



Environmental Monitoring Report

Environmental, Safety and Health Annual Monitoring Report
Loan/Investment Number: 1769/7162
February 2006 to February 2007

PHI: North Luzon Expressway Project

Prepared by Manila North Tollways Corporation (MNTC)

For the Asian Development Bank

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Asian Development Bank

MANILA NORTH TOLLWAYS CORPORATION

ENVIRONMENTAL, SAFETY AND HEALTH ANNUAL MONITORING REPORT (ESHAMR)

**MANILA NORTH TOLLWAYS CORPORATION (MNTC)
MANILA, PHILIPPINES**

Reporting Period: FEBRUARY 11, 2006 TO FEBRUARY 11, 2007
ESHAMR Completion Date: APRIL 30, 2007

ENVIRONMENTAL, SAFETY AND HEALTH ANNUAL MONITORING REPORT (ESHAMR)

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Attachments

Appendix A Monitoring Station Coordinates – Latitude & Longitude

Appendix B NLEX Map

Section 1

MNTC CERTIFICATION

1.1. ESHAMR Certification

1.1.1. IFC Project Identification: Manila North Tollways Corporation (MNTC)

1.1.2. IFC Project Sponsor: Manila North Tollways Corporation (MNTC)

1.1.3. IFC Investment Number: 9981

1.1.4. AMR reporting period: February 11, 2006 – February 11, 2007

1.1.5. MNTC authorized representative:

Allan Jeffrey N. Ang – Quality, Environmental, Safety & Health Manager

1.1.6. Manila North Tollways Corporation (MNTC) office physical address:

2nd Flr. Benpres Building, Exchange Road cor. Meralco Avenue, Ortigas Center, Pasig City 1600, Philippines

2.1.7. Telephone: (Country code – City code – Local telephone no.)

63 – 2 – 6384380

2.1.8. Facsimile: (Country code – City code – Local telephone no.)

63 – 2 – 6386276

2.1.9. Electronic E-mail address:

ajnang@mntc.com

2.1.10. Manila Tollways web page addresses (if applicable):

www. mntc.com

2.1.11. I certify that the data contained in this ESHAMR completely and accurately represent Manila Tollways operations during this reporting period. I further certify that analytical data summaries¹ incorporated into Section 5 are based upon data collected and analyzed in a manner consistent with the World Bank Group's *Pollution Prevention and Abatement Handbook, Monitoring*.²

ENGR. ALLAN JEFFREY N. ANG

QESH Manager

MNTC Employee Name

Signature

¹ Raw analytical data upon which summaries are based should not be submitted with this ESHAMR but must be preserved by Investment Sponsor and presented upon demand.

Section 2

SIGNIFICANT INCIDENTS REPORT

2.1. Reporting Events

Manila North Tollways Corporation (MNTC) personnel are required to report all environmental and social events³ that may have caused damage; brought about injuries or fatalities or other health problems; attracted the attention of outside parties; affected project labor or adjacent populations; affected cultural property; or created Manila North Tollways Corporation (MNTC) and/or MNTC liabilities.

2.2. Describing Events

Prepare discrete Significant Events Reports (see following page) for each incident that occurred during the reporting period. Attach photographs, plot plans, newspaper articles and all relevant supporting information that the lender will need to be completely conversant with the incident and associated environmental and social issues.

2.3. Table of Significant Event Reports

TABLE OF SIGNIFICANT EVENT REPORTS

Manila North Tollways Corporation (MNTC) Significant Event Reports from Tollways Management Corporation (TMC).

ITEM NO.	SIGNIFICANT EVENTS AND ISSUES	NO. OF CASES
1	Chemical and/or hydrocarbon material spills	0
2	Fire	0
3	Explosion or unplanned releases	0
4	Industrial injuries (Lost Time Injuries)	4
5	Fatalities including transportation	1
6	Ecological damage/destruction	0
7	Local population disruption	0
8	Disruption of emissions or effluent treatment	0
9	Legal/administrative notice of violation	0
10	Penalties	0
11	Fines	0
12	Increase in pollution charges	0
13	Negative media attention	0
14	Chance cultural finds	0
15	Labor unrest or disputes	0

³ Examples of significant incidents follow. Chemical and/or hydrocarbon materials spills; fire, explosion or unplanned releases; industrial injuries; fatalities including transportation; ecological damage / destruction; local population disruption; disruption of emissions or effluent treatment; legal / administrative notice of violation; penalties, fines, or increase in pollution charges; negative media attention; chance cultural finds; labor unrest or disputes.

Section 3

OTHER INFORMATION AND FEEDBACK

Provide any additional information including the following⁴.

- **Describe on-going public consultation and disclosure:**

1. MNTC continues to strengthen its alliance with various government units including the governors, congressmen and mayors, transport and business groups. At the same time, MNTC continues to meet with Local Government Executives, local media and other government agencies to listen to their concerns and thus, be prepared to respond to these concerns.
2. Submits regular reports and project progress updates to the regional and local government groups of Central Luzon. The groups that we interact with are NEDA-III, DTI-III and the Presidential Commission on the Central Luzon Growth Corridor (PC-CLGC).
3. Resettlement Action Plans (RAP) consultations are conducted by the Loan Compliance Group involving communities and Local Government Units.
4. We are closely working with the Department of Environment and Natural Resources (DENR), Local Government Units (LGUs) and communities on maintaining good social and sustainable environmental condition of NLEX.

- **In detail, describe print or broadcast media attention given to Manila North Tollways during this reporting period.**

1. The North Luzon Expressway Project has been still continues to get good publicity from both the print and broadcast media.
2. Positive media comments are more numerous indicating the economic benefits of the project on both local and national levels.
3. There are still numerous good news stories, radio commentaries and television features, as well as columns, have been written and presented about the NLE project. These involve the resulting progress and project benefits for the country.

- **In detail, describe interactions with non-governmental organizations or public scrutiny of the Manila North Tollways Corporation.**

The Non-Government Organizations and the public are fully aware and recognized the benefits of the NLEX improvements. Toll rates concerns was their primary focus but was addressed by the numerous information campaign of both Public Relations and Marketing Groups. We had distributed leaflets and produced Television Commercials for public information.

⁴ Provide additional sheets as needed for complete information

- **Describe training and quality initiatives (e.g. ISO14001 and ISO9000):**

In terms of initiatives ISO initiatives, the organization is had established the schedule for the implementation of the ISO9001:2002 (Quality) including the existing system for ISO14001 (Environmental) and OHSAS18001 (Health & Safety). A committee was assembled to lead the preparation of MNTC for IMS certification.

Oscars and Lopez Achievement Award

MBNQA Baseline survey was already conducted by FPHC auditors. The general summary includes that the Company is capable for application of ISO9000 Quality Management System (QMS) certification.

- **Describe Manila Tollways public relations efforts (e.g. establishments or a web page, etc.)**

MNTC has continuously achieved significant progress in its PR efforts.

- Media - Press and photo releases from the major dailies are regularly monitored and issues are actively addressed by the Corporate Communications (CorCom) Group.
- Continuous regular project briefings for government executives, LGUs, motorists, businessmen, news and public affairs are still a part of the Organization's public relations efforts.
- Frequent information dissemination about the new NLE is achieved by releasing various leaflets, newsletters and brochures.
- Conduct of numerous TV interviews and commercials explaining the traffic and safety management and benefits of the NLE, respectively.
- Good relationship with the media group is constantly nurtured by the Organization.
- Produced the 2006 MNTC Calendar promoting the NLE benefits received by congressmen, local government executives, motorists and the general public. This is to promote tourism and business investments in the Northern Luzon.

Section 4

SAMPLING AND MEASUREMENT REPORTS

- **Occupational Health and Safety**
- **Traffic and Safety Enhancement Projects**
- **Ambient Air Quality**
- **Pest Management Programs Monitoring**
- **Solid and Hazardous Waste Management**
- **Re-vegetation Monitoring**

Section 4

OCCUPATIONAL HEALTH AND SAFETY

Section 4

OCCUPATIONAL HEALTH AND SAFETY

STATISTICS

OCCUPATIONAL HEALTH AND SAFETY INCIDENTS REPORT

Manila North Tollways Corporation (MNTC) Contractor and Sub-Contractor Employees

- Incident statistics reporting for Manila North Tollways Corporation (MNTC) Contractor and Sub-contractor employees.

MNTC's Contractors and Sub-contractors Occupational Health and Safety Incidents	Number of Incidents this Reporting period	MNTC's Contractors and Sub-contractors Occupational Health and Safety Incident Details ⁷
Fatalities	0	<ol style="list-style-type: none">1. Date(s) of Fatality:<ul style="list-style-type: none">➤ Not Applicable2. Cause(s) of Fatality:<ul style="list-style-type: none">➤ Not Applicable3. Corrective or preventive measures to prevent any occurrence:<ul style="list-style-type: none">➤ Conduct of regular traffic, safety and health trainings.➤ Regular supply of proper and complete Personal Protective Equipment (PPE) and other required safety devices.
Total lost time accidents ⁸	1-case	<ol style="list-style-type: none">1. Date(s) of lost time accidents:<ul style="list-style-type: none">➤ TMC DATA (SEE NEXT PAGES – ESH ANNUAL ACCIDENT REPORT (LTI, MTC AND FAC CHART) 2006 - OPERATOR PERSONNEL & CONTRACTOR.2. Cause(s) of lost time accidents:<ul style="list-style-type: none">➤ TMC DATA (SEE NEXT PAGES – ESH ANNUAL ACCIDENT REPORT (LTI, MTC AND FAC CHART) 2006 - OPERATOR PERSONNEL & CONTRACTOR.

⁷ Attach additional sheets as needed to fully document occupational health and safety incidents.

⁸ Incapacity to work for at least one full workday beyond the day on which the accident or illness occurred.

MANILA NORTH TOLLWAYS CORPORATION (MNTC) PROJECT

MNTC's Contractors and Sub-contractors Occupational Health and Safety Incidents	Number of Incidents this Reporting period	MNTC's Contractors and Sub-contractors Occupational Health and Safety Incident Details ⁹
Total lost time accidents ¹⁰ (Continuation)		<p>3. Corrective or preventive measures to prevent any occurrence:</p> <ul style="list-style-type: none"> ➤ Conduct of regular traffic and safety trainings. ➤ Regular supply of proper and complete Personal Protective Equipment (PPE) and other required safety devices. ➤ Regular safety audits and inspections conducted. ➤ Safety engineering measures and management systems are formulated and implemented.
Total number of lost workdays ¹¹ resulting from incidents.	12-Mandays	<p>1. Total lost workdays this reporting period:</p> <ul style="list-style-type: none"> ➤ 12-Mandays <p>2. Total lost workdays last reporting period:</p> <ul style="list-style-type: none"> ➤ 144-Mandays
Total man-hours worked (total hours worked by all employees) during the reporting period and incidence calculation	2,512,539-manhours	<p>1. Total man-hours worked this reporting period:</p> <ul style="list-style-type: none"> ➤ 2,512,539-manhours <p>2. Incidence = total lost workdays / total hours worked</p> <ul style="list-style-type: none"> ➤ 4.77 <p>3. Incidence this reporting period:</p> <ul style="list-style-type: none"> ➤ 4.77 <p>4. Incidence last reporting period:</p> <ul style="list-style-type: none"> ➤ 6.30

⁹ Attach additional sheets as needed to fully document occupational health and safety incidents.

¹⁰ Incapacity to work for at least one full workday beyond the day on which the accident or illness occurred.

¹¹ Lost workdays are the number of workdays (consecutive or not) beyond the date of injury or onset of illness that the employee was away from work or limited to restricted work activity because of an occupational injury or illness

MANILA NORTH TOLLWAYS CORPORATION (MNTC) PROJECT

MNTC's Contractors and Sub-contractors Occupational Health and Safety Incidents	Number of Incidents this Reporting period	MNTC's Contractors and Sub-contractors Occupational Health and Safety Incident Details ¹²
Vehicular Collisions ¹³	TMC DATA (SEE NEXT PAGES - ESH ANNUAL ACCIDENT REPORT (LTI, MTC AND FAC CHART) 2006 - OPERATOR PERSONNEL & CONTRACTOR	<ol style="list-style-type: none">1. Date(s) of vehicular collision(s): See next pages.2. Vehicular Collision(s) cause: See next pages.3. Corrective or preventive measures to prevent re- occurrence: See next pages.

¹² Attach additional sheets as needed to fully document occupational health and safety incidents.

¹³ Vehicle Collisions: When a vehicle (device used to transport people or things) collides (comes together with violent force) with another vehicle or inanimate or animate object(s) and results in injury (other than the need for First-Aid) or death.



OPERATOR ACCIDENT REPORT SUMMARY: YEAR TO DATE

YEAR: 2006

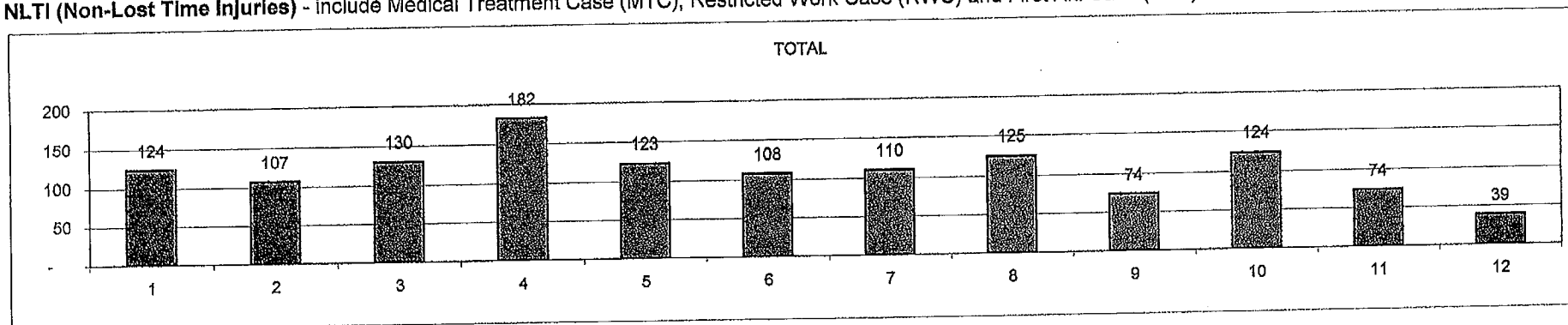
INCIDENT TYPE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR TO DATE
													INCIDENT/MAN HOUR
Fatality (LTI)	-	-	-	1	0	0	-	-	-	0	0	0	1
PTD (LTI)	-	-	-	-	0	0	-	-	-	0	0	0	-
PPD (LTI)	-	-	-	-	0	0	-	-	-	0	0	0	-
LWC (LTI)	-	-	-	-	0	0	-	2	-	0	0	0	2
MTC	1	-	-	1	1	0	-	-	-	0	2	1	6
RWC	-	-	-	-	0	0	-	-	-	0	0	0	-
FAC	1	2	-	-	0	0	2	-	1	1	3	0	10
Property Damage	54	50	58	67	45	47	50	47	24	52	28	22	544
Env't (pollution, spillage, leaks)	-	-	-	1	0	0	-	-	-	0	0	0	1
Occupational Illness	-	-	-	-	0	0	-	-	1	1	0	0	2
Near Miss	68	55	72	112	77	61	58	76	48	70	41	16	754
TOTAL	124	107	130	182	123	108	110	125	74	124	74	39	1,320
TOTAL MAN HOURS	206,648	210,770	215,440	209,739	198,690.5	233,574	213,875	212,714	201,405	204,329	213,228	192,126	2,512,539

