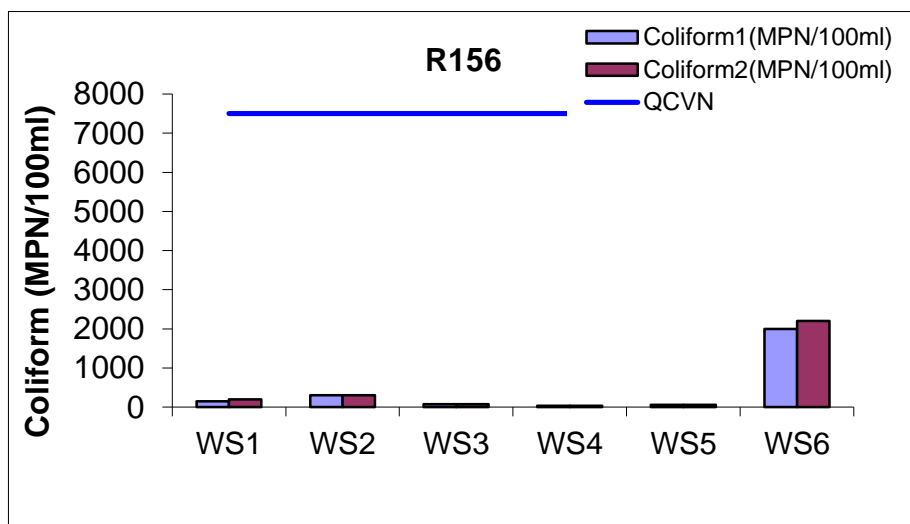


Figure II-4.9.1. Coliform concentrations of water in Yen Bai

Figure II-4.9.1. presents Coliform concentrations at R163 in Yen Bai province. It can be seen that Coliform contents here ranging from 20 MPN/100ml to 150 MPN/100ml are much lower than permissible limitation of column A1 of QCVN 08:2008/BTNMT. at R163-WS7 (Tran Quach, Mau Dong commune) there are no Coliform detected and the highest is obtained at R163- WS4 (Ngoi Hop bridge, Bao Đap).





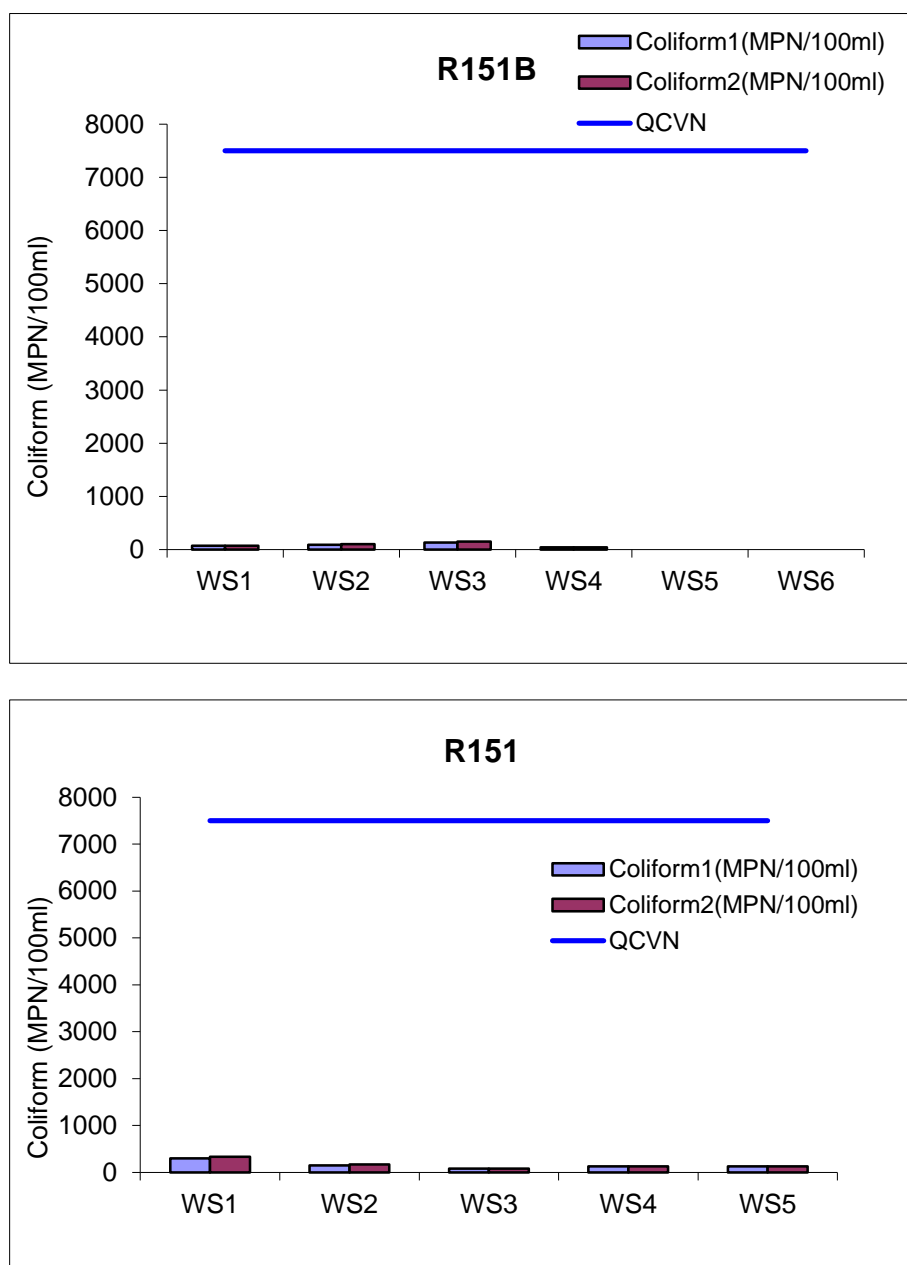


Figure II-4.9.2. Coliform concentrations of water in Lao Cai

Generally, coliform values at the monitoring positions along 5 roads 151, 151B, 154, 156, and 160 are lower than the limit of QCVN 08: 2008/BTNMT (column A1). even at R160-WS1, R154-WS1, R154-WS2, R154-WS3, R154-WS5, R151B-WS5, R151B-WS6 no coliform is detected. At the position R156-WS6 (Phoi village, Ta Phoi village) Coliform concentrations are significantly higher than those at other positions along R156 and also higher than those at the positions of the other roads in the area, the respective values are 32200 MPN/100ml (Figure II-4.9.2.). At R156-WS6, .

