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REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS & HIGHWAYS

REGIONAL OFFICE NO. 8

SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE

AES COMPOUND, IBARRA, MAASIN CITY

C.Y. 2025 PROJECT

DETAILED ENGINEERING DESIGN PLAN FOR

REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES

MAINTENANCE SECTION

SOUTHERN LEYTE

SUBMITTED :

DENNIS E. ORAIS
CHIEF, PLANNING & DESIGN SECTION

DATE : _____

RECOMMENDED :

GIDEON C. SACRO
ASSISTANT DISTRICT ENGINEER

DATE : _____

APPROVED :

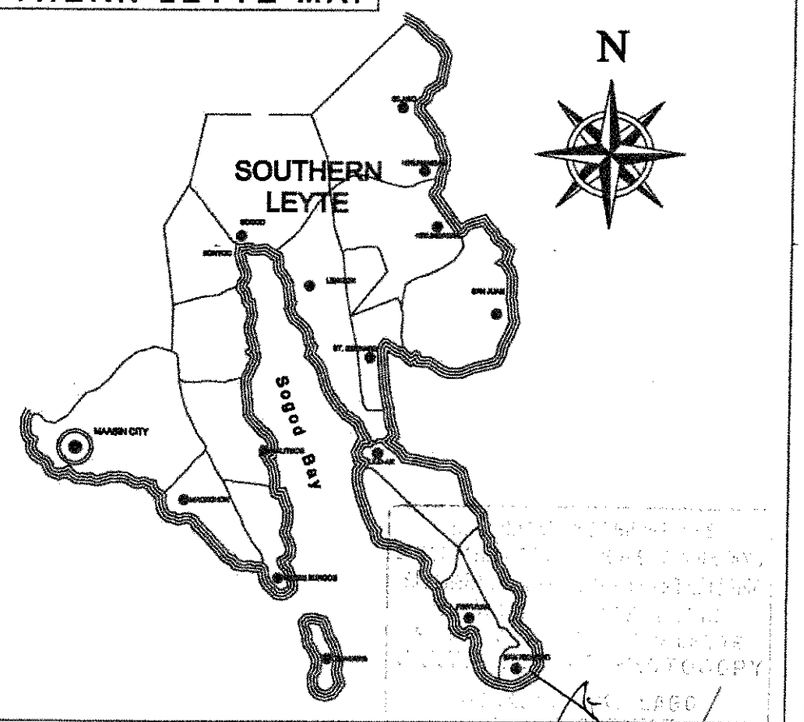
MANOLO A. ROJAS
DISTRICT ENGINEER

DATE : _____

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS
REGIONAL OFFICE NO. VIII
MAASIN CITY, SOUTHERN LEYTE
CERTIFIED TRUE PHOTOCOPY
JONARO K. LAGO
CAMP CRAME

INDEX OF SHEETS

SOUTHERN LEYTE MAP



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS
REGIONAL OFFICE NO. 8
SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE
ABS COMPOUND, IBARRA, MAASIN CITY

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	SUBMITTED:	REVIEWED:	RECOMMENDING	APPROVED:	SHEET NO.
REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	INDEX OF SHEETS, LOCATION MAP	MELVIN P. TOCMO ENGINEER III	JOSE RUPERTO C. BIGH CHIEF, MAINTENANCE SECTION	DENNIS F. ORAIS CHIEF, PLANNING & DESIGN SECTION	GIDEON O. BACRO ASSISTANT DISTRICT ENGINEER	MARIA [illegible] ROJAS DISTRICT ENGINEER	2/34

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNIT	REMARKS
B.4(10)	Miscellaneus Survey & Staking	1.00	Lump Sum	
B.5	Proiect Billboard / Signboard	3.00	each	
B.7(2)	Occupational Safety and Health Program	1.00	Lump Sum	
B.8(1)	Traffic Management	2.00	Month	
B.9	Mobilization / Demobilization	1.00	Lump Sum	
411(1)	Paint(Repainting of Various Existing Installed Guardrails, Posts & Chevron G.I. Posts)	50.00	Sq. M.	
411(2)	Repainting of Various Bridges	141.76	Sq. M.	
612(1)	Thermoplastic Pavement Markings (White)	1,702.72	Sq. M.	
612(2)	Thermoplastic Pavement Markings (Yellow)	90.00	Sq. M.	

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PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	SUBMITTED:	REVIEWED:	RECOMMENDING	APPROVED:	SHEET NO.
REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	SUMMARY OF QUANTITIES	MELVIN P. TOGMO ENGINEER II	JOSE RUPERTO K. RICH CHIEF, MAINTENANCE SECTION	DENNIS T. ORAIS CHIEF, PLANNING & DESIGN SECTION	GIDEON C. BACRO ASSISTANT DISTRICT ENGINEER	ENGR. LUCIA A. MOLAR DISTRICT ENGINEER	3/34

GENERAL NOTES

ITEM B.5 - PROJECT BILLBOARD/ SIGNBOARD

** GENERAL REQUIREMENTS*

THE CONTRACTOR SHALL INSTALL TWO (2) PROJECT INFORMATION SIGNS AT / OR NEAR THE BEGINNING AND THE END OF THE PROJECT OR UPON THE DISCRETION OF THE ENGINEER.