Remarks: TMA Incident April 6: 1 fatality, 2 LWC's- But only 1 incident (only the Fatality Case (more serious case) was entered since this table denotes # of incident

Note:

LTI (Lost Time Injuries) - Include Personal Temporary Disability (PTD), Personal Permanent Disability (PPD) and Lost Work Case (LWC)

NLTI (Non-Lost Time Injuries) - include Medical Treatment Case (MTC), Restricted Work Case (RWC) and First Aid Case (FAC)



ESH ANNUAL ACCIDENT REPORT (LTI, MTC AND FAC CHART) 2006 - OPERATOR PERSONNEL & CONTRACTOR

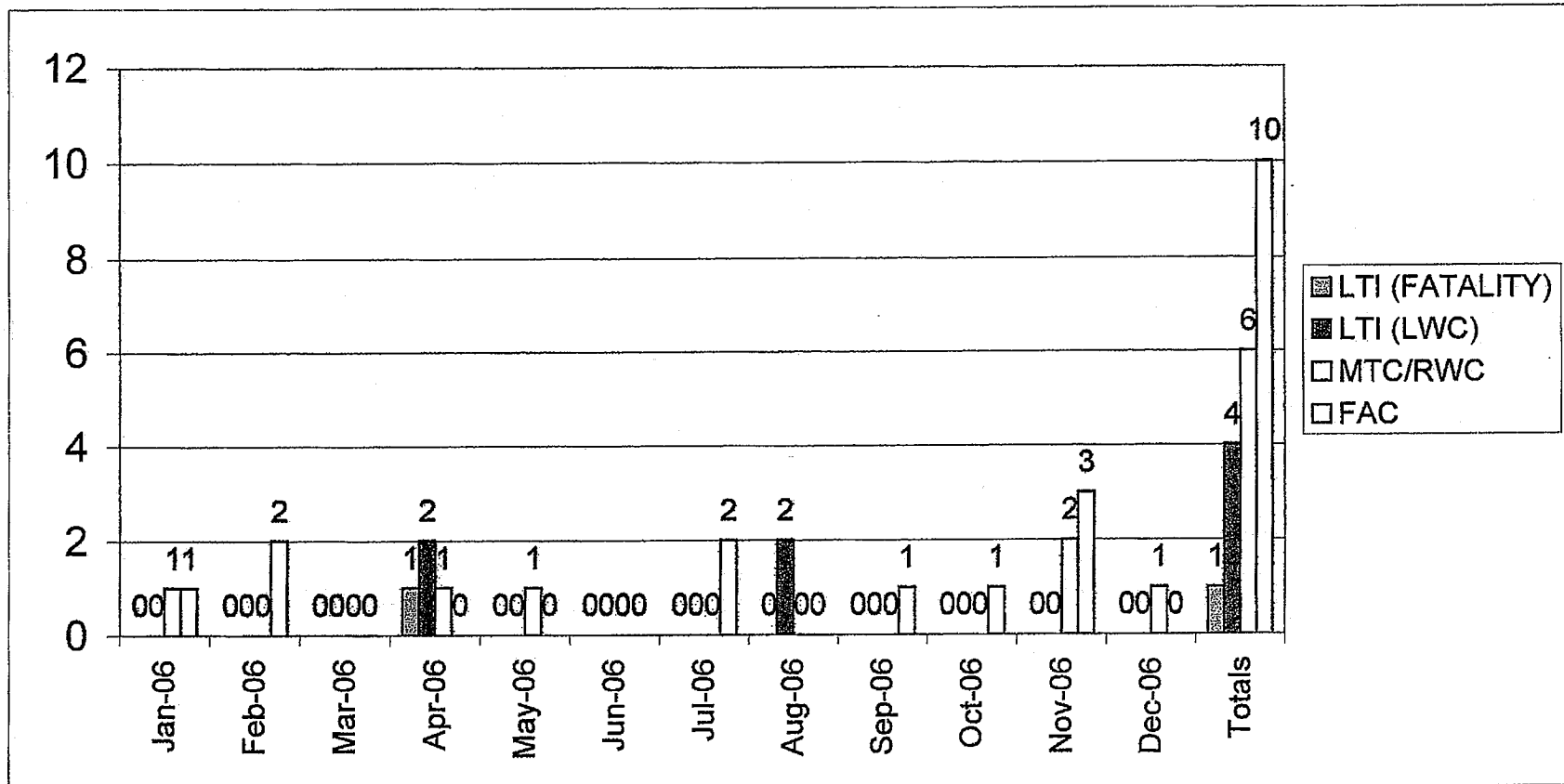
MONTH	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Totals
1 LTI (FATALITY)	0	0	0	1	0	0	0	0	0	0	0	0	1
2 LTI (LWC)	0	0	0	2	0	0	0	2	0	0	0	0	4
3 MTC/RWC	1	0	0	1	1	0	0	0	0	0	2	1	6
4 FAC	1	2	0	0	0	0	2	0	1	1	3	0	10
5 TOTALS	2	2	0	4	1	0	2	2	1	1	5	1	21

*Data indicates number of injuries (not number of incidents. 1 incident may have multiple injuries)

Note:

LTI (Lost Time Injuries) - include Personal Temporary Disability (PTD), Personal Permanent Disability (PPD) and Lost Work Case (LWC)

NLTI (Non-Lost Time Injuries) - include Medical Treatment Case (MTC), Restricted Work Case (RWC) and First Aid Case (FAC)



SUMMARY OF FAC, MTC, RAC and LTI Cases

Case No.	Incident Date	Div/Dept	Incident Title	Type of Injury	Recommended Corrective Measures
1	1/1/2006	Traffic Opns/TMS	Truck wheel run over right foot of Patrol Crew (PC Jericho Mercado). PC Mercado had damage on soft tissue of his right foot	MTC (TMC STAFF)	Observe road safety when working. Be cautious of incoming vehicles. Wear safety shoes.
2	1/17/2006	Traffic Opns/RMD	MR. G. dela Cruz of NLTEC grass mower while doing his task when his brush cutter accidentally hit a loose wire that cause to fly and hit his right thigh. This caused minor wounds.	FAC (CONTRACTOR)	<ul style="list-style-type: none"> - Inspect work area before and during work hours. - Practice safety precautions in performing assigned job. - Extra care should be observed during working hours.
3	2/20/2006	Toll Opns/Toll Collection	Balintawak Toll Teller Kristine Marcelo fainted at the TSR-Btwk due to fatigue, hunger and stress. Ms. Marcelo has a history of ulcer.	FAC (TMC STAFF)	Avoid delay of break time.
4	2/24/2006	Toll Opns/Toll Collection	Bumped her forehead on locker door resulting to minor wounds.	FAC (TMC STAFF)	Observe safe practices
5	4/6/2006	TMS	Patrol Vehicle Turned Turtle - Killing PC Selada	FATALITY (TMC STAFF)	Practice defensive driving and wear seatbelts at all times
6			Patrol Vehicle Turned Turtle - Injuring Christian Fuentes (April 7-May 24) 48 days	LTI (LWC) (TMC STAFF)	
7			Patrol Vehicle Turned Turtle - Injuring Alvin Aquino (April 7-July 6) 91 days	LTI (LWC) (TMC STAFF)	
8	4/28/2006	RMD	RMD Motorpool Employee bumped his head on the open side vehicle cover after checking battery of shuttle bus causing cuts (Ronald Tongco	MTC (TMC STAFF)	Observe Safe Practices
9	5/8/2006	Toll Audit	Toll Auditor Ina Molina suffered cuts in the forehead after he accidentally bumped her head in one of the cubicle at the Ground Floor Women's CR in OMC. The wound required 6 stitches to close.	MTC (TMC STAFF)	Observe Safe Practices
10	7/12/2006	RMD	NLTEC Grascutter hit by airborne wire. Suffered minor wound	FAC (CONTRACTOR)	Cut Grass Layer By layer. Wear protective PPE

Case No.	Incident Date	Div/Dept	Incident Title	Type of Injury	Recommended Corrective Measures
11	7/24/2006	Toll Opns/Toll Collection	Teller lost consciousness due to dizziness	FAC (TMC STAFF)	Ample Rest
12	8/11/2006	Toll Opns/Toll Collection	Toll Teller Ana Riza Septimo went down the catwalk stair near lane N02. She stumbled on the way down as her left foot landed on the ground because of the missing last step on the stair. The result indicated that she had an impacted fracture involving the 3rd and 4th metatarsal bones and her left foot was immediately cast. The attending physician advised her to rest for 30 days	LTI (LWC) (TMC STAFF)	Correct deficiency. Install the missing step
13	8/29/2006	TMS	TMA-AOVP Traffic Enforcer Berges (outsourced personnel) hit by a wayward vehicle while doing AOVP activities at Pulilan SB	LTI (LWC) (CONTRACTOR)	Check AOVP procedures. Revise if necessary
14	9/25/2006	RMD	RMD personnel's hand got pinched as he was closing the door of the service vehicle (Emanuel Sandrino)	FAC (CONTRACTOR)	Observe safe practices
15	10/21/2006	TMS	Patrol Crew hit in the head by the shuttle door (Revo) as another PC closed it and did not notice him (PC Ariel Beroy)	FAC (TMC STAFF)	Observe safe practices
16	11/4/2006	RMD	RMD personnel finger pinched at slidings of boom truck	FAC (CONTRACTOR)	Observe safe practices
17	11/21/2006	Toll Collection	Toll Supervisor Ana Celso and Genevieve Tuason suffered minor bruises after their vehicle suddenly stopped to avoid hitting another vehicle at Sta Rita POS Parking Area	FAC (TMC STAFF)	Wear seatbelts
18	11/27/2006	RMD	NLTEC Grass-cutting personnel Rogello Dela Cruz was mowing grass when his brushcutting blade accidentally hit a piece of stone thereby causing the bolt attaching the blade to the plate to give off, sending the blade to hit the and penetrated the safety boots of his right foot causing lacerated wound in his middle toe	MTC (CONTRACTOR)	Clear area of objects and obstructions before performing grasscutting
19	11/29/2006	Toll Collection	Val Teller Nerissa Abracero fell from it's chair after standing on the footrest. Resulting to fractured hip	MTC (TMC STAFF)	Never use the footrest as stand. The foot rest is not designed to carry the full weight of a man but simply as a point to rest one's feet

Case No.	Incident Date	Div/Dept	Incident Title	Type of Injury	Recommended Corrective Measures
20	11/30/2006	RMD	Mr. Juan Bolofer, RMD Foreman sustained minor scratch on his right wrist while dismantling the MNTC billboard at KM 26+400 NB. He accidentally scratched his right wrist on the control valve of an acetylene tank.	FAC (CONTRACTOR)	Observe Safe Practices
21	12/22/2006	RMD	RMD outsourced crew Edgardo Castillanes sustained a left eyebrow cut when the tree branch he was cutting accidentally fell on him. Part of the branch hit his left eyebrow causing the wound	MTC (CONTRACTOR)	Observe Safe Practices

ESH ANNUAL ACCIDENT REPORT(LTI, MTC AND FAC CHART) 2006 - CONTRACTOR/OUTSOURCED PERSONNEL

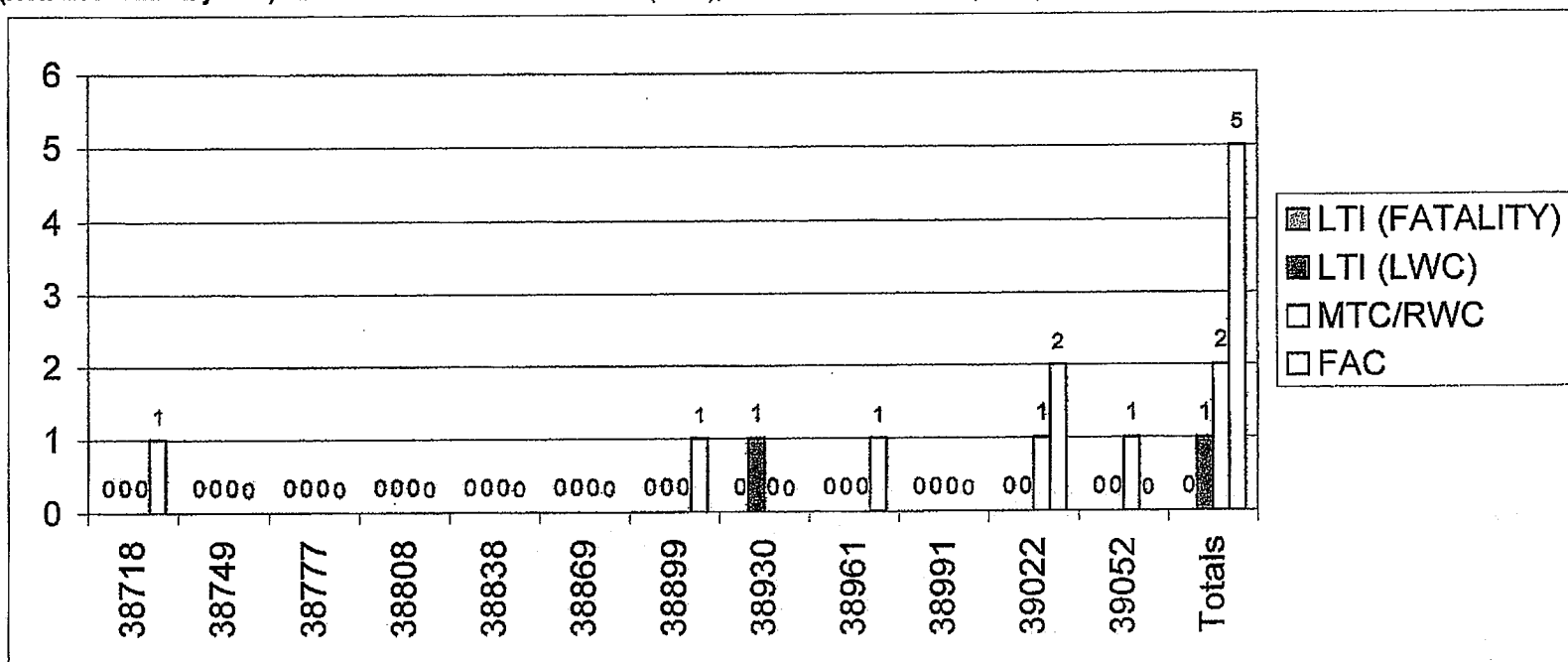
	MONTH	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Totals
1	LTI (FATALITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
2	LTI (LWC)	0	0	0	0	0	0	0	1	0	0	0	0	1
3	MTC/RWC	0	0	0	0	0	0	0	0	0	0	1	1	2
4	FAC	1	0	0	0	0	0	1	0	1	0	2	0	5
5	TOTALS	1	0	0	0	0	0	1	1	1	0	3	1	8

*Data indicates number of injuries (not number of incidents. 1 incident may have multiple injuries)

Note:

LTI (Lost Time Injuries) - include Personal Temporary Disability (PTD), Personal Permanent Disability (PPD) and Lost Work Case (LWC)

NLTI (Non-Lost Time Injuries) - include Medical Treatment Case (MTC), Restricted Work Case (RWC) and First Aid Case (FAC)