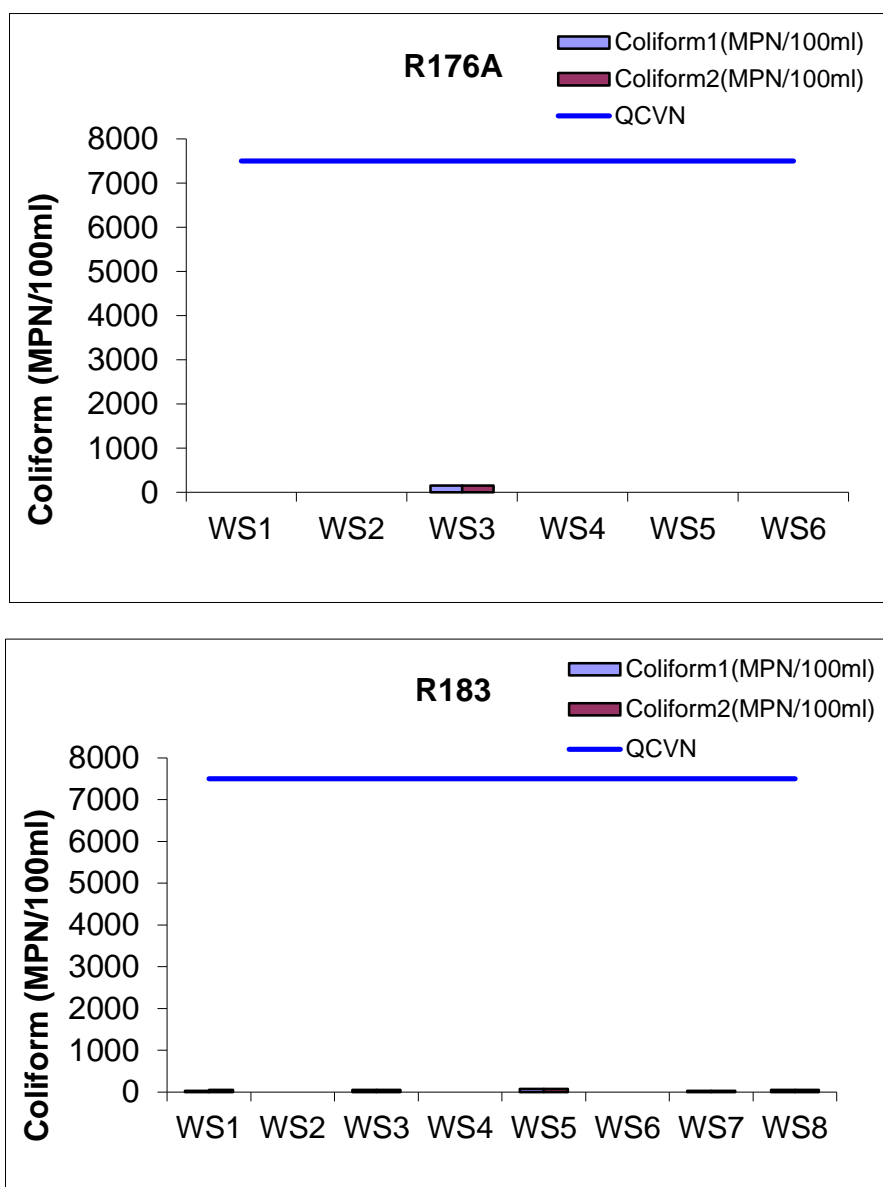


Figure II-4.9.3. Coliform concentrations of water in Ha Giang

Coliform results in Ha Giang province are presented in Figure II-4.9.3. Coliform concentrations are much lower than limit of column A1 of QCVN 08:2008/BTNMT. Excepting R176A-WS3, and R183-WS1, R183-WS3, R183-WS5, at the other positions no Coliform is detected