THE SIGNS ARE PRESCRIBED SEPARATELY BY THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH) FOR GOVERNMENT INFRASTRUCTURE PROJECTS TO INFORM THE PUBLIC OF THE IMPLEMENTATION OF THE PROJECT AND TO ADVISE THE ROAD USERS OF THE ONGOING CONSTRUCTION.

THE NEW BILLBOARD DESIGN LAYOUT, DIMENSION AND LETTER SIZES ON WHITE BACKGROUND, SHALL BE DEPICTED ON STANDARD BILLBOARD MEASURING 1,220MM X 2,440 MM USING 12.50 MM THICK MARINE PLYWOOD OR TARPAULIN OF THE SAME SIZE POSTED ON 5 MM MARINE PLYWOOD. FOR EACH BUILDING PROJECT, THE BILLBOARD SHALL BE INSTALLED IN FRONT OF THE PROJECT SITE. FOR EACH ROAD/BRIDGE/FLOOD CONTROL PROJECT, TWO BILLBOARDS SHALL BE INSTALLED, ONE (1) AT THE BEGINNING AND ONE (1) AT THE END OF THE PROJECT.

FOR ROAD PROJECTS WITH A LENGTH OF 10KM OR MORE, ADDITIONAL BILLBOARD SHALL ALSO BE INSTALLED AT EVERY 5KM INTERVAL. NAME(S) AND/OR PICTURE(S) OF ANY PERSONAGES SHOULD NOT APPEAR ON THE BILLBOARD.

NOT OTHER BILLBOARDS SHALL BE ALLOWED 100 M BEFORE AND 100 M AFTER ALL DPWH PROJECTS AND IN-BETWEEN THE PROJECT LIMITS OR WITHIN THE ROAD RIGHT-OF-WAY. DPWH CONTRACTORS SHALL NOT BE ALLOWED TO PLACE NAMES OF POLITICIANS OR CARRY POLITICAL BILLBOARD ON THEIR EQUIPMENT.

THE CONTRACTOR SHALL ALSO INSTALL ONE (1) BILLBOARD AS PER COA CIRCULAR NO. 2013-004, INFORMATION AND PUBLICITY ON PROGRAMS/PROJECTS/ACTIVITIES OF GOVERNMENT AGENCIES.

UPON COMPLETION OF THE WORK, ALL SIGNS INSTALLED SHALL BE REMOVED FROM THE SITE.

ITEM B.7 - OCCUPATIONAL SAFETY AND HEALTH

** DESCRIPTION*

THIS ITEM COVERS THE IMPLEMENTATION OF CONSTRUCTION SAFETY IN ALL STAGES OF PROJECT PROCUREMENT (DESIGN, ESTIMATE, CONSTRUCTION AND MAINTENANCE), REQUIREMENTS, PROVISIONS, AND INSTRUCTIONS FOR THE GUIDANCE OF THE ENGINEER.

** CONSTRUCTION SAFETY AND HEALTH PROGRAM(CSHP)*

EVERY CONSTRUCTION PROJECT SHALL HAVE A SUITABLE AND APPROVED CONSTRUCTION SAFETY AND HEALTH PROGRAM (CSHP) AS REQUIRED IN ALL PROJECTS REGARDLESS OF AMOUNT, FUNDING SOURCE AND MODE OF IMPLEMENTATION WHICH SHALL COMPLY WITH THE MINIMUM SAFETY AND HEALTH REQUIREMENTS AS SPECIFIED IN THE OCCUPATIONAL SAFETY AND HEALTH STANDARDS.

THE REQUIRE CSHP SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING:

1. COMPOSITION OF THE SAFETY AND HEALTH PERSONNEL RESPONSIBLE FOR THE PROPER IMPLEMENTATION OF CSHP.
2. SPECIFIC SAFETY POLITIES WHICH SHALL BE UNDERTAKEN IN THE CONSTRUCTION SITE, INCLUDING FREQUENCY OF AND PERSONS RESPONSIBLE FOR CONDUCTING TOOLBOX AND GANG MEETINGS.
3. PENALTIES AND SANCTIONS FOR VIOLATION OF THE CSHP.
4. FREQUENCY, CONTENT AND PERSONS RESPONSIBLE FOR ORIENTING, INSTRUCTING AND TRAINING ALL WORKERS AT THE SITE WITH REGARD TO THE CSHP WHICH THEY OPERATE.
5. THE MANNER OF DISPOSING WASTE ARISING FROM THE CONSTRUCTION.

B.8 (1) Traffic Management

B.8.1 GENERAL

THIS WORK CONSISTS OF TRAFFIC CONTROL DEVICES (ALL SIGNS, SIGNALS, MARKINGS, AND OTHER DEVICES USED TO REGULATE, WARN OR GUIDE TRAFFIC) WHICH CONTROL AND PROTECT PUBLIC TRAFFIC ADJACENT TO AND WITHIN THE PROJECT.