SUMMARY OF FAC, MTC, RAC and LTI Cases

Case No.	Incident Date	Div/Dept	Incident Title	Type of Injury	Recommended Corrective Measures
1	1/17/2006	Traffic Opns/RMD	MR. G. dela Cruz of NLTEC grass mower while doing his task when his brush cutter accidentally hit a loose wire that cause to fly and hit his right thigh. This caused minor wounds.	FAC (CONTRACTOR)	<ul style="list-style-type: none"> - Inspect work area before and during work hours. - Practice safety precautions in performing assigned job. - Extra care should be observed during working hours.
2	7/12/2006	RMD	NLTEC Grascutter hit by airborne wire. Suffered minor wound	FAC (CONTRACTOR)	Cut Grass Layer By layer. Wear protective PPE
3	8/29/2006	TMS	TMA-AOVP Traffic Enforcer Berges (outsourced personnel) hit by a wayward vehicle while doing AOVP activities at Pullan SB	LTI (LWC) (CONTRACTOR)	Check AOVP procedures. Revise if necessary
4	9/25/2006	RMD	RMD personnel's hand got pinched as he was closing the door of the service vehicle (Emanuel Sandrino)	FAC (CONTRACTOR)	Observe safe practices
5	11/4/2006	RMD	RMD personnel finger pinched at sidings of boom truck	FAC (CONTRACTOR)	Observe safe practices
6	11/27/2006	RMD	NLTEC Grass-cutting personnel Rogelio Dela Cruz was mowing grass when his brushcutting blade accidentally hit a piece of stone thereby causing the bolt attaching the blade to the plate to give off, sending the blade to hit the and penetrated the safety b	MTC (CONTRACTOR)	Clear area of objects and obstructions before performing grasscutting
7	11/30/2006	RMD	Mr. Juan Bolofer, RMD Foreman sustained minor scratch on his right wrist while dismantling the MNTC billboard at KM 26+400 NB. He accidentally scratched his right wrist on the control valve of an acetylene tank.	FAC (CONTRACTOR)	Observe Safe Practices

Case No.	Incident Date	Div/Dept	Incident Title	Type of Injury	Recommended Corrective Measures
8	12/22/2006	RMD	RMD outsourced crew Edgardo Castellanes sustained a left eyebrow cut when the tree branch he was cutting accidentally fell on him. Part of the branch hit his left eyebrow causing the wound	MTC (CONTRACTOR)	Observe Safe Practices

Section 4

OCCUPATIONAL HEALTH AND SAFETY

TRAFFIC AND SAFETY ENHANCEMENT PROJECTS

MNTC-OMAS-QESH

WIG 1 – Ensure that motorists are provided with superior quality of service and a safe road

NLEX TRAFFIC AND SAFETY ENHANCEMENT PROJECTS - SIGNAGES

ITEM NO.	ACTIVITY	REMARKS	
		QUANTITY & UNITS	STATUS
A	SIGNAGES		
1	Replacement of "NLEX Directional Signs" - Triangles	112-pieces	112-pieces
2	Additional Km Distance Information	24-pieces	Completed
3	NLEX Facility Signages		
4	Toll Booth Identification Signs - Supervisor's View	56-pieces	56-completed
5	Toll Booth Identification Stickers - Motorist View	147-pieces	147-Completed
6	Drainage and Culvert Signs	355-pieces	355-Completed
7	Speed Stopping Lane Signs	6-pieces	6-Completed
8	"To Manila" Signs	27-pieces	27-Completed
9	"Keep Right Except To Overtake"	10-pieces	10-Completed
10	No Loading and Unloading	6-pieces	6-Completed
11	Proceed On Green Light Only	100-pieces	100-Completed
12	Pavement Quality Assurance Testing	6-pieces	6-Completed
13	Greening The Interchange	2-pieces	2-Completed
14	Bawal Pumarada	8-pieces	8-completed
15	Convex Mirror Requirement	2-pieces	2-Completed
16	EC-Tag Only	20-pieces	20-Completed
17	Bawal Ang Manirahana Sa Ilalim Ng Tulay	84-pieces	41-Completed
18	Additional Chevron Signs at Balintawak	6-pieces	6-Completed
19	Drainage Enhancement Signs	8-pieces	8-Completed
20	PNP Information Signs - Anti-Robbery/Hijacking	3-pieces	3-Completed
21	Green Philippine Highway	20-pieces	20-Completed
	TOTAL	2,638pieces	2,638-pieces completed

Total Number of Signage Projects =21-projects

MNTC-OMAS-QESH

WIG 1 – Ensure that motorists are provided with superior quality of service and a safe road

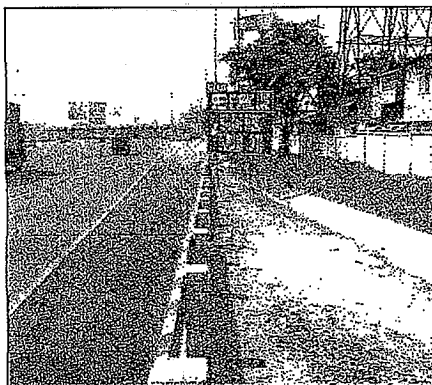
NLEX TRAFFIC AND SAFETY ENHANCEMENT PROJECTS - PAVEMENT MARKINGS

ITEM NO.	ACTIVITY	REMARKS	
		QUANTITY & UNITS	STATUS
B	PAVEMENT MARKINGS		
1	Installation of Reflective Pavement Sticker	13,446-pieces	7%-remaining
2	SFEX Cat's eye	21-pieces	Completed
3	Painting of Zebra Markings at Curb - Priority Areas	756-meters	Completed
4	Sta.Ines Lane Markings - Road Enhancement	1,100-meters	Completed
5	Marilao Directional NB Side Pavement Arrows	200-meters	Completed
6	Reflectorized Stickers - for new jersey barrier KM38 to KM44 SB side (section of Jan.25, 2006 multiple accident)	498-pieces	Completed
7	Installation of reflectorized sticker at Candaba Viaduct	477-pieces	Completed

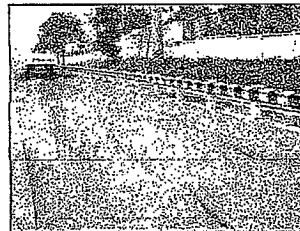
Total Number of Pavement Marking Projects = 7-projects

NLEX TRAFFIC & SAFETY ENHANCEMENTS

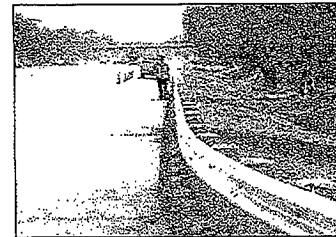
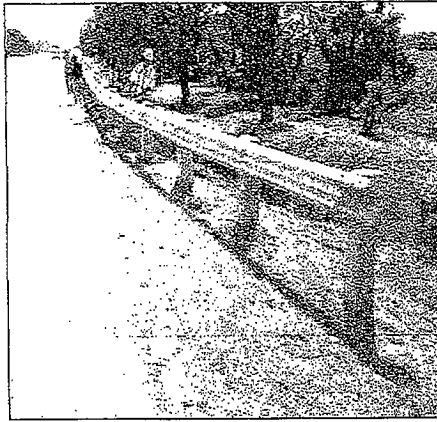
EMERGENCY ARRESTER BED (EAB)



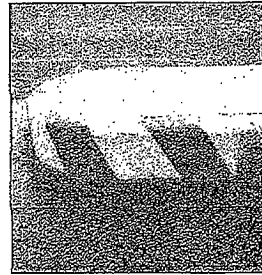
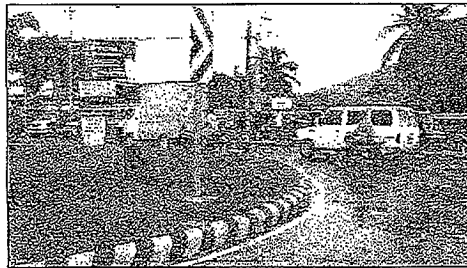
Four (4) wayward trucks were recorded to actually use the EAB. It was effective and no fatalities recorded.



5KM GUARDRAIL INSTALLATION

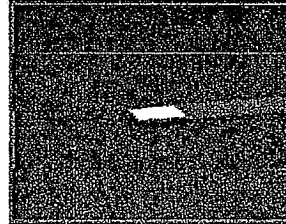
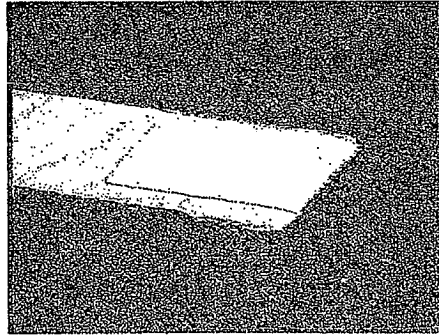


ZEBRA PAINT MARKINGS ON CONCRETE CURBS



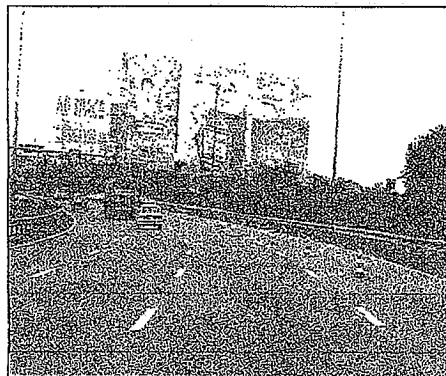
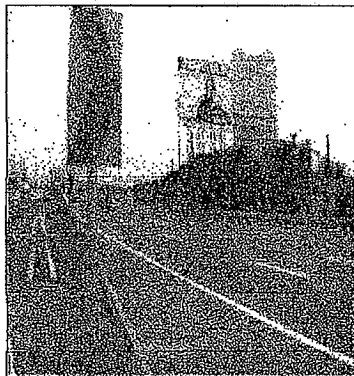
COMPLETED 756-LINEAR METERS AT IDENTIFIED PRIORITY AREAS

3M HIGHLY REFLECTIVE PAVEMENT STICKER



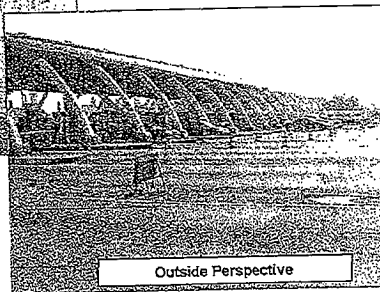
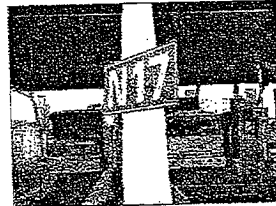
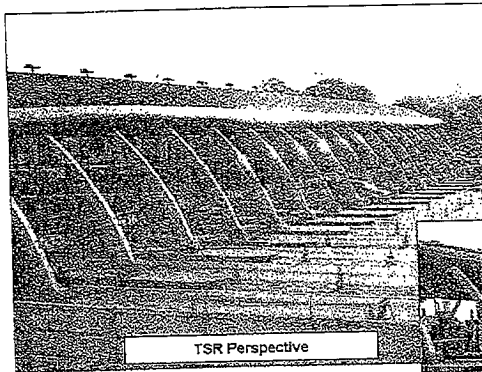
This covers from Buroi to Sta.Ines at both NB & SB sections.

CHEVRON SIGNS INSTALLED – ADVANCE WARNING SIGNS



COMPLETED 21-PIECES INCLUDING BALINTAWAK (NB & SB) AND BOCAUE TOLL BARRIERS (NB SIDE)

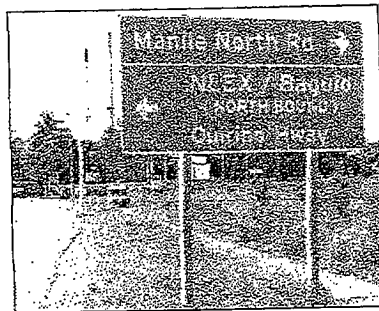
BALINTAWAK TOLL BARRIER – TSR TOLL BOOTH IDENTIFICATION SIGNS



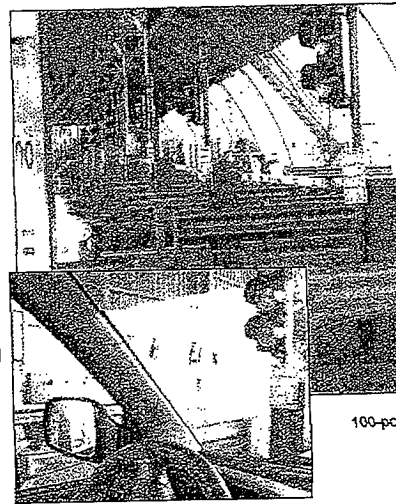
TSR Perspective

Outside Perspective

NLEX DIRECTIONAL, INFORMATORY AND WARNING SIGNS

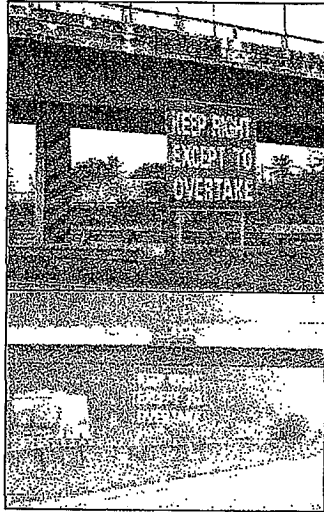


NLEX Directional Signs 112-pieces

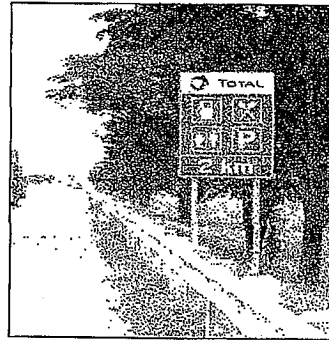


"Proceed On Green Light" – for motorists

NLEX DIRECTIONAL, INFORMATORY AND WARNING SIGNS

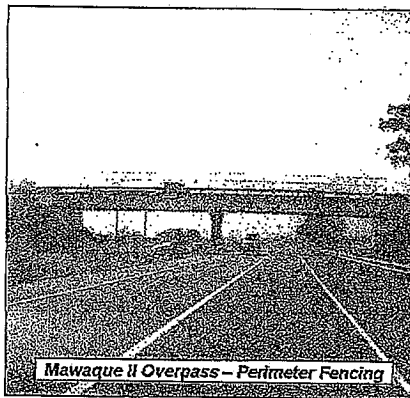


"Keep Right Except to Overtake" – 10-pos.