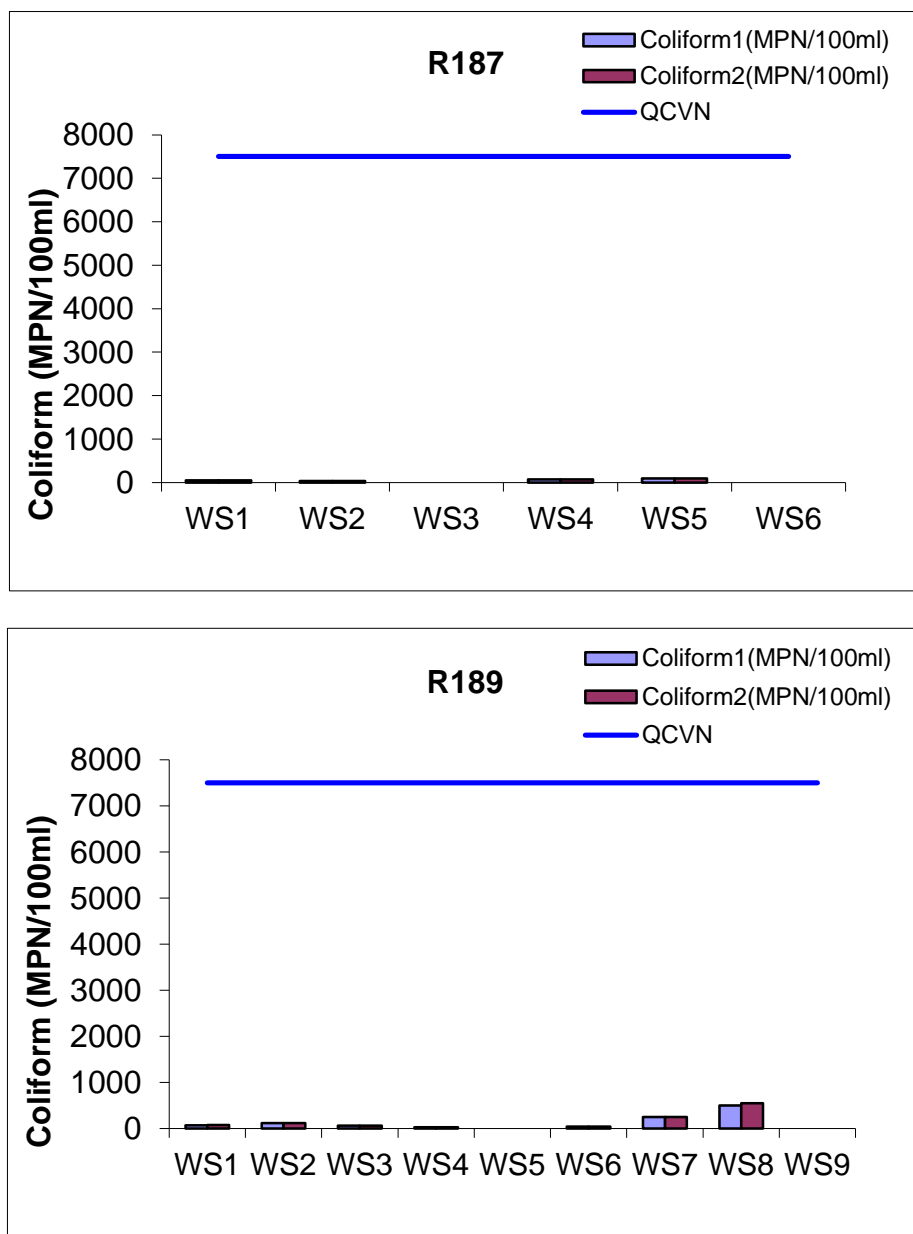


Figure II-4.9.4. Coliform concentrations of water in Tuyen Quang

The graph presents monitoring results at the water bodies along two roads 187 and 189 in Tuyen Quang. Coliform concentrations are low. The highest value obtained at position R189- WS8 (Lang Ęn village, B ch Xa, Ham Yen) is of 550 MPN/100ml. At R187-WS3, R187-WS6, R189-WS5, R189-WS9, no Coliform is detected.

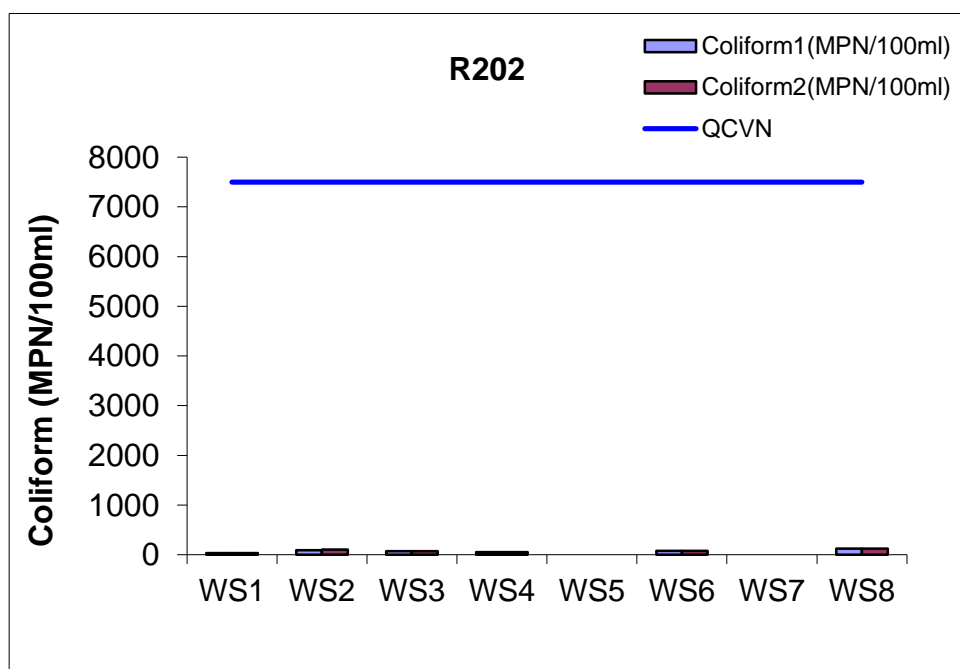


Figure II-4.9.5. Coliform concentrations of water in Cao Bang

Coliform concentrations at the positions along R202 (Cao Bang) are lower than limitation in column A1 of QCVN 08:2008/BTNMT. At the position including R202-WS7 (Lung Vai village, Dinh Phung commune, Bao Lac), and at R202-WS5 (Nam Pap village, Dinh Phung commune, Bao Lac) there is no coliform detected (Figure II-4.9.5.).