IT SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF THE DPWH MANUALS (PART 1 : ROAD SAFETY DESIGN MANUAL AND PART 2 : ROAD SIGNS AND PAVEMNENT MARKINGS MANUAL) AND ON UNIFORM TRAFFIC CONTROL DEVICES FOR STRRTS AND HIGHWAYS (MUTCD).

ITEM B.9 - MOBILIZATION / DEMOBILIZATION

** GENERAL REQUIREMENTS*

MOBILIZATION SHALL MEAN THE TRANSPORT TO THE PROJECT SITE OF THE CONTRACTOR'S PERSONNEL, CONSTRUCTION PLANT AND EQUIPMENT AS STIPULATED IN THE PROPOSAL AND CONTRACT OF THE PROJECT WHILE DEMOBILIZATION SHALL BE THEIR SUBSEQUENT REMOVAL FROM THE SITE AFTER THE COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL SECURE APPROVAL OF THE ENGINEER SHOULD HE OPTED TO DEMOBILIZE ANY OF THE MAJOR PLANT AND/OR EQUIPMENT BEFORE THE COMPLETION OF THE PROJECT.

B.9 Mobilization & Demobilization
Mobilization shall include transportation to the site of Contractor's plant, materials, equipment, employees, furnishings and temporary facilities.
Mobilization, as provided in these Specifications, means preparatory work and operations, including, but not limited to, those necessary for the movement of necessary personnel, plant and equipment to the Site.
Demobilization shall include dismantling and removal from the site of Contractor's plant, materials and equipment and all temporary facilities. It shall also include cleanup of the site after completion of the Contract Work as approved by the Engineer and transportation from the site of Contractor's employees.
The Contractor shall furnish the Engineer with a resources schedule, showing in detail the sequence of proposed delivery to the Site of plant and equipment necessary to comply with the proposed construction program.
The Contractor shall keep the Engineer informed of the arrival of plant and equipment on the Site.
In accordance with the Conditions of Contract, the Contractor shall not remove construction plant and equipment from the Site without the approval of the Engineer.

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SOUTHERN LEYTE DISTRICT ENGINEERING OFFICE
REGIONAL OFFICE NO. VIII
MAASIN CITY, SOUTHERN LEYTE
CERTIFIED TRUE/PHOTOCOPY
JONATHAN K. LAGO
G. AA. I. C. PATAZ

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS & HIGHWAYS REGIONAL OFFICE NO. 8 SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE ASR COMPOUND, IBARRA, MAASIN CITY	PROJECT NAME AND LOCATION: REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	SHEET CONTENTS: *GENERAL NOTES*	PREPARED: MELVIN P. TOCMO ENGINEER III	SUBMITTED: JOSE RUPERTO K. RICH CHIEF, MAINTENANCE SECTION	REVIEWED: DENNISE E. ONAIS CHIEF, PLANNING & DESIGN SECTION	RECOMMENDING RIDEON D. SACRO ASSISTANT DISTRICT ENGINEER	APPROVED: MANUEL CAL. ROJAS DISTRICT ENGINEER	SHEET NO. 4 34

ITEM 411 – PAINT

411.1 Description

This Item shall consist of furnishing and applying all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures; sampling testing and packing; preparation of the surface and application of paint to structures.

411.2 Materials Requirements

411.2.1 General

Paint, except aluminum paint, shall consist of pigments of the required fineness and composition ground to the desired consistency in linseed oil in a suitable grinding machine, to which shall be added additional oil, thinner and drier as required.

Aluminum paint shall consist of aluminum powder or paste of the required fineness and composition to which shall be added the specified amount of vehicle. The paint shall be furnished for use in ready mixed, paste or powder form.

All paints shall meet the following general requirements:

1. The paint shall show no excessive settling and shall easily redisperse with a paddle to a smooth, homogeneous state. The paint shall show no curdling, livering, caking or color separation and shall be free from lumps and skins.

2. The paint as received shall brush easily, possess good leveling properties and shall show no running or sagging when applied to a smooth vertical surface.

3. The paint shall dry to a smooth uniform finish, free from roughness grit, unevenness and other imperfections.

4. The paint shall not skin within 48 hours in a ¾ filled tightly closed container.

411.2.2 The paint shall conform to the requirements of the Specifications indicated as follows:

Ready Mixed Red Lead Paint	AASHTO M 72 and PNS Type I, II, III & IV
Aluminum Paint	AASHTO M 69 and PNS Type I & II
White & Tinted Ready Mixed Paint	AASHTO M 70
Foliage Green Bridge Paint	AASHTO M 67
Black Paint for Bridges And Timber Structures	AASHTO M 68
Basic Lead-Silico-Chromate Ready Mixed Primer	AASHTO M 229
Ready Mixed Aluminum Paint	AASHTO M 260 and PNS

411.2.3 Drier

This Specification covers both straight oil drier (material free from resins and gums), and Japan drier (material containing varnish gums). The drier shall be composed of lead manganese or cobalt or a mixture of any of these elements, combined with a suitable fatty oil, with or without resins or gums, and mineral spirits or turpentine, or a mixture of these solvents. The drier shall conform to the following requirements:

1. Appearance – Free from sediment and suspended matter.

2. Flash Point – (Tag Close Up) Not less than 30°C.

3. Elasticity – The drier when flowed on metal and baked for 2 hours at 100°C shall have an elastic film.

4. Drying – It shall mix with pure raw linseed oil in the proportion of 1 volume of drier to 19 volume of oil without curdling and the resulting mixture when flowed on glass shall dry in not more than 18 hours.