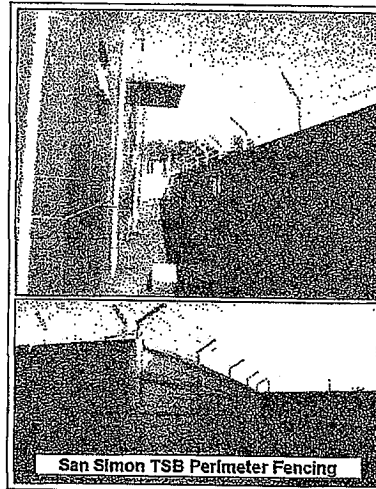


Toll Service Facility (TSF) Signs – 15-signs

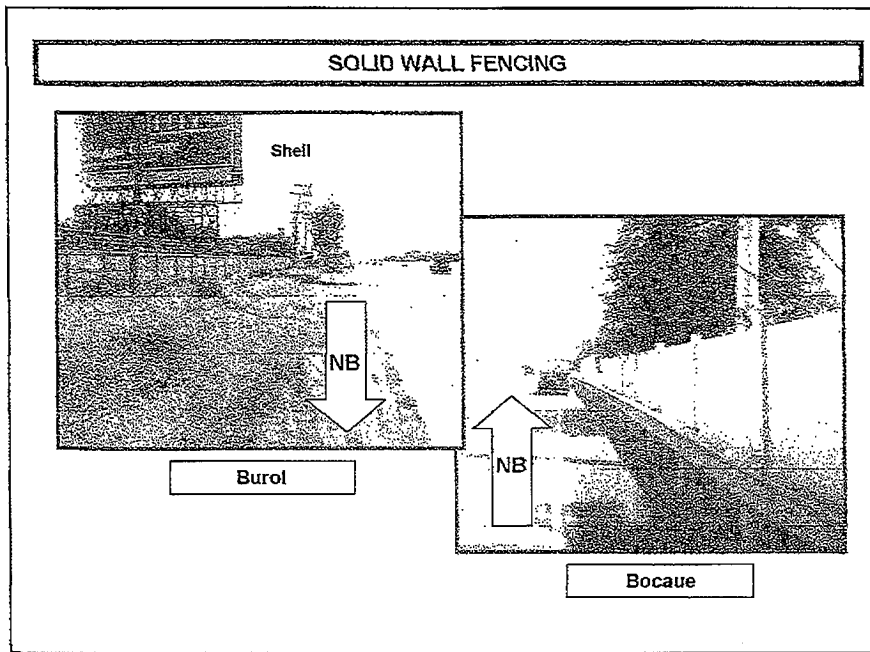
SECURITY PERIMETER FENCING



Mawaque II Overpass – Perimeter Fencing



San Simon TSB Perimeter Fencing



Section 4

AMBIENT AIR QUALITY

ENVIRONMENTAL QUALITY MONITORING REPORT -SAMPLING AND MEASUREMENT-

(Section 5 of the Environmental, Safety and Health Annual Monitoring Report)

Ambient Air Quality

Background

Ambient air sampling was conducted while the MNTP is in operation. Individual samples and individual report for each sampling station were presented. The results were taken by conducting a twenty four (24) sampling period for each station.

Ambient air quality parameters were analyzed and included Particulate Matter (PM10), Oxides of Nitrogen (NO₂), Sulfur Oxides (SO₂), Lead(Pb) and Ozone(O₃).

The sampling methodology and apparatuses used, location of sampling stations/points, existing weather condition, existing LCAL activities during the actual sampling, results and discussion and the summary and conclusion part were discussed in detailed below.

Methodology and apparatuses used

Particulate Matter (PM 10)

The High Volume Sampler equipment was used to measure the Particulate Matter (PM10). The sampling equipment was positioned two (2) meters above ground level as its required height. Flow rate is strictly monitored during the entire period to attain measurement accuracy.

Ambient air is drawn for a period of 24 hours for each station through a pre-weigh filter by means of a turbine blower. The filter paper was carefully placed inside the plastic envelope container every sampling has completed and then brought to laboratory for proper measurement. The filter is weighed before and after sampling so that the mass of collected sample is determined. The concentration of the dust is computed as the mass of collected particulates divided by the volume of air sampled and is expressed in microgram/m³, or $\mu\text{g}/\text{m}^3$.

Data collection were completed in seven (7) days for monitoring three stations.

Lead, Pb

The High Volume Sampler equipment was also used to collect air samples for measuring Lead (Pb). The filter paper used to measure particulate matter was then brought to an accredited laboratory for the analysis of Lead.

Sulfur Dioxide(SO₂) and Nitrogen Dioxide (NO₂)

The Ambient Air sampling for SO_x and NO_x was done using a Kimoto Gas Bubbler air sampling equipment. Grab sampling using one (1) hour averaging time was conducted over a 24 hour period per station. This procedure ensures that air samples at various

times of the day are taken to establish the real situation of the ambient air quality of the area.

The Kimoto Gas Bubbler was also positioned at two (2) meters above the ground. For each pre-identified stations four (4)-one hour ambient air sampling was conducted to represent the 24 -hour period requirement. SO₂ and NO₂ laboratory prepared solutions were used to collect air samples and brought to an accredited laboratory for analysis. To preserve the samples during the entire sampling activity these samples were placed at the (ice chest container?) and sealed properly to control the temperature.

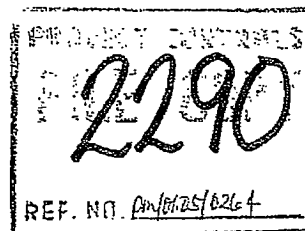
Location of sampling stations/points

The pre-identified sampling stations outside of the tollways boundary were located strategically at Sta. Ines, Mabalacat, Pampanga, Tabang, Guiguinto, Balacan, and Balintawak, Quezon City.

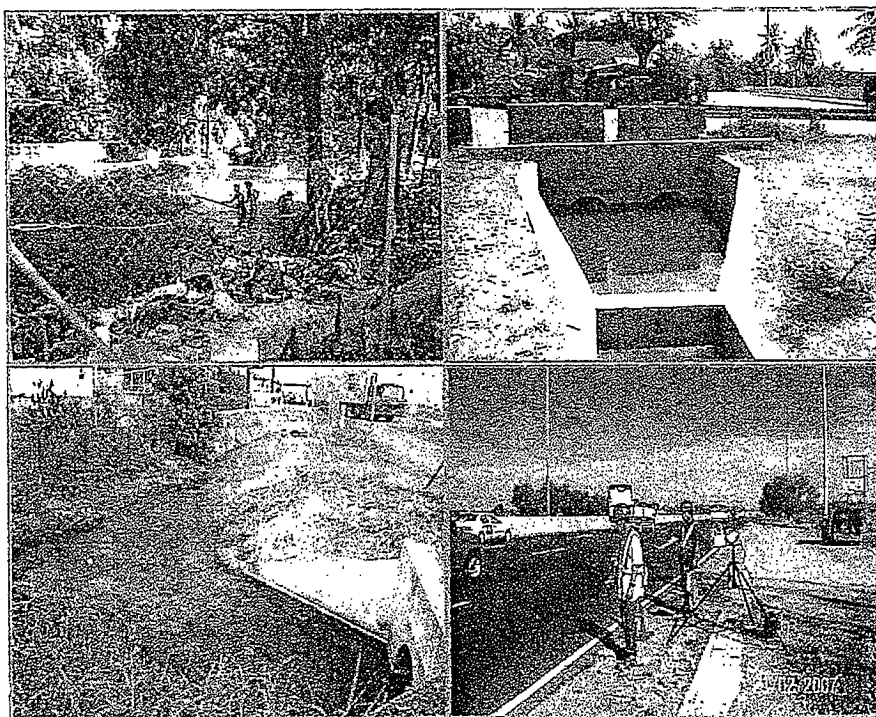
Comprehensive Report

See next page for ECOSYS comprehensive report for Environmental Management and Monitoring Program (EMMP) for the North Luzon Expressway (NLEX) 4th Quarter 2006, which covers the whole annual operation of the business.

Manila North Tollways Corporation (MNTC)



**Environmental Management
and Monitoring Report (EMMR)
for the
North Luzon Expressway (NLEX)
4th Quarter 2006-2007**



ECOSYSCORP. INC.

March 2007

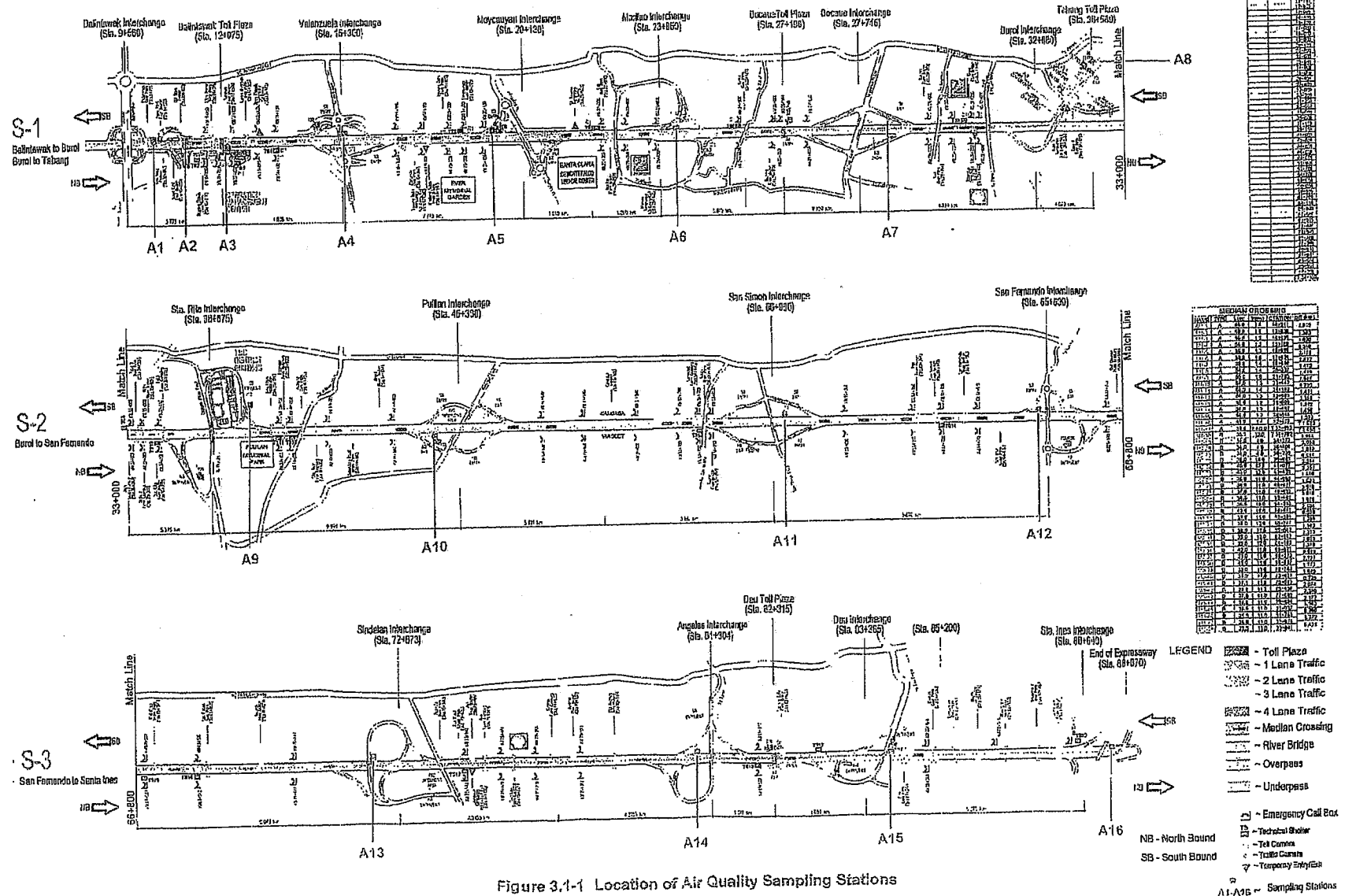


Figure 3.1-1 Location of Air Quality Sampling Stations

3 PRESENTATION AND DISCUSSION OF RESULTS

3.1 Air Quality Sampling and Analysis

Air quality monitoring at the 16 sampling stations established along NLEX was undertaken from February 20-23, 2007. The parameters considered were Sulfur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Lead (Pb), Carbon Monoxide (CO), Hydrocarbon (HC) and Total Suspended Particulates (TSP). The location of sampling sites is shown in **Figure 3.1-1**. The basic description of ambient air quality sampling stations established along the NLEX is described in **Table 3.1-1**.

Table 3.1-1 Description of the Air Quality Sampling Stations along the NLEX	
Station No.	Description of Station
A1	Balintawak Cloverleaf (South Bound)
A2	Novaliches Flyover (South Bound Outer Lane-Bus Loading/Unloading Station)
A3	Balintawak Toll Plaza (North Bound)
A4	Valenzuela Interchange (North Bound)
A5	Meycauayan Interchange (North Bound)
A6	Marilao Interchange (North Bound)
A7	Bocaue Interchange (South Bound)
A8	Tabang Toll Plaza (South Bound)
A9	Sta. Rita Interchange (North Bound)
A10	Pulilan Interchange (North Bound)
A11	San Simon Interchange (North Bound)
A12	San Fernando Interchange (South Bound)
A13	Mexico Interchange (North Bound)
A14	Angeles Interchange (North Bound Exit)
A15	Dau Interchange (South Bound)
A16	Sta. Ines Interchange (North Bound)

The weather was sunny to partly cloudy during the monitoring. The traffic/vehicular emission are the primary source along the North Luzon Expressway (NLEX) alignment from Balintawak Clover Leaf to Sta. Ines Interchange. Discussion of results of the sampling conducted is presented in the succeeding sections, while the values obtained are summarized in **Table 3.1-2** below.

Table 3.1-2 Air Quality Concentration Measured Along North Luzon Expressway (NLEX) February 20-23, 2007								
			SO ₂ µg/Ncm	NO ₂ µg/Ncm	TSP µg/Ncm	Lead µg/Ncm	CO Ppm	HC Ppm
DENR Standards			340	260	300	20	30	-
	Station	Date & Time						
A1	Balintawak Cloverleaf	0748-0848H 23 Feb2007	55	41	722	0.854	10	330
A2	Novaliches Flyover	1736-1836H 20 Feb2007	34	25	585	0.603	18	380
A3	Balintawak Toll Plaza	0926-1026H 23 Feb2007	31	19	577	0.599	15	310
A4	Valenzuela Interchange	1612-1712H 20 Feb2007	22	17	373	0.384	2	210
A5	Meycauayan Interchange	0710-0810H 22 Feb2007	25	19	366	0.302	4	130
A6	Marilao Interchange	0824-0924H 21 Feb2007	28	19	192	0.241	3	170
A7	Bocaue Interchange	0958-1058H 22 Feb2007	24	16	119	0.277	10	180
A8	Tabang Toll Plaza	0840-0940H 22 Feb2007	40	31	223	0.311	12	250
A9	Sta. Rita Interchange	1129-1229H 22 Feb2007	14	8	60	0.141	1	80
A10	Pullan Interchange	1253-1353H 22 Feb2007	12	11	94	0.154	2	120
A11	San Simon Interchange	1001-1101H 21 Feb2007	11	9	54	0.201	2	130
A12	San Fernando Interchange	1122-1222H 21 Feb2007	12	10	106	0.298	5	170
A13	Mexico Interchange	1434-1534H 22 Feb2007	11	9	64	0.238	1	70
A14	Angeles Interchange	1608-1708H 22 Feb2007	22	15	133	0.289	6	180
A15	Dau Interchange	1727-1827H 22 Feb2007	29	18	377	0.268	5	210
A16	Sta. Ines Interchange	1843-1943H 22 Feb2007	23	14	193	0.289	1	140

3.1.1 Gaseous Air Pollutants

SO₂ and NO₂

For the last quarter of this year's monitoring, the observed concentration level of SO₂ at the 16 sampling stations along the NLEX ranged between 11-55 µg/Ncm. Again, the Balintawak Cloverleaf area recorded the highest level of SO₂ at 55 µg/Ncm or approximately 16.2% of the DENR standard of 340 µg/Ncm. On the other hand, the San Simon and Mexico Interchanges exhibited the lowest SO₂ concentration levels of 11µg/Ncm.