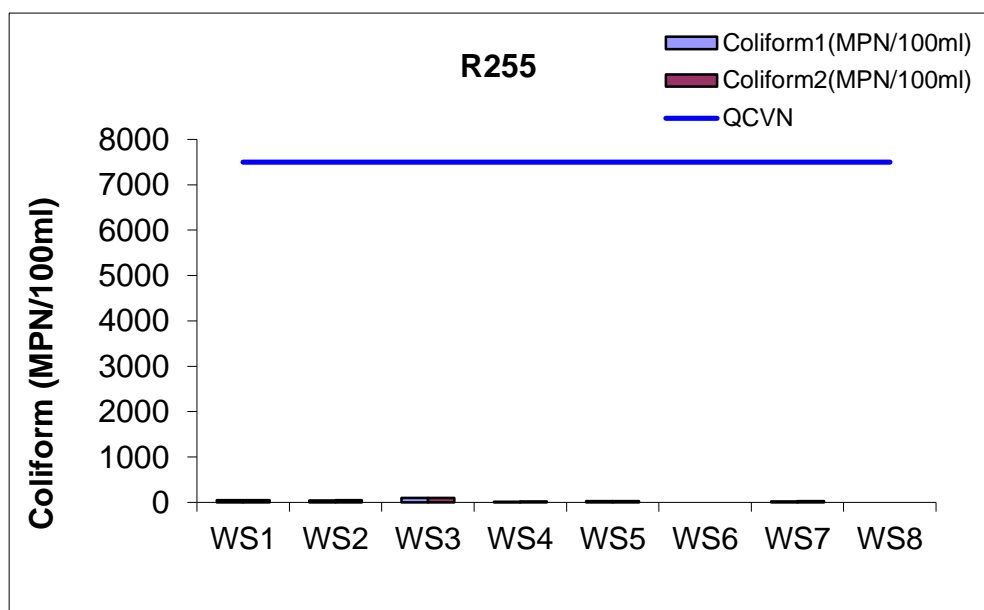


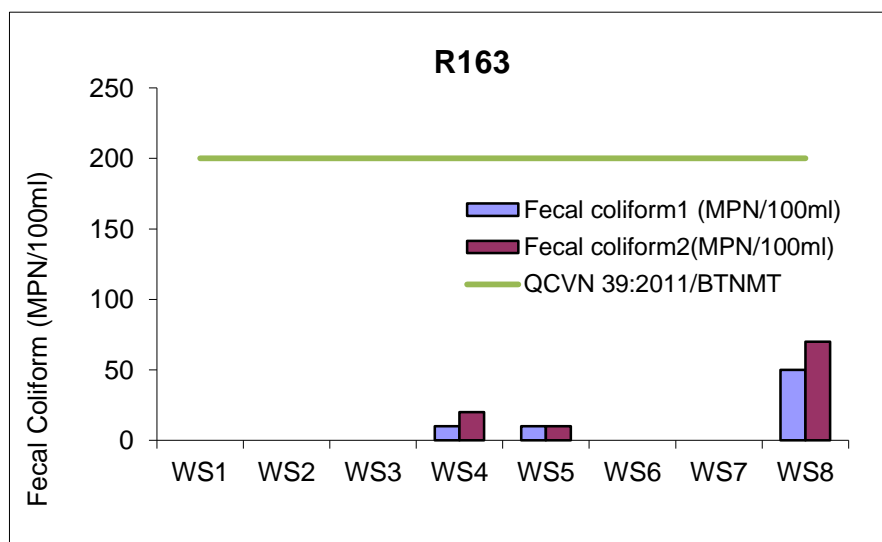
Figure II-4.9.6. Coliform concentrations of water in Bac Kan

Figure II-4.9.6. shows the results of coliform measured at the monitoring positions along road R255 in Bac Kan province. Graphically, Coliform concentrations are not over 100 MPN/100 ml and much lower than limitation in column A1 of QCVN 08:2008/BTNMT(2500 MPN/100ml). The highest is obtained at the position R255-WS3 (Ban Bay village, Yen Thuong, Cho Don). At R255-WS6 (Pho Cau village, Yen Thinh, Cho Don) and R255-WS8 (Vay village, Yen Thinh, Cho Don) no Coliform is detected

II.4.10. Fecal Coliform

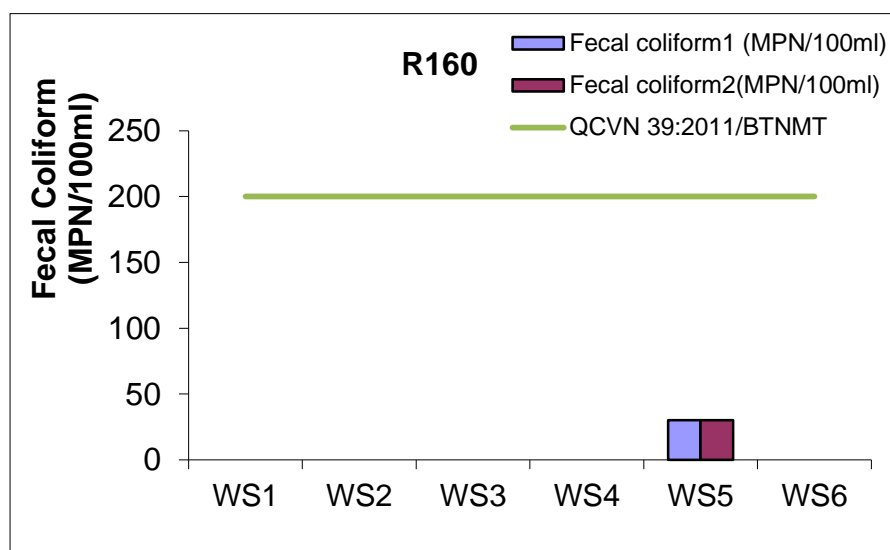
The graphs from FigureII-4.10.1. to FigureII-4.10.6. demonstrate Fecal coliform concentrations measured for each position at each specific road in 6 provinces: Lao Cai, Yen Bai, Ha Giang, Tuyen Quang, Cao Bang, Bac Kan in -6-7/2015.