5. Color – When mixed with pure, raw linseed oil in the proportion of 1 volume of drier to 8 volume of oil, the resulting mixture shall be darker than a solution of 6 grams of Potassium Dichromate in 13 cc of pure Sulfuric Acid (sp.gr. 1.84).

411.3 Construction Requirements

411.3.1 Proportion of Mixing

It is the intent of this Specification to provide a paint of proper brushing consistency, which will not run, steak or sag and which will have satisfactory drying qualities.

411.3.2 Aluminum Paint, Field Coats On Structural Steel

The paint shall be mixed in the proportion of 240 grams of aluminum powder or paste per liter of vehicle of long oil spar varnish. This makes a paint containing 21 percent pigment and 79 percent vehicle. The weighed amount of powder or paste shall be placed in a suitable mixing container and the measured volume of vehicle poured over it. The paste or powder shall be incorporated in the paint by vigorous stirring with a paddle. The powder or paste will readily disperse in the vehicle. Before removing any paint from the container, the paint shall be thoroughly stirred to insure a uniform mixture, and the paint shall be suitably stirred during use. The paint shall be mixed on the job and only enough for one day's use shall be mixed at one time.

When two field coats of aluminum paint are specified, the first coat shall be tinted with lampblack paste or Prussian blue paste in the quantity of 24 grams/liter of paint. The exact quantity used shall be sufficient to give a contrast in color which can be readily distinguished. When three field coats of aluminum paint are specified, the second coat shall be tinted.

411.3.3 Aluminum Paint, Field Coats on Creosoted Timber

The paint shall be mixed as specified for Aluminum Paint for Structural Steel except that the proportions shall be 270 grams of aluminum powder or paste to one litre of vehicle.

Other paint composition may be used when and as stipulated in the Special Provisions.

411.3.4 Containers and Markings

All paints shall be shipped to strong substantial containers plainly marked with the weight, color and volume in litres of the paint content, a true statement of the percentage composition of the pigment, the proportions of the pigment to vehicle, the name and address of the manufacturers, and the stencil of the authorized inspecting agency. Any package or container not so marked will not be accepted for use.

411.3.5 Sampling and Testing

Method of sampling shall be as follows:

1. One 20-litre can sample in original unopened container shall be obtained for 100 cans of the delivered material or 10% fraction thereof.

2. One 4-litre can sample in original unopened container shall be obtained for every 100 cans or fraction thereof of the delivered material.

Methods of testing will be in accordance with the applicable AASHTO or ASTM Methods.

411.3.6 Painting

411.3.6.1

The painting of structure shall include the proper preparation of the surface; the application, protection and drying of the paint coatings, the protection of the pedestrians, vehicular or other traffic upon or underneath the structures, the protection of all parts of the structure (both superstructure and substructure) against disfigurement by spatters, splashes and smirches of paint or of paint materials; and the supplying of all tools, tackle, scaffolding labor, paint and materials necessary for the entire work.

Paint shall not be applied during rain, storms or when the air is misty, or when, in the opinion of the Engineer, conditions are otherwise unsatisfactory for the work. Paint shall not be applied upon damp surfaces or upon metal which has absorbed heat sufficient to cause the paint to blister and produce a pervious paint film.

No wide flat brush shall be used. All brushes preferably shall be either round or oval but if flat brushes are used, they shall not exceed 100 mm in width. The paint when applied shall be so manipulated as to produce a uniform even coating in close contact with the surface being painted, and shall be worked into all corners and crevices.

On surfaces inaccessible to brushes, the paint shall be applied by spray gun or with sheepskin daubers specially constructed for the purposes. Paint shall be thoroughly stirred, preferably by means of mechanical mixers, before being removed from the containers, and, to keep the pigments in suspension, shall be kept stirred while being applied.

When a paint gun is used, the equipment used shall be of an approved type and shall have provision for agitation of paint in the spray container. In the case of aluminum paint, the pressure used shall be only that necessary to secure adequate atomization. If in the opinion of the Engineer unsatisfactory results are obtained from the use of a spray gun, its use shall be discontinued and the painting completed by the use of brushes.