As can be discerned from Table 3.1-2, the obtained NO₂ levels along the sampling sites ranged from 8-41 µg/Ncm. Likewise, the highest level of 41 µg/Ncm was recorded at the Balintawak Cloverleaf (A1) or about 15.8% of the allowable limit for NO₂ (260 µg/Ncm). Sta. Rita Interchange exhibited the lowest level at 8 µg/Ncm.

Results of the sampling conducted like in previous monitoring are very well within the permissible limit set by the DENR for a 1-hr sampling period. Furthermore, the values obtained characterize an average clean atmosphere.

Carbon Monoxide (CO)

For carbon monoxide (CO), the measured CO levels ranged from 1.0 to 18.0 ppm. Novaliches Flyover, A2 exhibits the highest concentration level of CO with 18 ppm. Next is the Balintawak Toll Plaza with 15 ppm, followed by Tabang Toll Plaza with 12 ppm. AS for the 16 sampling stations, the average CO concentration is 6.10 ppm. The air quality index for CO is considered as fair with a concentration of 5 ppm. The observed values are still within the allowable DENR standard of 30 ppm. The maximum measured CO of 18 ppm is about 60.0% of the DENR standard of 30 ppm.

Hydrocarbon (HC)

The measured levels of HC at the sampling sites ranged from 70 to 380 ppm. Hydrocarbon pollutant has no existing DENR standard for ambient air. As

previously stated, this pollutant is the main source of smog and ground level of ozone when it interacts with nitrogen oxides.



Plate No. 1 Photo of the SO₂ and NO₂ level monitoring conducted at the south bound lane of the Balintawak Cloverleaf on February 22, 2007.

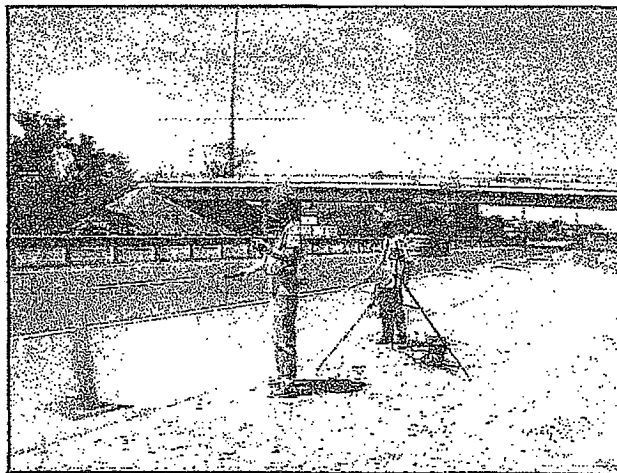


Plate No. 2 Photo taken at the south bound entry ramp of Sta. Rifa Interchange where measurements of HC and CO levels were undertaken on February 22, 2007.

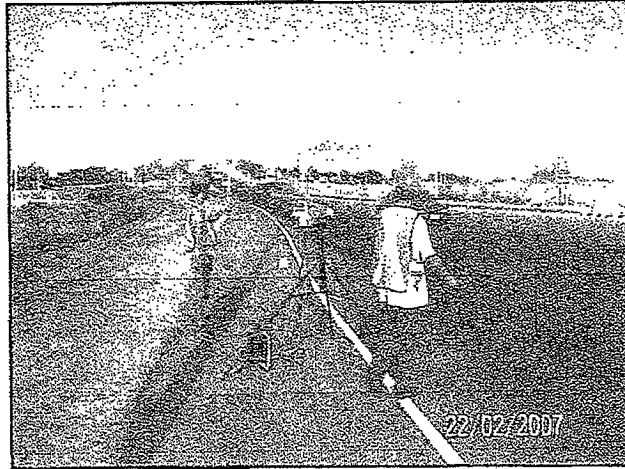


Plate No. 3 CO level monitoring at the north bound exit ramp of the Angeles Interchange.

The graphical output of gaseous air pollutants monitored along the North Luzon Expressway (NLEX) from Balintawak Cloverleaf to Sta. Ines Section for the 4th Quarter of 2006-2007 are presented in Figures 3.1-2 to 3.1-5.