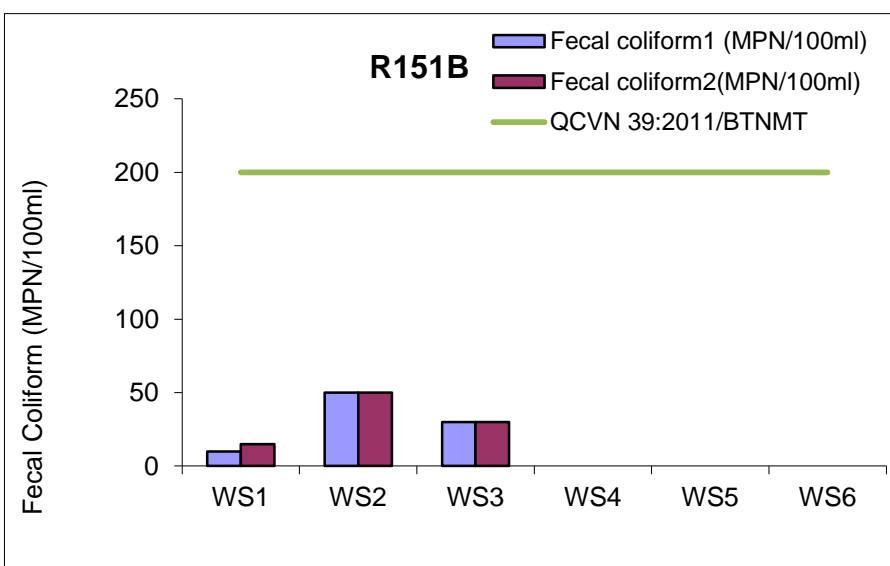
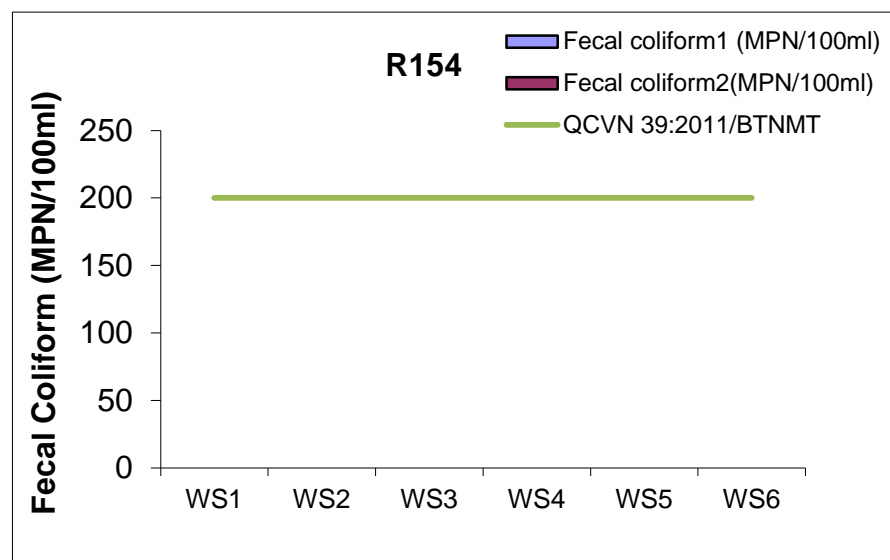
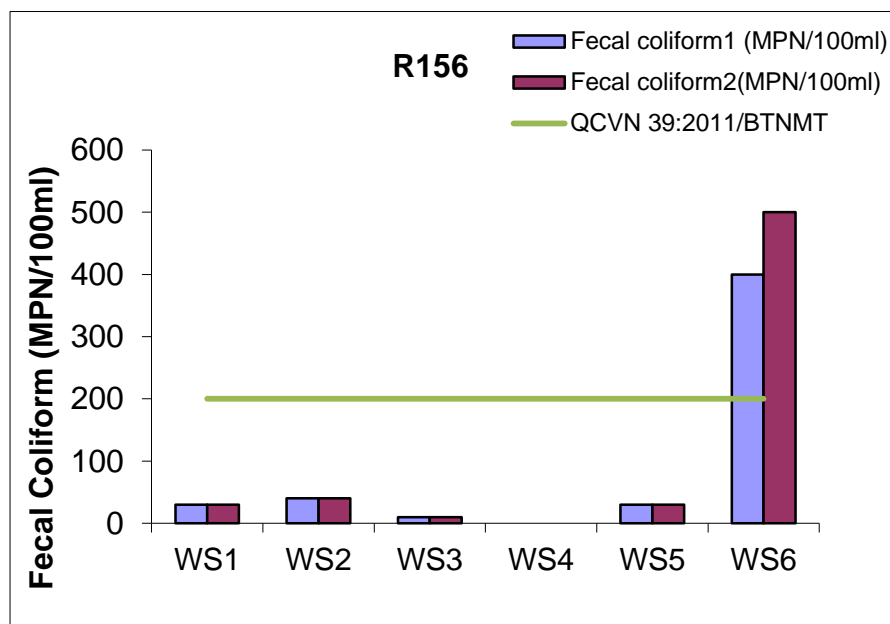
Fecal Coliform values of water sample in upstream (1) and downstream (2) from the construction site at the monitoring positions have a little difference.



FigureII-4.10.1. Fecal coliform concentrations of water in Yen Bai

FigureII-4.10.1. presents Fecal Coliform concentrations at the monitoring positions along R163 in Yen Bai province. It can be seen that Fecal Coliform concentrations here are low. There are 3 positions R163-WS4, R163-WS5, R163-WS8 at which fecal coliform is detected. The highest values obtained at R163-WS4 (Ngoi Hop village, Ngoi Hop village, Bao Dap commune) is of 50-70 MPN/100ml, much lower than the limitation in QCVN 39:2011/BTNMT.





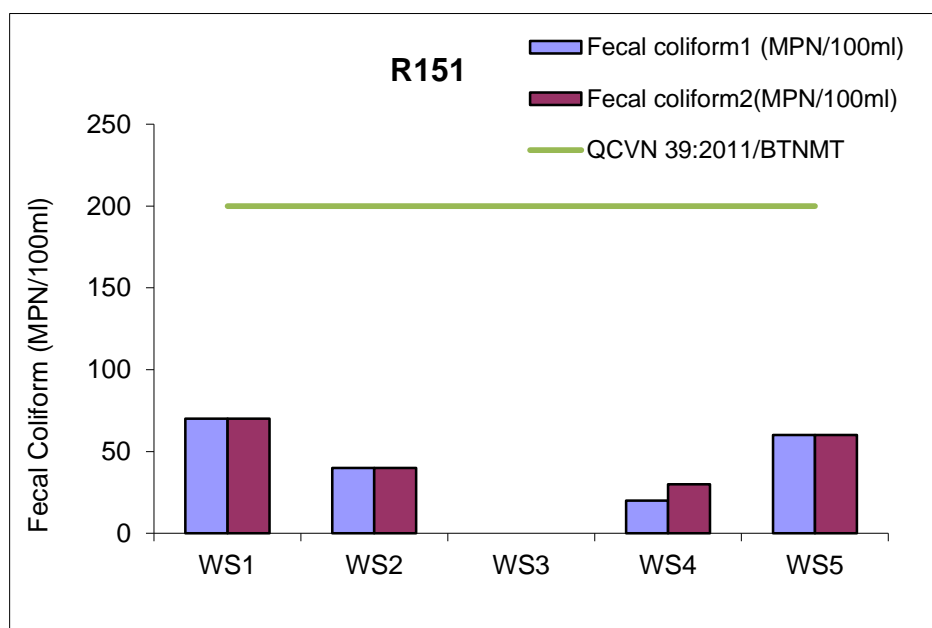
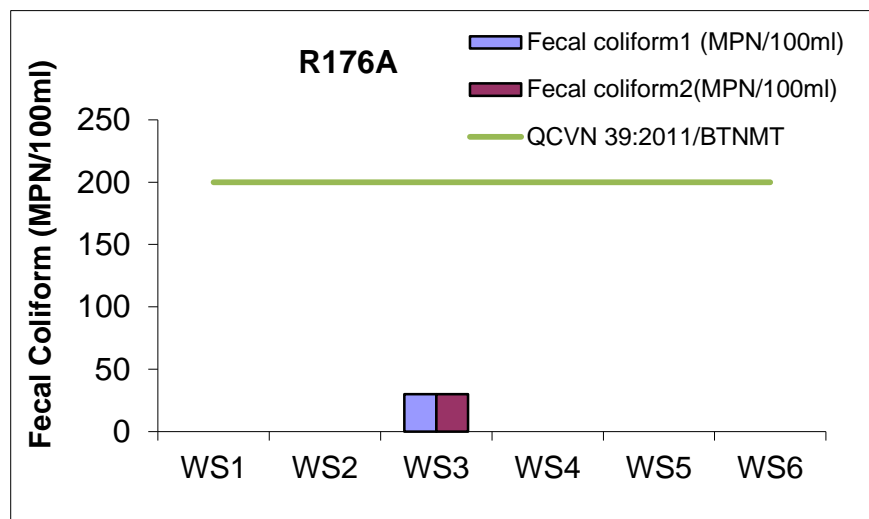