411.3.6.2 Painting Structural Steel

Surfaces of metals to be painted shall be thoroughly cleaned of rust, loose mill, scale, dirt, oil or grease, and other foreign substances. Unless cleaning is to be done by sandblasting, all weld areas, before cleaning is begun, shall be neutralized with a proper chemical, after which they shall be thoroughly rinsed with water. Cleaning may be by any of the following three methods:

1. Hand Cleaning.

The removal of rust, scale and dirt shall be done by the use of metal brushes, scrapers, chisels, hammers or other effective means. Oil and grease shall be removed by the use of gasoline or benzene. Bristle or wood fiber brushes shall be used for removing loose dust.

2. Sandblasting

Sandblasting shall remove all scale and other substances down to the base metal. Special attention shall be given to the cleaning of corners and re-entrant angels. Before painting, sand adhering to the steel in corners and elsewhere shall be removed. The cleaning shall be approved by the Engineer prior to any painting. The material shall be painted before the rust forms and not later than 2 hours after cleaning.

3. Flame Cleaning

Oil and grease shall be removed by washing with suitable solvent. Excess solvent shall be wiped from the work before proceeding with subsequent operation. The surface to be painted shall be cleaned and dehydrated (freed of occluded moisture) by the passage of oxyacetylene flames which have an oxygen to acetylene of at least one. The inner cones of these flames shall have a ratio length to port diameter of at least 8 and shall not be more than 4 mm center to center. The oxyacetylene flames shall be traversed over the surface of the steel in such manner and at such speed that the surface is dehydrated, and dirt, rust, loose scale, scale in the form of blisters or scabs, and similar foreign matter are freed by the rapid intense heating by the flames. The flames shall not be traversed so slowly that loose scale or other foreign matter is fused to the surface of the steel. The number, arrangement and manipulation of the flames shall be such that all parts of the surface are adequately cleaned and dehydrated. Promptly after the application of the flames, the surface of the steel shall be wire-brushed, hand scraped wherever necessary and then swept and dusted to remove all free materials and foreign particles. Compressed air shall not be used for this operation. Paint shall be applied promptly after the steel has been cleaned and while the temperature of the steel is still above that of the surrounding atmosphere, so that there will be no recondensation of moisture on the cleaned surfaces.

4. Shop Painting of Structural Steel

When all fabrication work is completed and has been tentatively accepted, all surfaces not painted before assembling shall be given two coats of Red Lead Shop Paint conforming to the requirements of this Specification. (The inside of top chords for trusses and laced members or inaccessible parts, except contact surfaces, may be painted before assembling). Shipping pieces shall not be located for shipment until thoroughly dry. No painting shall be done after loading the materials on transport vehicles.

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Erection marks for field identifications of members shall be painted upon previously painted surfaces.

With the exception of abutting joints and base plates, machine finished surface shall be coated, as soon as practicable after acceptance with a hot mixture of white lead and tallow before removal from the shop. The composition used for coating machine-finished surface shall be mixed in the following proportions:

Pure Tallow	1,915 grams
Pure White Lead	958 grams
Pure Linseed Oil	1.0 liter

5. Field Painting of Structural Steel

When the erection work is complete including riveting and straightening of bent metal; all adhering rust, scale, dirt, grease or other foreign material shall be removed as specified under cleaning of surfaces.

As soon as the Engineer has examined and approved all field rivets, the heads of such rivets and field bolts, all welds and any surfaces from which the shop coat of paint has become worn off or has otherwise become defective, shall be cleaned and thoroughly covered with one coat of shop coat paint.

When the paint applied for "touching up" rivet heads and abraded surfaces has become thoroughly dry, such field coats as called for shall be applied. In no case shall a succeeding coat be applied until the previous coat has dried throughout the full thickness of the film. All small cracks and cavities which were not sealed in water-tight manner by the first field coat shall be filled with a pasty mixture of red lead and linseed oil before the second field coat is applied.

The following provisions shall apply to the application of all field coats. To secure a maximum coating on edges of plates or shapes, rivet heads and other parts subjected to special wear and attack, these parts shall first be stripped, followed immediately by the general painting of the whole surface, including the edges and rivet heads.

The application of the final coats shall be deferred until adjoining concrete work has been placed and finished. If concreting operations have damaged that paint, the surface shall be recleaned and repainted.

411.3.6.3 Painting and Timber Structures

Timber structures shown on the Plans to be painted, shall be given two coats of the specified materials, which shall be thoroughly brushed in. Additional coats shall be required when so specified on the Plans. All surfaces shall be thoroughly dry before painting, and each coat shall be allowed to stand for three or four days, or until thoroughly dry before applying the succeeding coat.

Timber which required painting must be seasoned timber surfaced on 4 sides. It shall be either untreated or salt-treated timber as specified on the Plans.

The entire surface of all untreated timber that is to be painted, shall be given a priming coat immediately after the material is delivered to the project. All contact surfaces shall receive the second coat paint.

Special care shall be taken during construction and handling so that the pieces to be painted do not come in contact, except when required, with the creosoted materials and that no oil is brushed on the same during construction operations. The Contractor shall be required to pile such pieces separately from the creosoted materials and keep them from contact with same until ready for erection.

Creosoted materials such as guardrails and guide posts which are to be painted, shall be painted with aluminum paint as specified above.