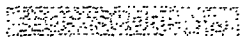


Figure 3.1-2 Observed SO₂ Level along the NLEX on February 20-23, 2007

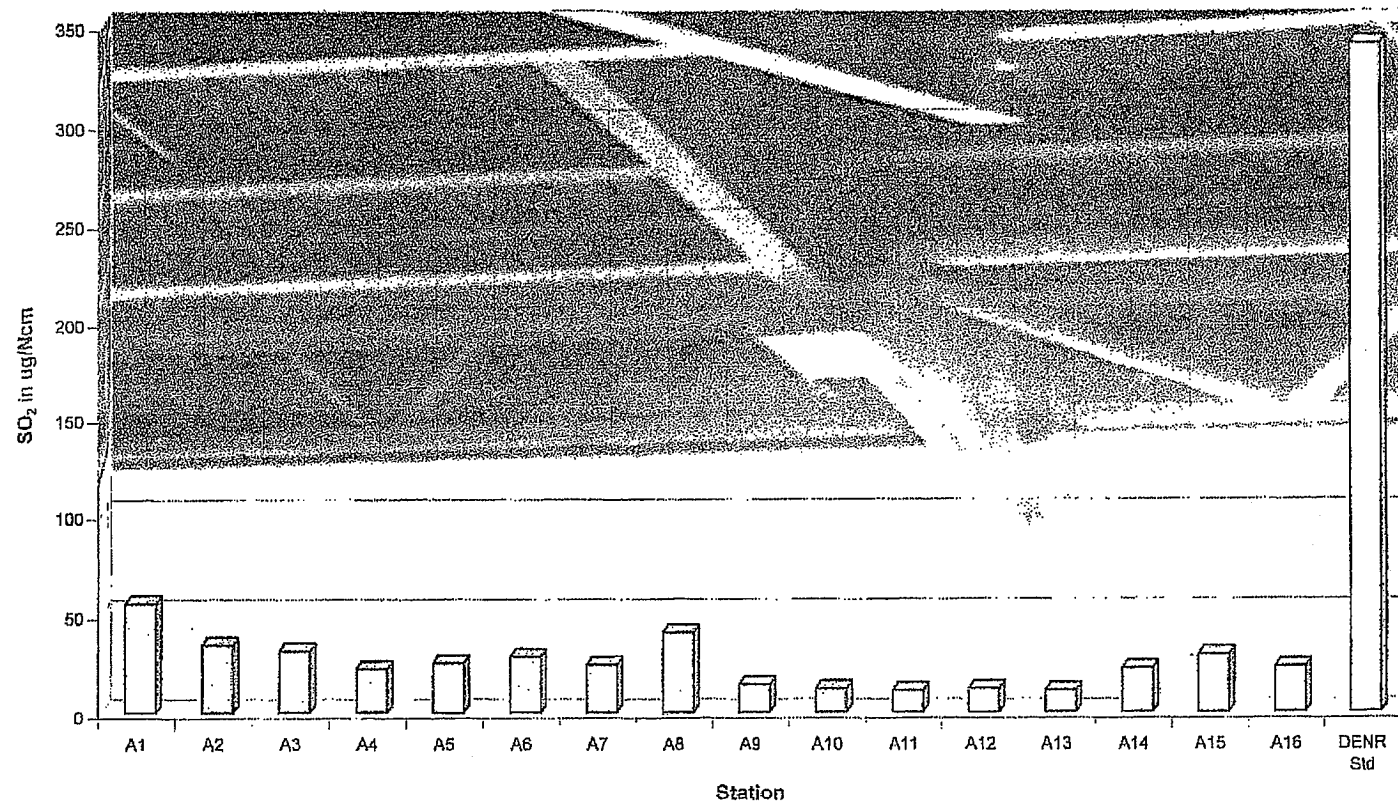


Figure 3.1-3 Observed NO₂ Level along the NLEX on February 20-23, 2007

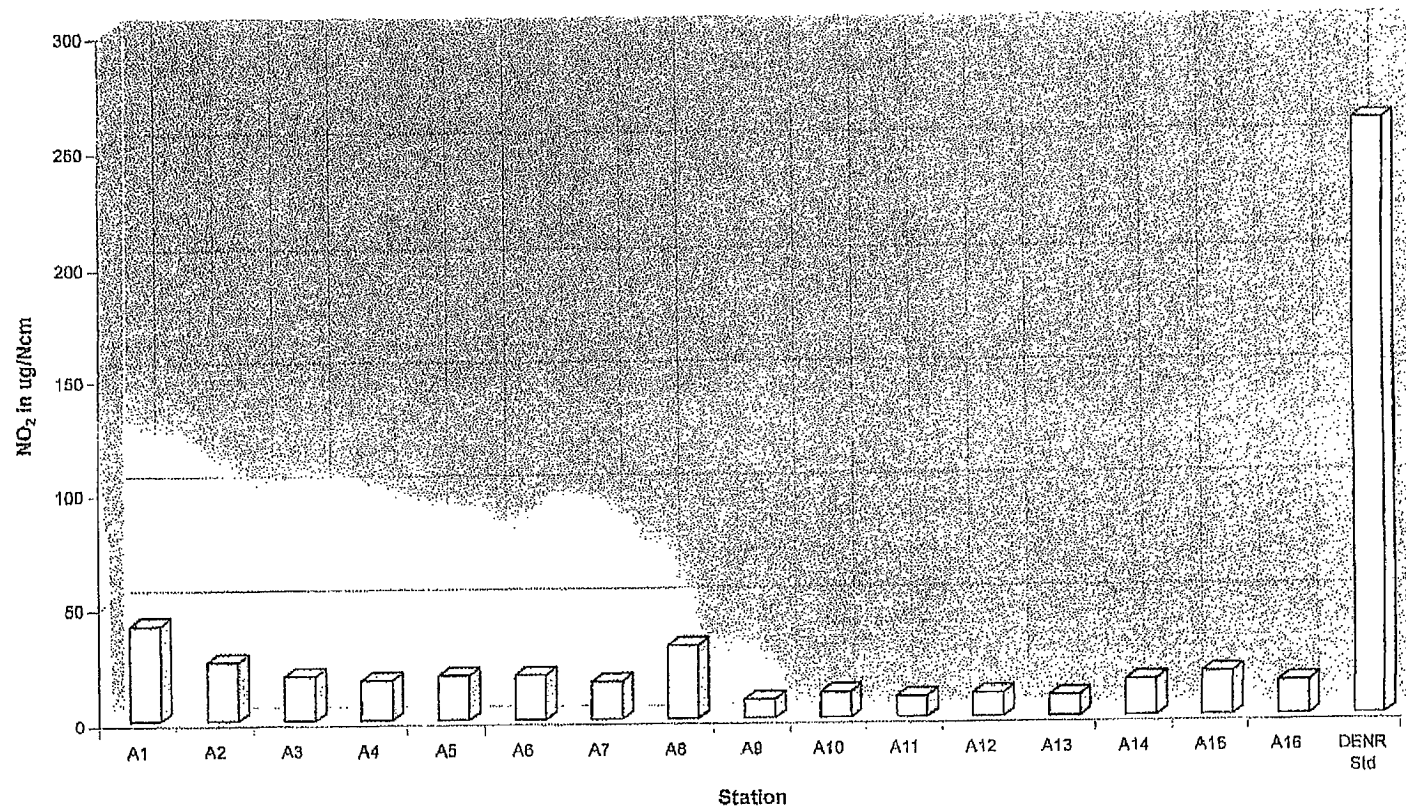


Figure 3.1-4 Observed CO Level along the NLEX on February 20-23, 2007

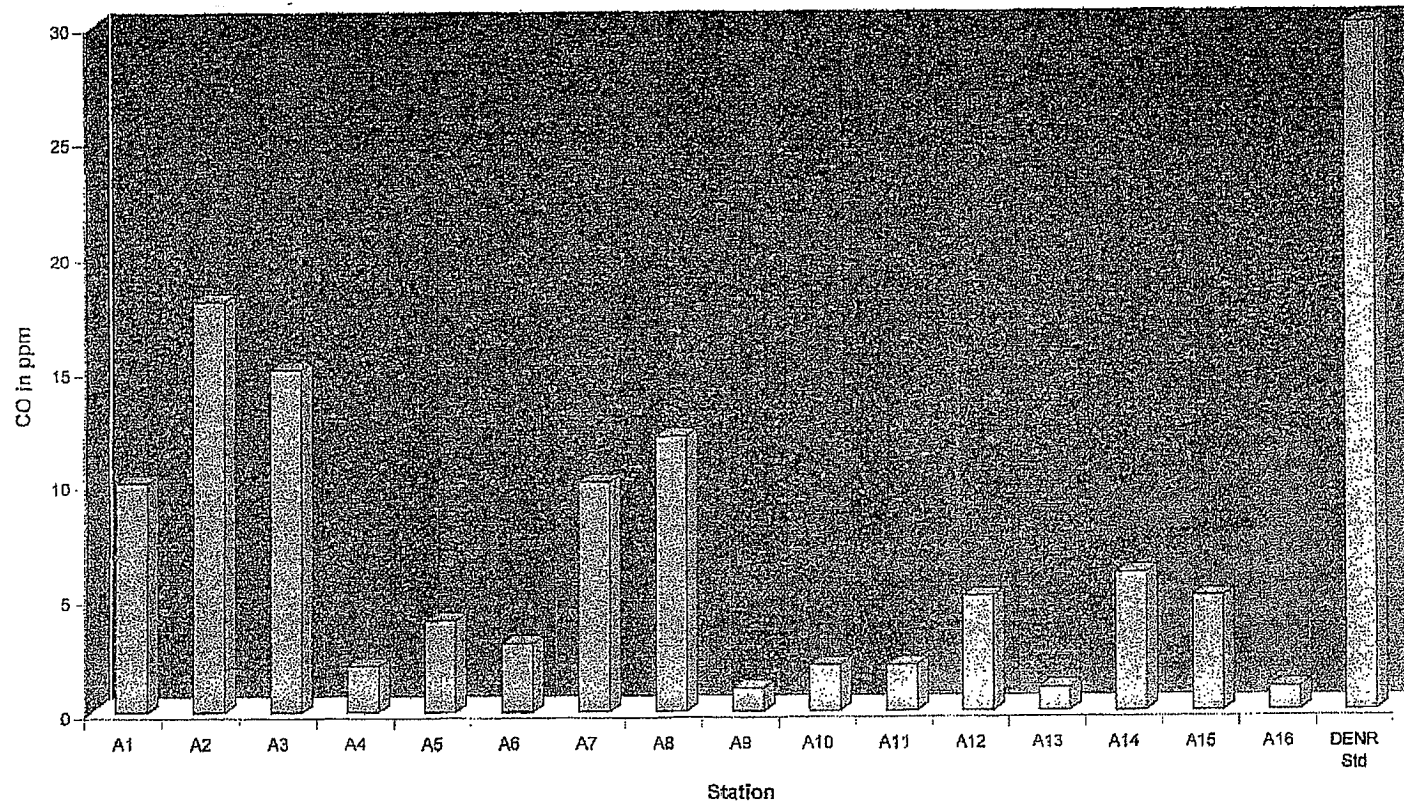
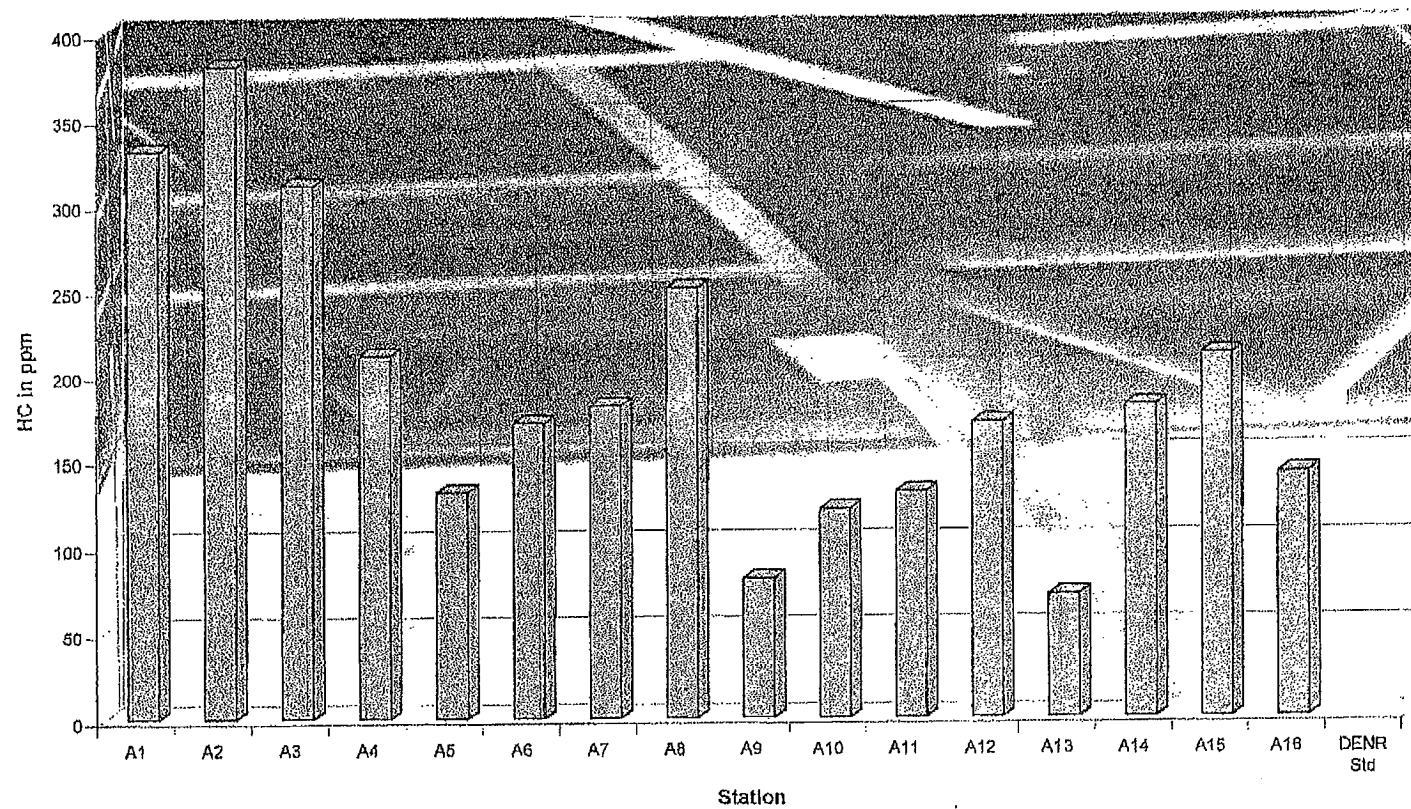


Figure 3.1-5 Observed HC Level along the NLEX on February 20-23, 2007



3.1.2 Total Suspended Particulates (TSP) and Lead (Pb)

Total Suspended Particulates (TSP)

Based on the sampling conducted, the observed ambient concentrations of TSP at the six (6) sampling sites exceeded the DENR Standard of 300 $\mu\text{g}/\text{Ncm}$. The results ranged between 373-722 $\mu\text{g}/\text{Ncm}$. These stations include the Balintawak Cloverleaf Interchange (A1), Novaliches Flyover (A2), Balintawak Toll Plaza (A3), Valenzuela Interchange (A4), Meycauayan Toll Plaza (A5), and Dau Toll Plaza (A15).

The top three (3) stations that recorded the highest TSP concentration levels are Balintawak Cloverleaf (722 $\mu\text{g}/\text{Ncm}$), Novaliches Flyover (585 $\mu\text{g}/\text{Ncm}$), and Balintawak Toll Plaza (577 $\mu\text{g}/\text{Ncm}$). The values obtained are quite expected, since these areas are very proximate to the metropolis and are rather busy, in terms of vehicular traffic than the other sampling sites. One also of the contributing factors is the bus stop located near the Balintawak Cloverleaf sampling station, which generates considerable exhaust emissions from accelerating buses and jeepneys. The lowest level was recorded at the Sta. Rita Interchange, at 60 $\mu\text{g}/\text{Ncm}$.

In conclusion, there is a significant increase in the level of TSP concentrations this monitoring period compared to the previous. The average of the TSP level for the 16 stations is 266.1 $\mu\text{g}/\text{Ncm}$ or about 88.7% of the DENR standard, which is 10% higher than last quarter's results (77.5%).

Lead (Pb)

Like in the previous monitoring conducted, the recorded Pb concentrations are way below the permissible limit (i.e. 20 $\mu\text{g}/\text{Ncm}$) set by the DENR. The values ranged from 0.141 to 0.854 $\mu\text{g}/\text{Ncm}$. The kind and extent of all identifiable effects on public health or welfare that maybe expected in the presence of lead at 20 $\mu\text{g}/\text{Ncm}$ in the ambient air is not recognizable. The observed concentration is less than 1 $\mu\text{g}/\text{Ncm}$, this level is considered as a good air quality that no harmful effect is expected on human. The observed concentrations are less than 5% of the DENR standard for lead

Figures 3.1-6 to 3.1-7 show the 4th quarter monitoring graphical output of the TSP and Pb measurement along the NLEX.

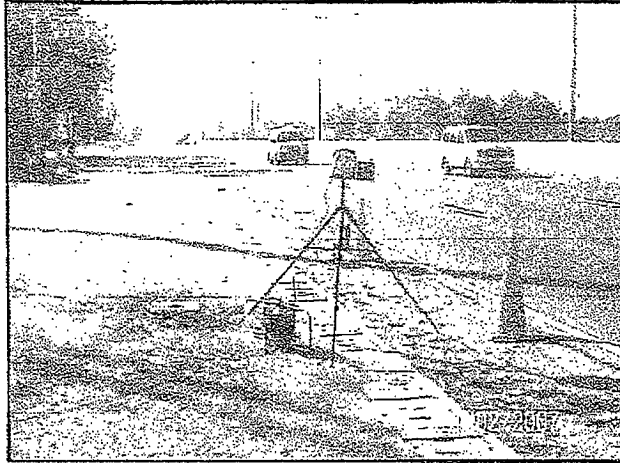


Plate No. 4 TSP sampling near the north bound exit ramp of the Marilao Interchange.

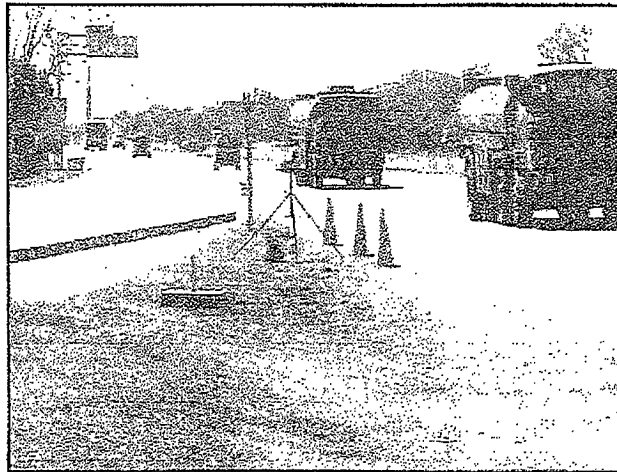
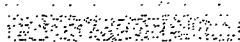


Plate No. 5 Lead (Pb) measurement at the north bound exit ramp of the San Simon Interchange.



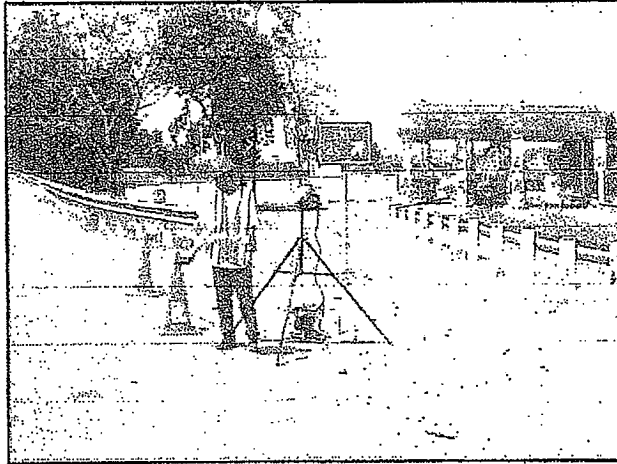


Plate No. 6 Photo taken near the north bound exit ramp of Pulilan Interchange during the TSP level monitoring on February 22, 2007.

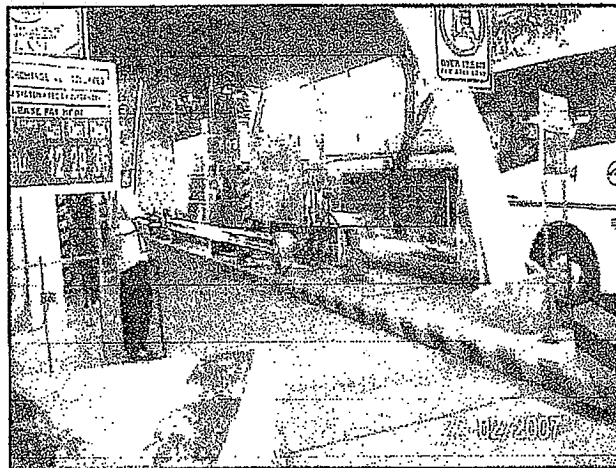


Plate No. 7 Pb sampling at the north bound toll exit of the Dau Interchange on February 22, 2007.

Figure 3.1-6 Observed TSP Level along the NLEX on February 20-23, 2007

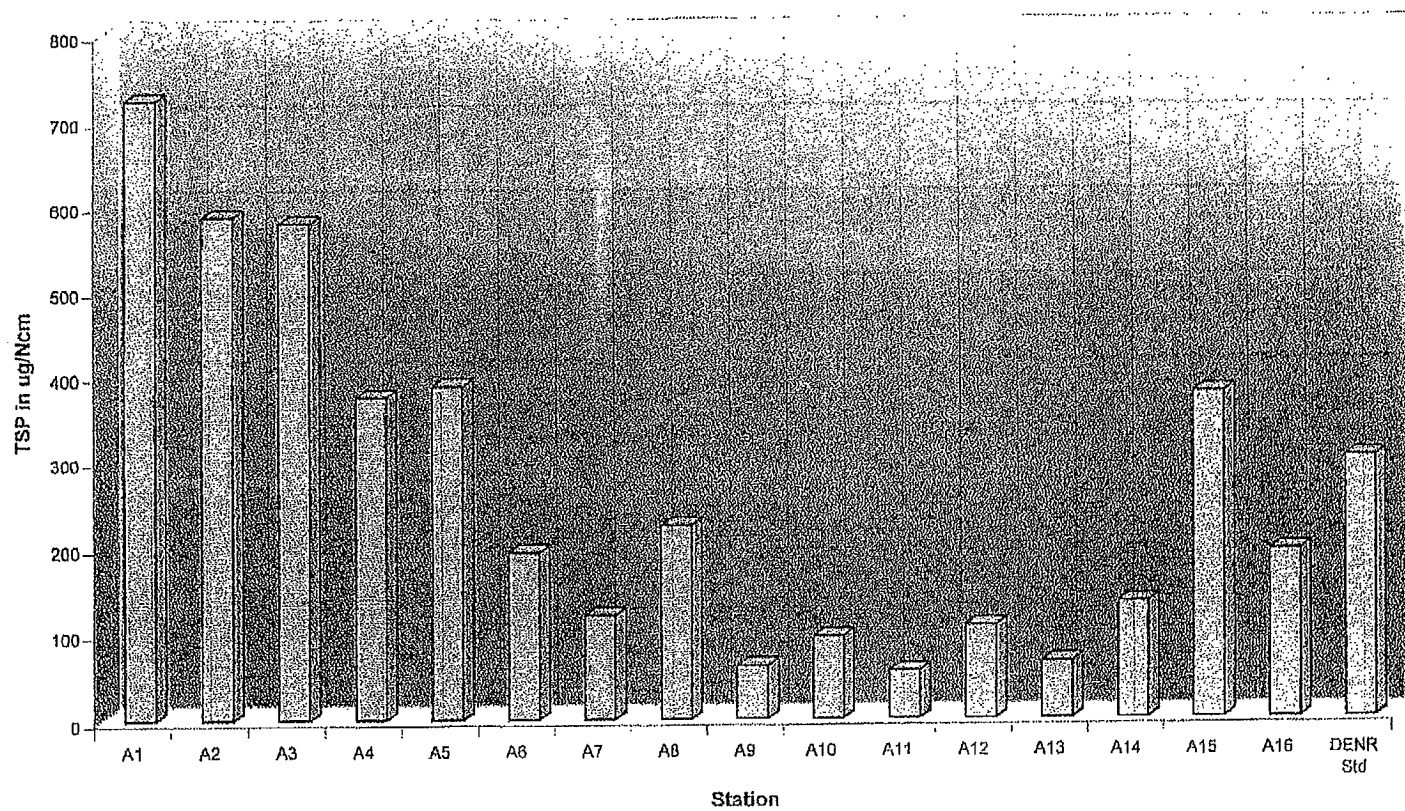
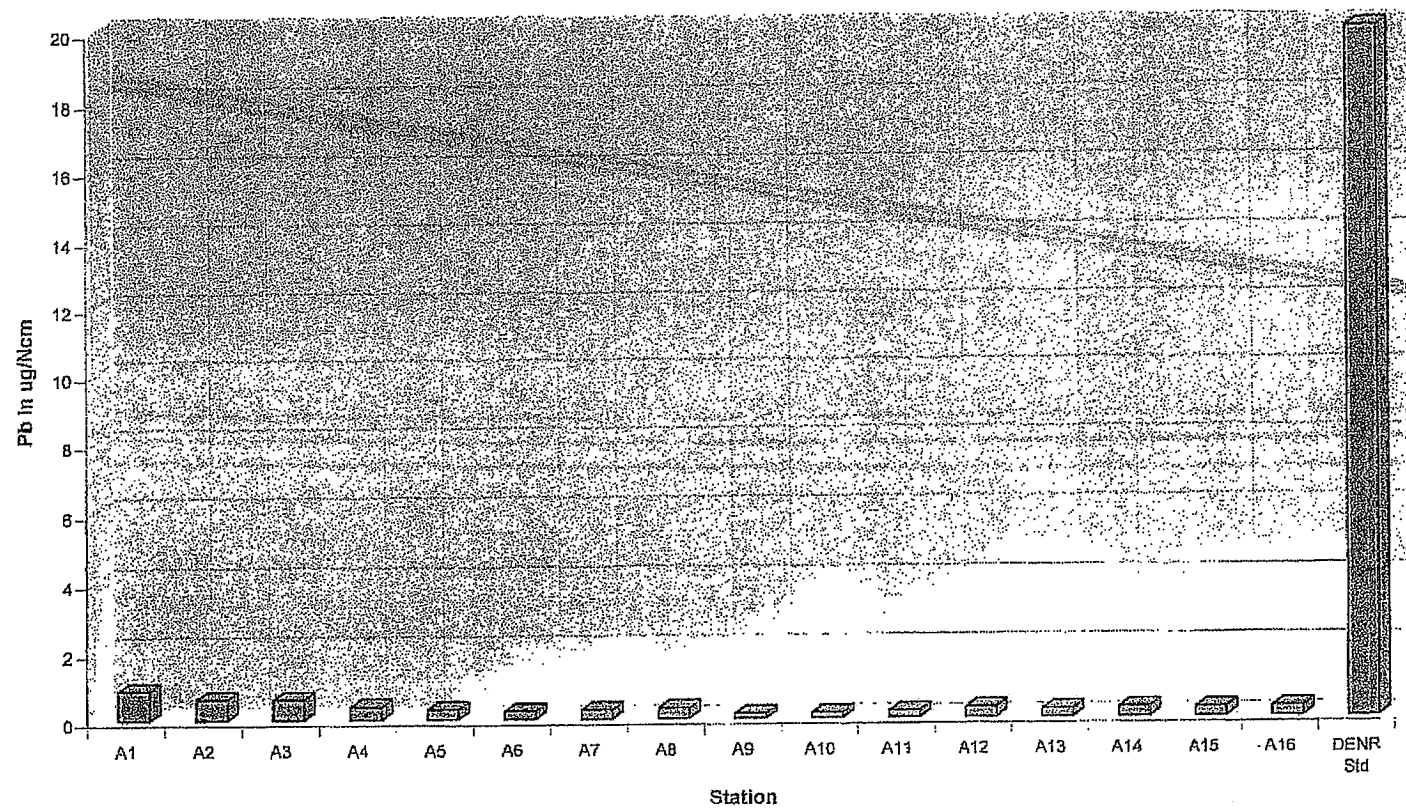