Figure II-4.10.2. Fecal coliform concentrations of water in Lao Cai

along 5 roads 151, 151B, 154, 156, 160, the only position at which Fecal Coliform concentration exceed QCVN 39:2011/BTNMT is R156-WS6 (Phoi village, Ta Phoi commune) with the highest value of 400-500 MPN/100ml (Figure II-4.10.2.). No Fecal Coliform is detected at all the positions along R154, and the other positions including R160-WS1, R160-WS2, R160-WS3, R160-WS4, R160-WS6, R156-WS4, R151B-WS4, R151B-WS5, R151B-WS6, R151-WS3.



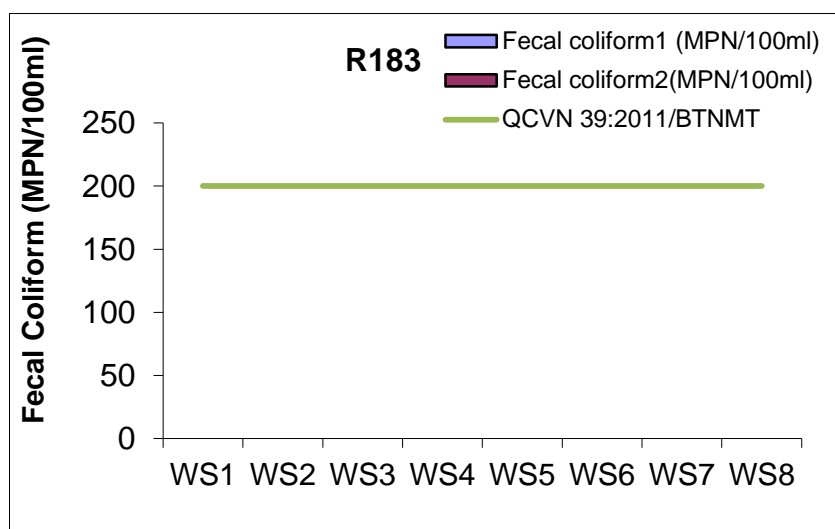


Figure II-4.10.3. Fecal coliform concentrations of water in Ha Giang

Monitoring results of Fecal Coliform in Ha Giang province are presented in Figure II-4.10.3. At the water bodies along R176A, R183, the only position at which Fecal coliform is detected is R176A-WS3 with the concentrations of 30, MPN/100ml, much lower than the limitation of QCVN 39:2011/BTNMT.

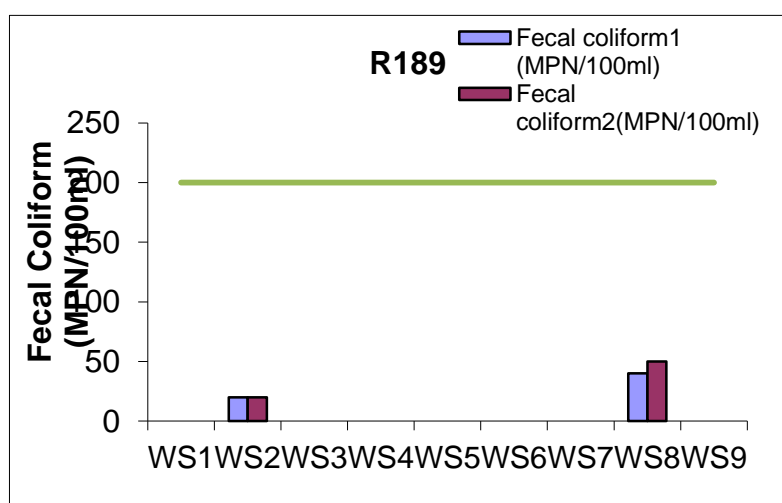
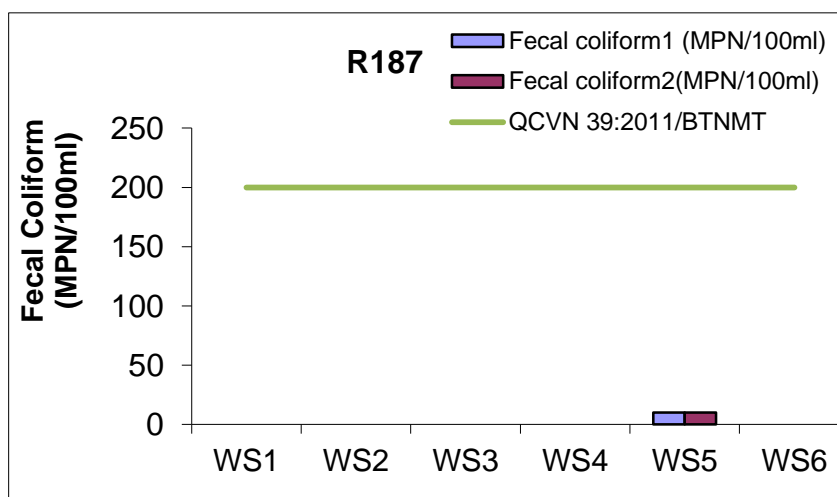