411.3.6.4 Painting Galvanized Surface

For the purpose of conditioning the surface of galvanized surfaces to be painted, the painting shall be deferred as long as possible in order that the surface may weather.

Before painting galvanized surfaces they shall be treated as follows:

1. In 4 litres of soft water, dissolve 60 ml of copper chloride, copper nitrate, and sal ammonia, then add 60 ml of commercial muriatic acid. This should be done in earthenware or glass vessel, never in tin or other metal receptacle. Apply the solution with a wide flat brush to the galvanized surface, when it will assume a dark almost black color which on drying becomes a grayish film.

2. The surfaces, when dry, may then be painted as described.

411.3.6.5 Repainting Existing Structures

When called for on the Plans or in the Special Provisions, existing structures shall be given the number and kind of coats of field paint as stipulated. The surface to be repainted shall be cleaned as specified under Subsection 411.3.6.2, Painting Structural Steel, with the added provisions that all dead or loose paint shall be removed by scraping, chipping, or brushing as may be necessary. Timber railings, name plates, planking and other interfering parts shall be removed before cleaning is begun and shall be replaced after the painting has been completed and the last coat has thoroughly dried. The application of the coat shall be as specified under Subsection 411.3.6.2, (5), Field Painting of Structural Steel.

ITEM 612 – REFLECTIVE THERMOPLASTIC STRIPPING MATERIALS (SOLID FORM)

612.1 Description

This standard specifies the requirement for reflectorized thermoplastic pavement striping material conforming to AASHTO M 249 that is applied to the road surface in a molten state by mechanical means with surface application of glass beads at a rate of not less than 350 g/L of glass beads having a size range of drop in type and will produce an adherent reflectorized stripe of specified thickness and width capable of resisting deformation by traffic.

612.2 Materials Requirements

1. Reflectorized Thermoplastic Pavement Material shall be homogeneously composed of pigment, filler, resins and glass reflectorizing spheres.

The thermoplastic material shall be available to both white and yellow.

2. Glass Beads (Pre-Mix) shall be uncoated and shall comply with the following requirements:

Refractive Index, min. - 1.50
Spheres, Percent, min. - 90

Gradation:

Sieve mm	Mass Percent Passing
0.850	100
0.600	75-95
0.425	-
0.300	15-35
0.180	-
0.150	0-5

612.3 General Requirements

612.3.1 Composition

The pigment, beads and filler shall be uniformly dispersed in the resin. The material shall be free from all skins, dirt and foreign objects and shall comply with the requirements as specified in Table 612.1.

Table 612.1 – Composition Requirements

Component	White	Yellow
Binder, min.	18.0	18.0
Glass Beads:		
min.	30	30
max.	40	40
Titanium Dioxide, min.	10.0	
Chrome Yellow, Medium, min.		10.0
Calcium Carbonate And Inert Fillers, Max.	42.0	42.0

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REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS & HIGHWAYS REGIONAL OFFICE NO. 8 SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE ABS COMPOUND, BAYBAY, MAASIN CITY	REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	GENERAL NOTES	MELVIN P. TOCMO ENGINEER III	JOSE RUBIO BALINGIT, JR. CHIEF, MAINTENANCE SECTION	DENNIS M. ORAIS CHIEF, PLANNING & DESIGN SECTION	GIDEON C. LAGO ASSISTANT DISTRICT ENGINEER	MARIVIC M. ROJAS DISTRICT ENGINEER	7/34

612.3.2 Qualitative

The material shall conform to the qualitative requirements as specified in Table 612.2.

Table 612.2 – Qualitative Requirements

Specific Gravity, max.	2.15
Drying Time, minutes, max.	10.0
Bond Strength to Portland Cement Concrete after heating for four (4) hours ±5 min. @ 218°C, MPa, max.	1.24
Cracking Resistance @ low temp. after heating for four (4) hours ±5 min. @ 218 ±2°C.	No cracks
Impact Resistance after heating for four (4) hours ±5 min. @ 218 ±2°C and forming test specimens, mm/kg, min.	115
Softening Point after heating for four (4) hours ±5 min. @ 218 ±2°C.	102.5 ± 9.5°C
Daylight reflectant @ 45 Degrees – 0 degrees, % min.	75 45

612.4 Application Properties

The material shall readily extrude at a temperature of 211 ± 7°C, from approved equipment to produce a line 3.2 to 4.8 mm thick which shall be continuous and uniform in shape having clear and sharp dimensions.

The material shall not exude fumes which are toxic, obnoxious or injurious to persons or property when heated during applications.

The application of additional glass beads by drop-in methods shall be at a rate of not less than 350 g/L of glass beads having a size range for drop-in type. The typical size range of spheres of drop-in type paints is as follows.