Figure 3.1-7 Observed Lead (Pb) Level along the NLEX on February 20-23, 2007



Section 4

PEST MANAGEMENT PROGRAMS MONITORING

PEST MANAGEMENT PROGRAMS

The Manila North Tollways Project has not encountered significant pest occurrence or infestation, which would require extensive pest management.

1. List pest species affecting in Manila North Tollways Corporation, harmful effect and control method.

No pest has significantly affected the Manila North Tollways Corporation project requiring extensive pest management program.

Regular pest management maintenance and facilities upkeep is being conducted to prevent any significant pest occurrence or infestation in all the facilities.

2. Describe chemical control methods employed during the reporting period:

Target Species (common name)	Name of Chemical Pesticide (brand name and type ¹)	Total Liters (liquids) or Kilograms (solids) Pesticide Concentration and Application Method ² Applied during the Reporting Period
Cockroach	Maxforce	5,120-liters (total for the year 2006)
Mosquitoes	PesGuard Dichlorvos	
Termites	PesGuard Dichlorvos	
Ants	PesGuard Dichlorvos	

3. Describe other pest control methods utilized during the reporting period:

The activities include the following: Regular housekeeping, fogging, insecticide spraying, proper garbage disposal and supply of proper waste containers.

Section 4

SOLID AND HAZARDOUS WASTE MANAGEMENT

SOLID AND HAZARDOUS WASTE MANAGEMENT

All solid wastes and hazardous waste are being managed in accordance with the requirement of the Ecological Solid Waste Management Act of 2001 and Toxic Substances and Hazardous Wastes Control Act of 1990, respectively.

SOLID AND HAZARDOUS WASTE GENERATION AND DISPOSAL REPORT

Manila North Tollways Corporation (MNTC) Solid and Hazardous Waste Generation and Disposal

Waste Type	Quantities Generated	Method of Storage and/or Treatment ⁸	Disposal Method ⁴⁵⁶
Reporting period	Year: 2006		
• Containers/pallets	Approx. 20 tons	Segregation area	Sold to recyclers/reuse
• Domestic waste	Approx. 3,000L/yr.	Septic tanks	Hauled by accredited waste treater
• Truck and auto tires	Approx. 50 pieces/yr.	Segregation area	Sold to recyclers/reuse
• Waste fuel hydrocarbons	Approx. 420 L/yr.	Stored in drums	Hauled by accredited waste treater
• Waste hydraulic fluids	Approx. 450 L/yr.	Stored in drums	Hauled by accredited waste treater
• Waste lubricating hydrocarbons	Approx. 350 L/yr.	Stored in drums	Hauled by accredited waste treater
• Waste solvents	Approx. 510 L/yr.	Stored in drums	Hauled by accredited waste treater
• Contaminated soil	Approx. 0-tons/yr.	Not Applicable	Not Applicable

Section 4

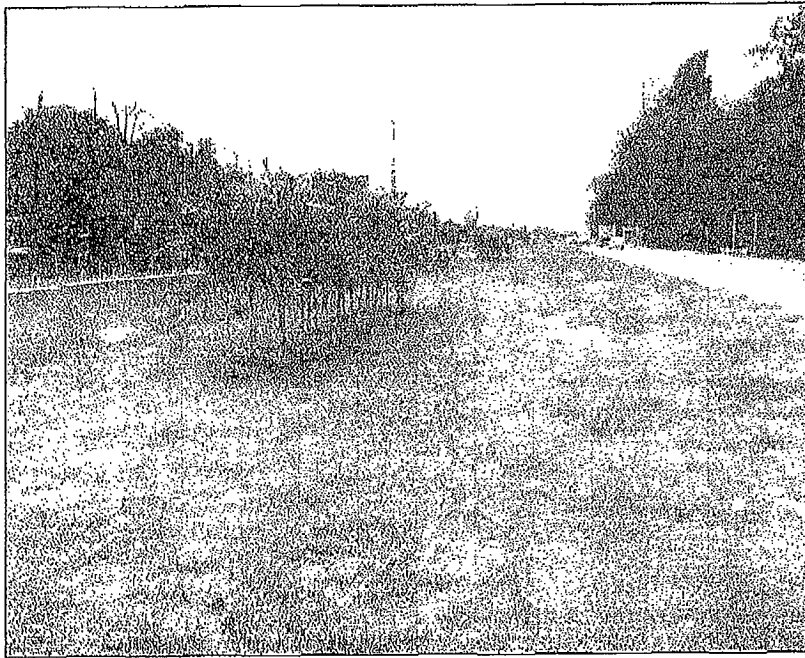
REVEGETATION MONITORING

REVEGETATION MONITORING REPORT

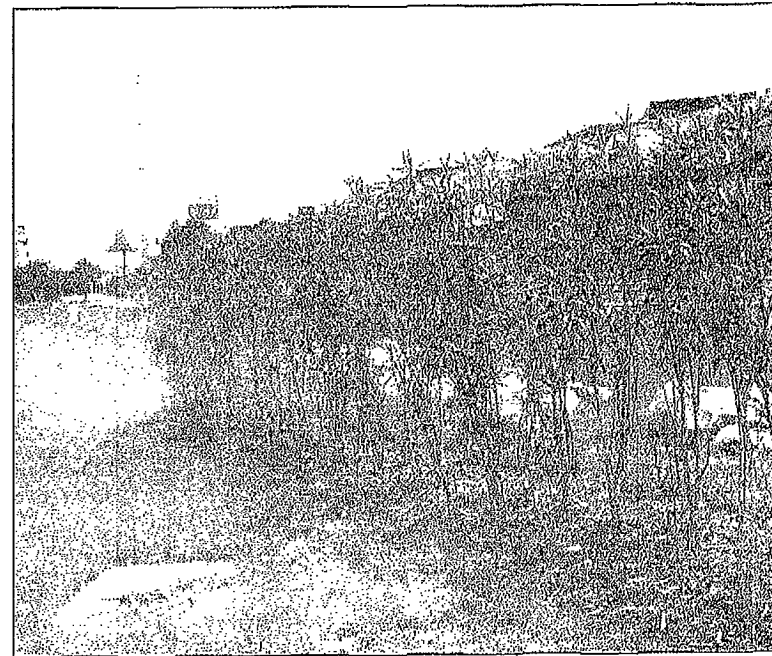
All required areas for reclamation and re-vegetation have been scheduled to prevent soil erosion and scouring along the river banks and slope areas. As of the end of year 2006, continuous reclamation and re-vegetation activity is being done.

We had invested this year for the maintenance of the landscaping project for supporting the revegetation and greening of the NLEX. In the event of an environmental disaster, the investment cost on NLEX landscaping has a sustainable effect on the environmental condition of the expressway. It is not just aesthetics but protection of both life and property. This also prolongs the life of the road because of the elimination of soil erosion and road cracking due to abundant plant life that holds the embankment. The Return On-Investment (ROI) in this activity is greater because of the positive environmental effects and better aesthetics of the new NLEX.

Environmental Activities – Tree Planting at Median



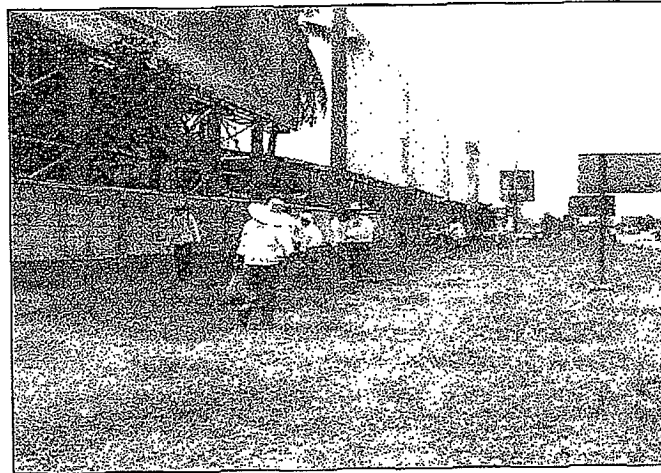
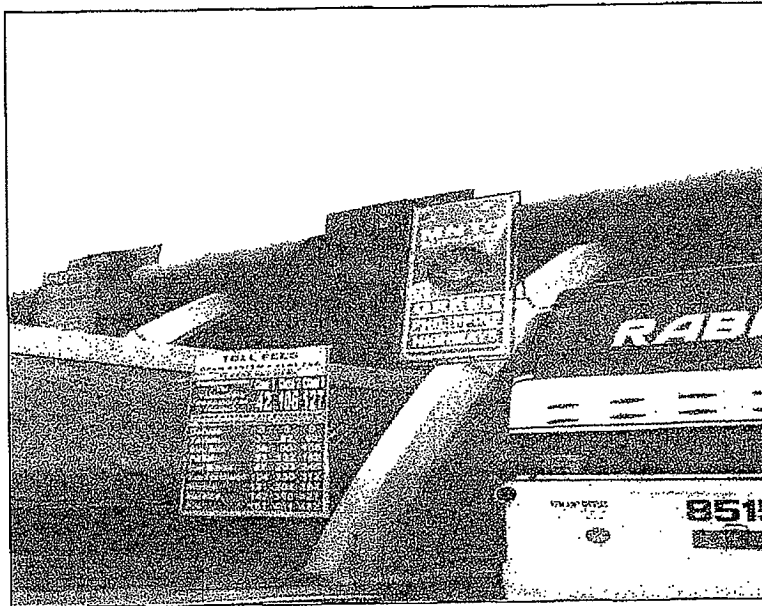
NEW TREES PLANTED - PALMERA (THEVETIA
PERUVIANA)



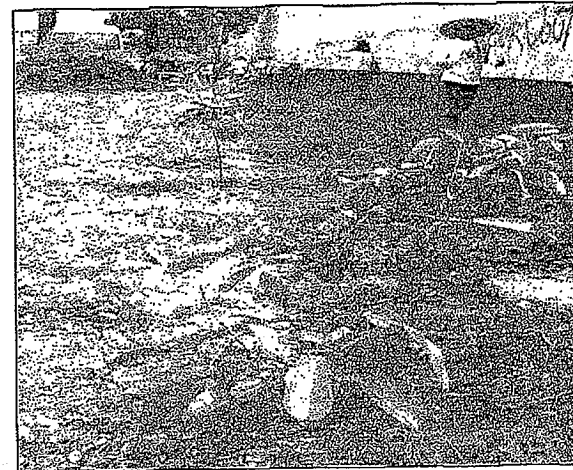
NEW TREES PLANTED - ROSE TULIP (NERIUM
OLEANDER) PERUVIANA)

DENR GREEN PHILIPPINE HIGHWAYS PROJECT

DATE: AUGUST 25, 2006



MNTC participated in the activity managing the tree planting activity for the whole NLEX. 5,000-trees are planted along selected areas with different organizations involved.



DENR GREEN PHILIPPINE HIGHWAYS PROJECT

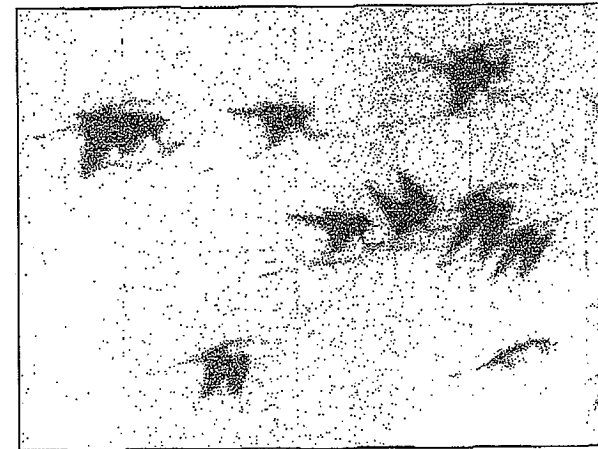
DATE: AUGUST 25, 2006



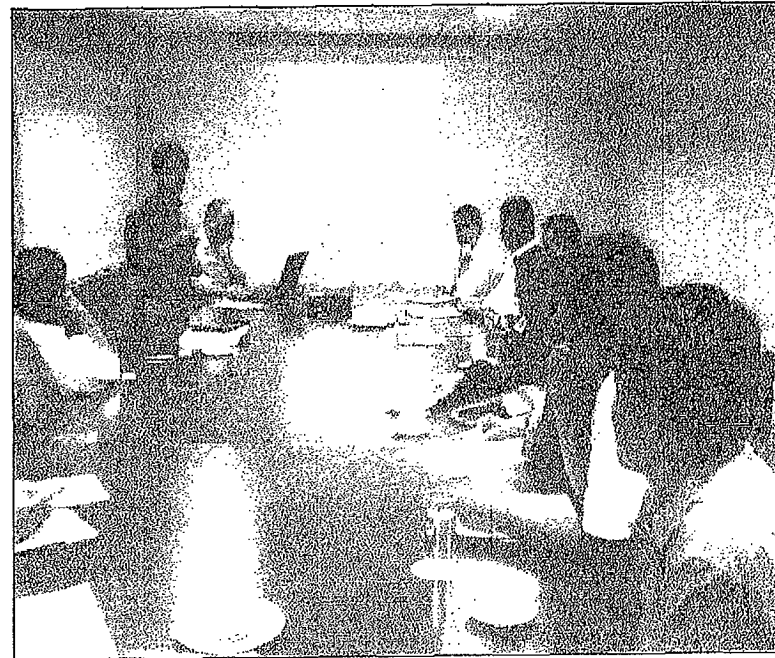
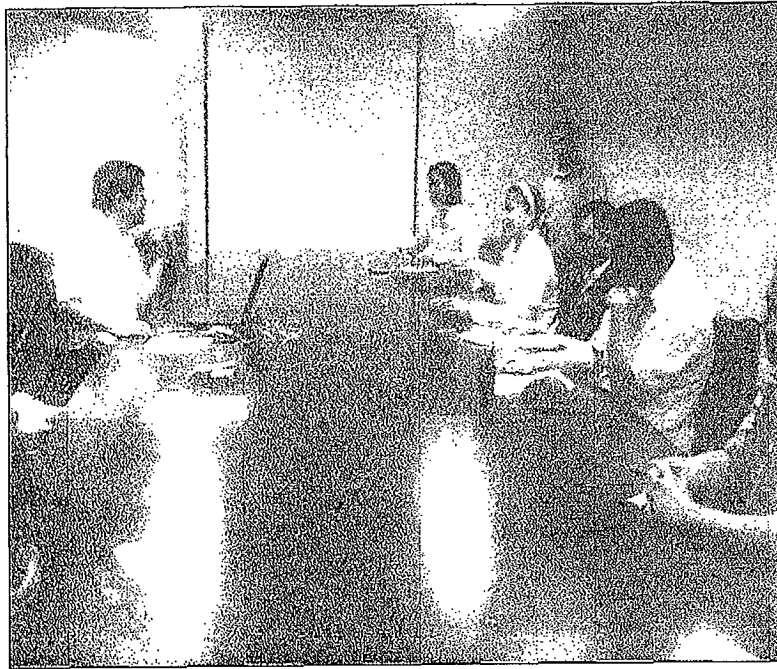
MNTC participated in the activity managing the tree planting activity for the whole NLEX. 5,000-trees are planted along selected areas with different organizations involved.