Figure II-4.10.4. Fecal coliform concentrations of water in Tuyen Quang

Figure II-4.10.4. graphically presents Fecal Coliform results at the monitoring positions along two roads 187 and 189 in Tuyen Quang. It can be seen that Fecal Coliform concentrations are lower than the limitation of QCVN, Fecal coliform is detected at the 3 positions including R187-WS5, R189-WS2, R189--WS8, with the respective values of 10, 20, 50 MPN/100ml and still meet the permissible limitation of QCVN 30:2011/BTNMT.

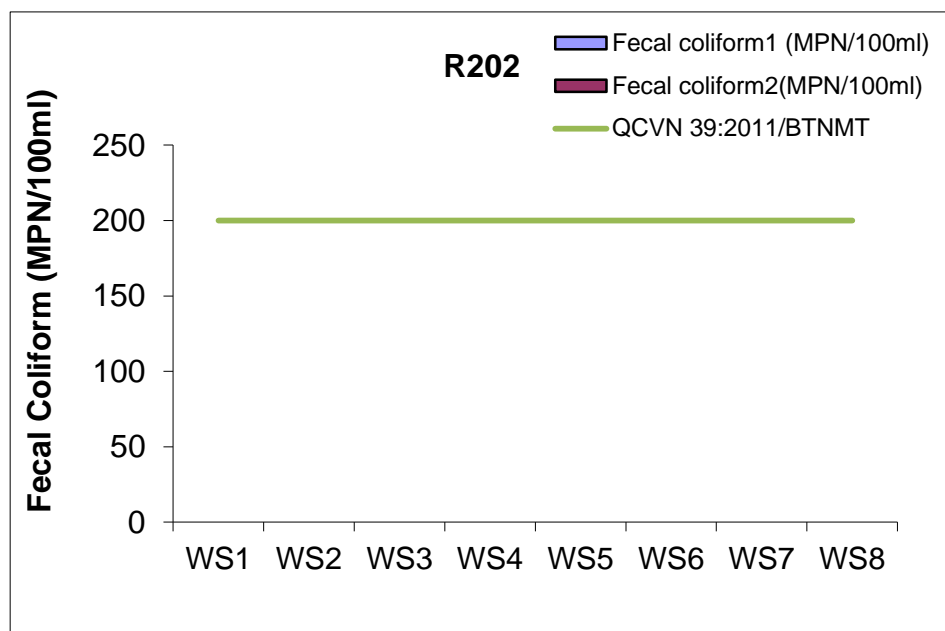


Figure II-4.10.5. Fecal coliform concentrations of water in Cao Bang

Based on Figure II-4.10.5, It can be seen that, at all positions along R202, no Fecal Coliform is detected.

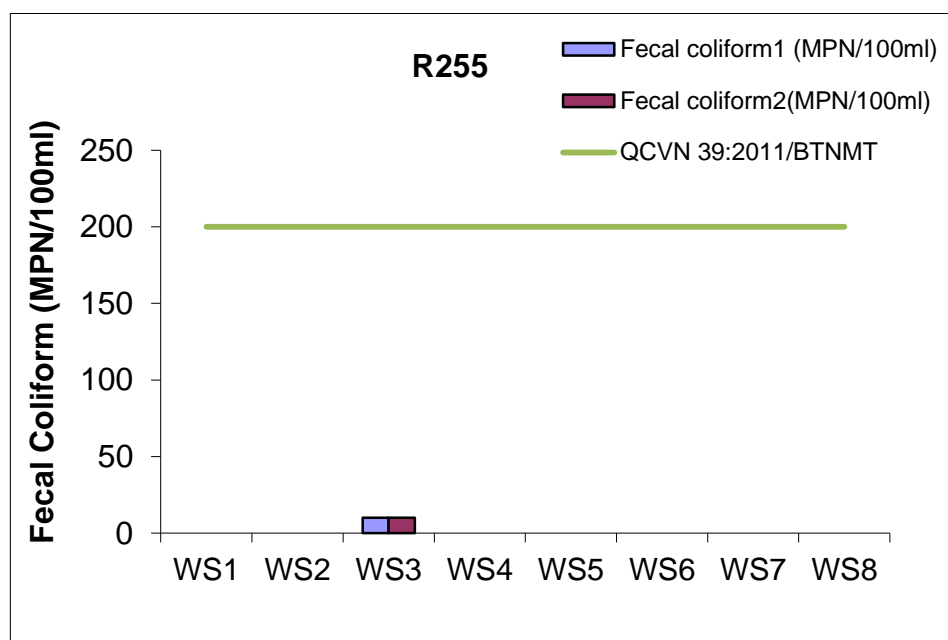


Figure II-4.10.6. Fecal coliform concentrations of water in Bac Kan

Figure II-4.10.6. shows the results of Fecal coliform values measured at the monitoring positions along the road R255 in Bac Kan province. Graphically, the only position at which Fecal Coliform is detected is R255-WS3 (stream Km 9+900, Ban Bay village, Yen Thuong) with the value of 10 MPN/100ml satisfying the limitation of QCVN 39:2011/BTNMT. .

II.5. Discussion and assessment

II.5.1. Air quality

The detail TSP values monitored of the monitoring stages at the positions along 12 roads of 6 provinces in the project area, it can be seen that:

- In the prior construction stage, the baseline air quality based on TSP values is not good at some monitoring positions including R163-AQ3, R156-AQ2. TSP concentrations were over the permissible limitation of QCVN 05:2013/BTNMT due to some construction activities were conducted.
- In the construction stages, from the step 1 to the current step 5, there are no position at which TSP is over the stipulated standard.
- Generally, almost TSP concentrations obtained in the step 5 of construction stage decrease compared to the values in the step 4.