Passing 850 um (#20) sieve and retained on 250 um (#60) sieve, %	80 – 100

a) Preparation of Road Surface – the materials should be applied only on the surface which is clean and dry. It shall not be laid into loose detritus, mud or similar extraneous matter, or over an old paint markings, or over an old thermoplastic marking which is faulty. In the case of smooth, polished surface stones such as smooth concrete, old asphalt surfacing with smooth polished surface stones and/or where the method of application of the manufacturer of the thermoplastic materials shall be recommended, and with the approval of the Engineer.

b) Preparation of Thermoplastic Materials – The materials shall be melted in accordance with the manufacturer's instruction in a heater fitted with a mechanical stirrer to give a smooth consistency to the thermoplastic and such the local overheating shall be avoided. The temperature of the mass shall be within the range specified by the manufacturer and shall on no account be allowed to exceed the maximum temperature stated by the manufacturer. The molten material shall be used as expeditiously as possible and for thermoplastics which have natural resin binders or otherwise sensitive to prolong heating the materials shall not be maintained in a molden condition for more than 4 hours.

c) Laying – Center lines, lane lines and edges lines shall be applied by approved mechanical means and shall be laid in regular alignment. Other markings may be applied by hand – screed, hand propelled machine or by self-propelled machine approved or directed by the Engineer. After transfer to the laying apparatus the materials shall be maintained within the temperature range specified by the manufacturer and stirred to maintain the right consistency for laying.

In the case of screen application, the material shall be laid to a thickness of not less than 3 mm or more than 6 mm unless authorized by the Engineer when laid over an existing markings. In the case of sprayed application the material shall be laid to thickness of not less than 1.5 mm unless authorized by the Engineer. In all cases the surface produced shall be uniform and appreciably free from bubbles and steaks. Where the Contractor Documents require or the Engineer direct that ballotini shall be applied to the surface of the markings, these shall be applied uniformly to the surface of hot thermoplastic immediately after laying such that the quality of ballotini firmly embedded and retained in the surface after completion complies with the requirements of Sub-section 606.2.2, Material Requirements.

Road markings of a repetitive nature, other center lines, lane lines, etc., shall unless otherwise directed by the Engineer be set out with stencils which comply with the size and spacing requirements shown on the Plans.

d) Re-use of Thermoplastic Materials – At the end of day's as much as possible the material remaining in the heater and/or laying apparatus shall be removed. This may be broken and used again provided that the maximum heating temperature has not been exceeded and that the total time during which it is a molden condition does not exceed the requirements of Sub-section 606.2.3, Construction Requirements.

612.4.1 Defective Materials or Workmanship

Materials which are defective or have been applied in an unsatisfactory manner or to incorrect dimensions or in a wrong location shall be removed, the road pavement shall be made good and materials replaced, reconstructed and/or properly located, all at the Contractor's expenses and to the satisfaction of the Engineer.

612.4.2 Protection of the Traffic

The Contractor shall protect pedestrians, vehicles and other traffic adjacent to the working area against damage or disfigurement by construction equipment, tools and materials or by spatters, splashes and smirches or paint or other construction materials and during the course of the work, provide and maintain adequate signs and signals for the warning and guidance of traffic.

612.5 Sampling

A minimum weight of 10 kg. of Reflectorized Thermoplastic paint shall be taken for every 100 bags or fraction thereof.

612.6 Testing

The material shall be tested in accordance with AASHTO T 250 or with the appropriate method in ASTM designation.

612.7 Packing and Marking

The material shall be packaged in a suitable containers to which it will not adhere during shipment and storage. The blocks of cast thermoplastic material shall be approximately 300 x 915 by 51 mm and shall weigh approximately 23 kg. Each container label shall designate the color, manufacturer's name, batch number and date of manufacture. Each batch manufactured shall have its own separate number. The label shall warn the user that the material shall be heated to 211 ± 7°C during application.

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS & HIGHWAYS REGIONAL OFFICE NO. 8 SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE ABS COMPOUND, IBARRA, MAASIN CITY	PROJECT NAME AND LOCATION: REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	SHEET CONTENTS: GENERAL NOTES	PREPARED: MELVIN P. TOCMO ENGINEER III	SUBMITTED: JOSE RUPERTO K. RICH CHIEF, MAINTENANCE SECTION	REVIEWED: DENNIS E. ORAIS CHIEF, PLANNING & DESIGN SECTION	RECOMMENDING GIDEON C. MACRO ASSISTANT DISTRICT MANAGER	APPROVED: ROMULO A. ROJAS DISTRICT ENGINEER	SHEET NO. 8 / 34

BDRY. SOUTHERN LEYTE-MAASIN-MACROHON-SOGOD-JCT.
DAANG MAHARLIKA
THERMOPLASTIC SCHEDULE (WHITE)