Environmental Activities – Tree Planting at Candaba Swamp Wildlife Reserve



Environmental Compliance – Coordination Meetings



Environment, Safety and Health issues are discussed during various coordination meetings to ensure management and compliance with the regulatory and technical standards.

Environmental Monitoring – Air Quality Sampling



Plate No. 3 SO₂ monitoring near the north bound entry of Station A4, Valenzuela Interchange

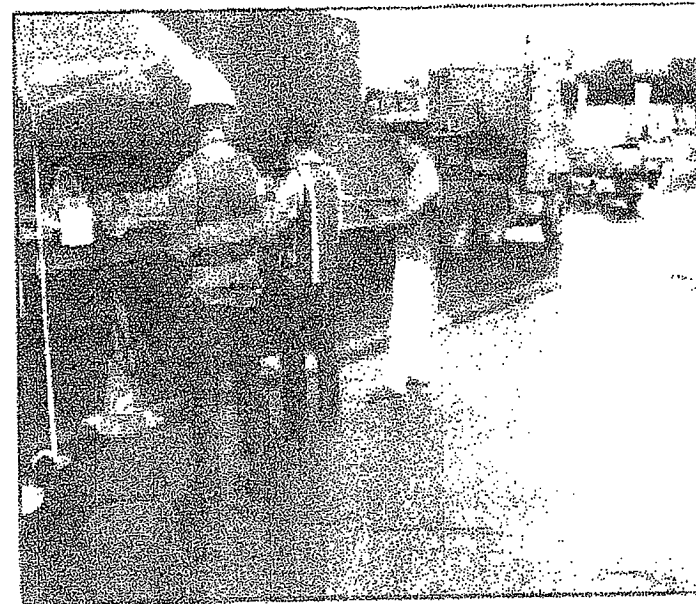
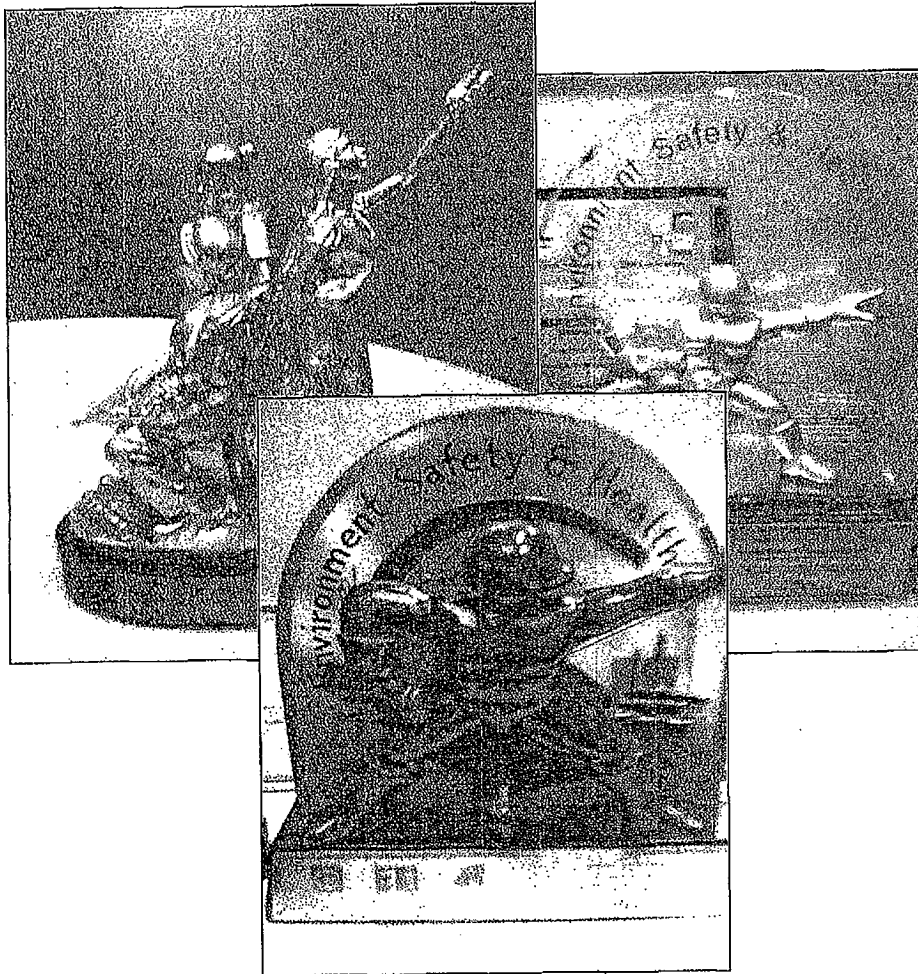


Plate No. 2 TSP and SO₂ measurements along the north bound lane near the Balara Toll Plaza

An independent group is contracted to quarterly monitor air quality at NLEX. Generally, NLEX has satisfactory standard air quality levels.

Environmental Compliance Measure – Awards



As part of the Lopez Group Environmental Compliance, companies under the group are audited twice a year by an independent organization.

MNTC's ESH compliance had resulted in achieving five awards from the Lopez Group of Companies.

APPENDIX A

MONITORING STATION COORDINATES – LATITUDE & LONGITUDE

I. Air Monitoring Stations

A. Air Quality (Total Suspended Particulates)

Station No.	Location	Geographical Coordinates	
		Latitude	Longitude
A1	Pulilan Plant Site	15°10'52.87"	120°50'42.15"
A2	Balintawak clover leaf interchange	14°39'32.18"	120°59'54.48"
A3	Novaliches flyover	14°40'5.60"	120°59'55.60"
A4	Balintawak tollgate, 500m(New)	14°39'49.90"	120°59'55.40"
A5	Valenzuela interchange	14°2'35.90"	120°59'28.50"
A6	Meycauayan exit/interchange	14°44'46.60"	120°58'17.30"
A7	Marilao exit, 500 after (Marilao new)	14°46'36.10"	120°57'19.00"
A8	Bocaue interchange	14°48'9.90"	120°56'28.90"
A9	Tabang toll plaza	14°50'19.26"	120°52'07.65"
A10	Sta. Rita interchange	14°51'49.00"	120°51'27.00"
A11	San Simón interchange	14°59'30.80"	120°44'55.10"
A12	San Fernando interchange	15°3'4.7"	120°41'36.50"
A13	Sindalan interchange new	15°6'23.4"	120°39'43.4"
A14	Angeles interchange new	15°9'52.20"	120°36'42.80"
A15	Dau interchange	15°9'47.0"	120°36'47.80"
A16	Sta. Ines interchange	15°13'24.80"	120°35'11.40"

B. Air Quality-IFC (SO₂, NO₂, PM₁₀, Pb, O₃)

Station No.	Location	Geographical Coordinates	
		Latitude	Longitude
Station 1	Near Sta. Ines Toll Plaza	14°13'24.80"	120°35'11.40"
Station 2	Near Balintawak Toll Plaza	14°39'32.18"	120°59'54.48"
Station 3	Near Tabang Toll Plaza	14°50'19.26"	120°52'07.65"

C. Noise Monitoring Stations- DENR FORMAT

Station No.	Location	Geographical Coordinates	
		Latitude	Longitude
1	Balintawak Interchange	14°39'49.90"	120°59'55.40"
2	Novaliches Flyover	14°40'5.60"	120°59'55.60"
3	Pedestrian Overpass (Bagong Barrio)	14°40'55.90"	120°59'57.60"
4	New Balintawak Toll Plaza	14°39'49.90"	120°59'55.40"
5	Tullahan River Bridge	14°41'09.65"	120°59'57.01"
6	Valenzuela Interchange	14°2'35.90"	120°59'28.50"
7	Malaking Sapa River Bridge	14°43'38.77"	120°58'34.84"
8	Meycauayan River Bridge	14°44'26.11"	120°58'28.70"
9	Meycauayan Interchange	14°44'46.60"	120°58'17.30"
10	Marilao River Bridge	14°46'20.92"	120°57'26.90"
11	Marilao Interchange (New)	14°46'36.10"	120°57'19.00"

A NORTH

ORATION

May

11

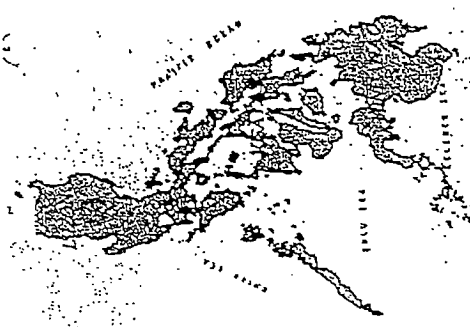
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APPENDIX B

NLEX MAP

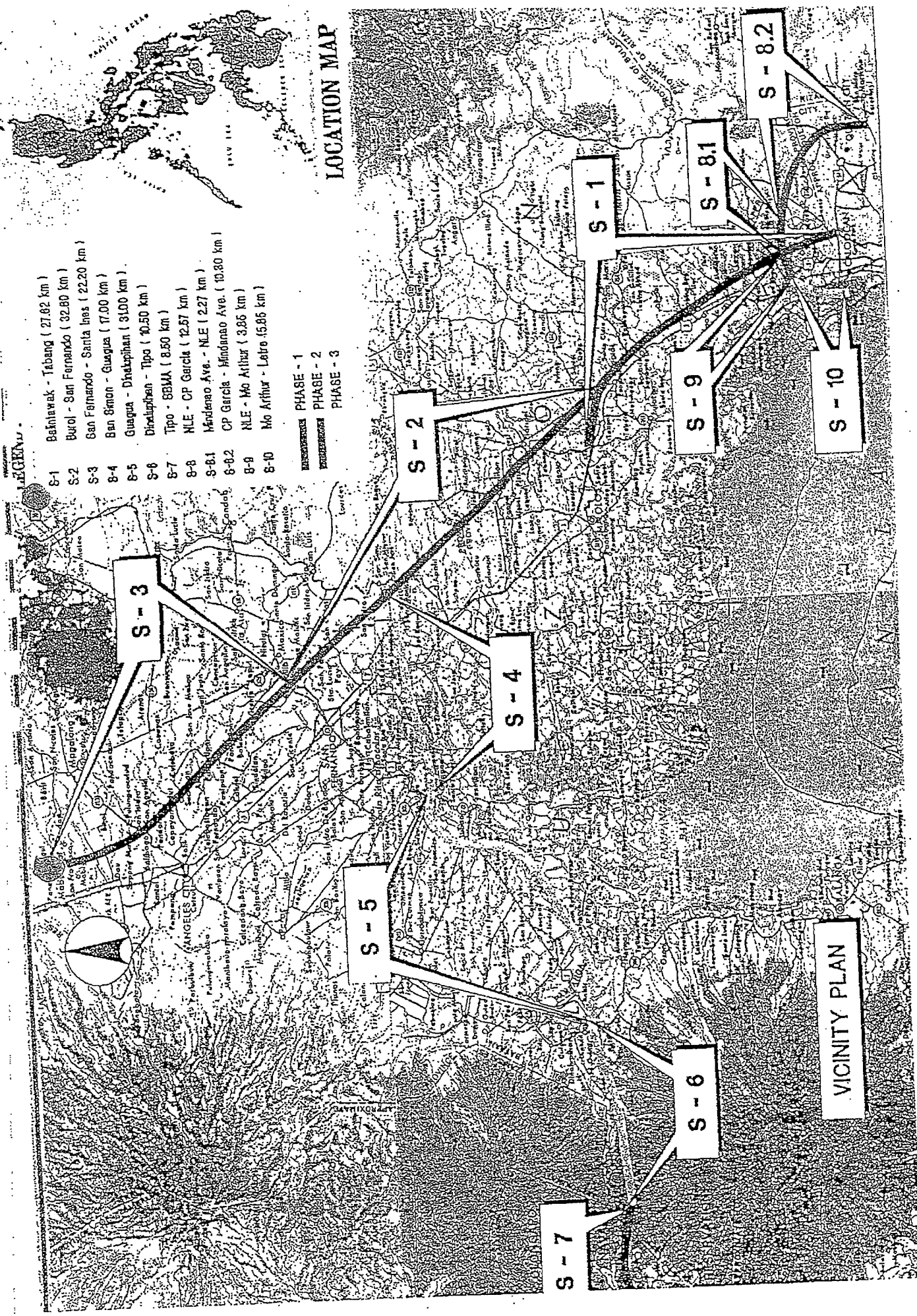


LOCATION MAP

LEGEND

- S-1 Bahawak - Tabang (27.62 km)
- S-2 Burol - San Fernando (32.80 km)
- S-3 San Fernando - Santa Inas (22.20 km)
- S-4 San Simon - Guagua (17.00 km)
- S-5 Guagua - Dinalupihan (31.00 km)
- S-6 Dinalupihan - Tupo (10.50 km)
- S-7 Tupo - SBMA (8.50 km)
- S-8 NLE - CP Garcia (12.57 km)
- S-8.1 Mandanay Ave. - NLE (2.27 km)
- S-8.2 CP Garcia - Mindanao Ave. (10.30 km)
- S-9 NLE - Mo Arthur (3.85 km)
- S-10 Mo Arthur - Letre (5.95 km)

- PHASE - 1
- PHASE - 2
- PHASE - 3



VICINITY PLAN