Based on the TSP results and the current state of construction activities of each stage, it can be considered that the impact of construction stages on surrounding areas, measuring points, residential areas of the project areas is not significant. The extent impact on the surrounding environment of a local nature, affecting every moment, every position.

II.5.2. Equivalent noise (Leq)

The detail equivalent noise values monitored of the monitoring stages at the positions along 12 roads of 6 provinces in the project area, it can be seen that:

- In the prior construction stage

In the period of 6h-21h, at the positions such as R163-AQ3, R156-AQ2/AQ1, R187-AQ2, R255-AQ3, the noise levels were over the permissible limitation (70dBA) of QCVN 26: 2010/BTNMT.

In the period of 21h-22h, at the positions such as R163-AQ1/AQ3, R160-AQ1, R156-AQ1/AQ2, R154-AQ1, R151-AQ2/AQ3, R151B-AQ1, R176A-AQ2, R183-AQ3/AQ4, R187-AQ2, R202-AQ1, R255-AQ1/AQ3/AQ4, the noise levels disatisfied the limitation (55 dBA).

- In the construction stages:

In the period of 6h-21h: some remarkable noise levels over the limitation are R156-AQ2 (step 3), R187-AQ1 (step 2), R183-AQ3 (step 3), R154-AQ1 (step 3), R189-AQ3 (step 3).

In the period of 21h-20h: the values of noise level not meeting the stipulated standard were recorded at R163-AQ1 (step 1,3,5), R163-AQ2 (step 5), R160-AQ1 (step 1,3,5), R156-AQ2 (step 1), R156-AQ2 (step 5), R154-AQ1 (step 5), R151-AQ1 (step 3), R176A-AQ2 (step 2), R183-AQ3 (step 2), R183-AQ5 (step 5), R187-AQ1 (step 2), R202-AQ1 (step 1), R202-AQ5 (step 5), R255-AQ1 (step 5), R225-AQ2 (step 1,3).

After considering the monitoring results about noise level of the monitoring stages (from the prior stage to the 3rd step of the construction stage) as well as the construction situation at each monitoring position, it can be evaluated that the main source causing the noise at almost of the monitoring positions resulted from life activities including production, transportation. At almost the monitoring positions noise level satisfied the standard of QCVN 26: 2010/BTNMT. The noise level at some positions increase and over the limitation but not considerable and local nature

II.5.3. Water quality

The detail equivalent noise values monitored of the monitoring stages at the positions along 12 roads of 6 provinces in the project area. It can be seen that:

- About pH: generally, pH values downstream and upstream are not considerably different, all pH values are in the permissible range of QCVN 08:2008/BTNMT. About turbidity and TSS: compared to values obtained in the previous monitoring stage-the 4th step of the construction, At some positions along R163, R151B, R151, R189, R176A, turbidity and TSS values decrease but still do not satisfy the permissible limitation of QCVN 08:2008/BTNMT. At some other positions along R156, R160, R183, R202, turbidity and TSS did slight increase.

- About DO: in this monitoring step – the 5th step, almost DO concentrations of water bodies satisfy the limitation of column B1 QCVN 08:2008/BTNMT, excepting for that of positions R156-WS6 (DO concentrations monitored in the previous steps of construction stage were lower than the limitation) At the position R202-WS8, DO increase and meet the standard in this step compared to the 4th step. At the other positions, DO satisfy the permissible limitation.
- About BOD5 and COD: the values of BOD5 and COD of almost water bodies in the 5th step of the construction stage decrease compared to those of the 4th step, and satisfy the permissible limitation of column B1 QCVN 08:2008/BTNMT. However, COD at R156-WS6 increase and still the highest among the other values and is the only values do not meet permissible limitation.
- About oil and grease: Oil and grease concentrations obtained in the 5th step decrease in comparison with those of the 4th step, almost values satisfy the limitation of column B1 QCVN 08:2008/BTNMT, excepting some exceed the limitation but not much, including R163-WS4-2, R151-WS5, R151B-WS2, R156-WS6, R189-WS2, R189-WS3-2, R189-WS8, R183-WS1, R183-WS8, R202-WS3, R202-WS8, R255-WS3, R255-WS8-2. It is noticed that, the number of positions at which oil and grease concentration decrease in the 5th step. About Coliform and Fecal Coliform: all values of Coliform concentrations of the 5th step meet the QCVN 08:2008/BTNMT. Fecal coliform values generally satisfy the limitation of QCVN 39:2011/BTNMT, excepting for that monitored at R156-WS6, (Fecal coliform concentrations were inherently high and exceed the permissible limitation in the the baseline construction stage, and the previous steps of the construction stage. Generally, almost values of Coliform and Fecal Coliform concentrations of the 5th step decrease in comparison with those obtained in the 4th step. Overall, based on the results of measurement and analysis of some basic parameters in the monitoring periods including the prior stage, the construction stage- step from 1 to 5, it can be found that, the quality of surface water in the project areas is improved respect to DO, oil and grease, Coliform, Fecal Coliform. DO concentrations at almost monitoring positions satisfy the permissible limitation excepting that of several positions are inherently low in the baseline construction stage. Almost values of oil/grease, Coliform, Fecal Coliform in this step decrease below the respective limitation of QCVN. This show that, in this period, the collecting of domestic wastewater and wastewater of construction activities as well as applying the methods to reduce the amount oil and grease and microbiological released to the environment are conducted well, especially at the above monitoring positions at which the pollutant concentrations exceed the QCVN comparing to the values of the baseline stage.
- However, at some positions, turbidity and TSS concentration exceed the limitation or decrease in comparison with those in the 4th step but are still higher the permissible limitation. This could be due to, the construction activities regarding to transfer materials for construction were carried out around
- After consideration about construction status as well as the condition and position at which water samples were sampled, some comments were given as below:
- Although the water quality in project area was affected by construction activities but the impact is not great
- The direct effect of construction activities (living activities of workers, material transferring activities) on water quality is partial and not significant.
- The effect on quality of surface water was display mainly by the specific indicators turbidity and TSS, oil and grease, Fecal Coliform.