STATION	DESCRIPTION	LENGTH (LN.M)	WIDTH	LOCATION	AREA
K1159 + 000 - K1159 + 500	EDGE	500.00	0.10	R/S	50.00
K1162 + 200 - K1162 + 800	EDGE	600.00	0.10	R/S	60.00
K1167 + 000 - K1167 + 700	EDGE	1,400.00	0.10	B/S	140.00
K1158 + 000 - K1158 + 500	BROKEN	168.00	0.15	C	25.20
K1159 + 200 - K1160 + 000	BROKEN	267.00	0.15	C	40.05
K1160 + 200 - K1160 + 900	BROKEN	234.00	0.15	C	35.10
K1161 + 200 - K1162 + 000	BROKEN	267.00	0.15	C	40.05
K1162 + 500 - K1163 + 000	BROKEN	168.00	0.15	C	25.20
K1163 + 000 - K1164 + 000	BROKEN	336.00	0.15	C	50.40
K1164 + 100 - K1164 + 600	BROKEN	168.00	0.15	C	25.20
K1143 + 100 - K1143 + 600	BROKEN	168.00	0.15	C	25.20
K1165 + 000 - K1166 + 000	BROKEN	336.00	0.15	C	50.40
K1167 + 000 - K1167 + 500	BROKEN	168.00	0.15	C	25.20
K1160 + 520 SAN ROQUE ELEM SCHOOL	PEDESTRIAN	40.00	0.30	2 LANES	12.00
K1193 + 000 - K1193 + 500	EDGE	1,000.00	0.10	B/S	100.00
K1193 + 300 MASLOG ELEMENTARY SCHOOL	PEDESTRIAN	40.00	0.30	2 LANES	12.00
K1196 + 200 - K1197 + 000	EDGE	1,600.00	0.10	B/S	160.00
1196 + 400 T. OPPUS ELEMENTARY SCHOOL	PEDESTRIAN	80.00	0.30	4 LANES	24.00
K1198 + 700 - K1199 + 300	EDGE	600.00	0.10	R/S	60.00
K1201 + 000 - K1201 + 350	EDGE	700.00	0.10	B/S	70.00
K1202 + 950 MUNICIPAL OF BONTOC	PEDESTRIAN	60.00	0.30	3 LANES	18.00
K1203 + 000 - K1203 + 400	EDGE	800.00	0.10	B/S	80.00
K1203 + 600 - K1203 + 900	BROKEN	102.00	0.15	C	15.30
K1203 + 500 - K1203 + 900	EDGE	400.00	0.10	L/S	40.00
K1204 + 300 - K1204 + 600	EDGE	600.00	0.10	B/S	60.00
K1204 + 600 - K1204 + 900	BROKEN	102.00	0.15	C	15.30
K1205 + 500 - K1205 + 900	EDGE	800.00	0.10	B/S	80.00
SUB-TOTAL					**1,338.60**

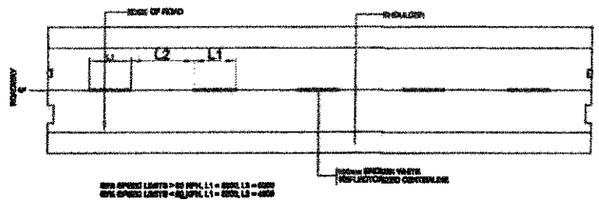
BATO-BONTOC ROAD
THERMOPLASTIC SCHEDULE (WHITE)

STATION	DESCRIPTION	LENGTH (LN.M)	WIDTH	LOCATION	AREA
K1122 ± 700 - K1122 ± 400	BROKEN	204.00	0.15	B/S	30.60
K1122 + 600 - K1122 + 700	BROKEN	36.00	0.15	R/S	5.40
K1125 + 100 - K1125 + 600	EDGE	500.00	0.10	L/S	50.00
K1124 + 950 - K1125 + 050	BROKEN	72.00	0.15	B/S	10.80
K1126 + 500 - K1126 + 900	EDGE	800.00	0.10	B/S	80.00
K1126 + 100 - K1126 + 500	EDGE	400.00	0.10	L/S	40.00
K1129 + 050 DIVISORIA NATIONAL HIGH SCHOOL	PEDESTRIAN	80.00	0.30	4 LANES	24.00
K1129 + 200 - K1129 + 600	EDGE	400.00	0.10	L/S	40.00
K1129 + 200 - K1129 + 793.20	EDGE	593.20	0.10	R/S	59.32
K1125 + 050 SAMPONGON ELEMENTARY SCHOOL	PEDESTRIAN	80.00	0.30	4 LANES	24.00
SUB-TOTAL					**364.12**
TOTAL					**1,702.72**

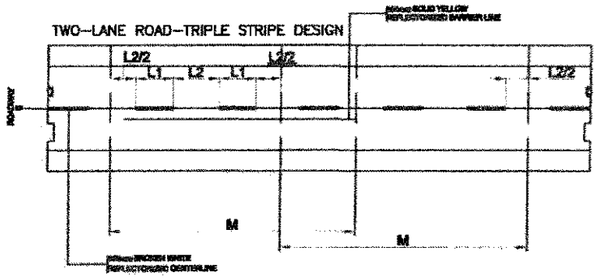
BDRY. SO. LEYTE-MAASIN-MACROHON-SOGOD-JCT.
DAANG MAHARLIKA
THERMOPLASTIC SCHEDULE (YELLOW)

STATION	DESCRIPTION	LENGTH (LN.M)	WIDTH	LOCATION	AREA
K1163+700 - K1163+800	YELLOW	100.00	0.15	C	15.00
K1165+500 - K1165+550	YELLOW	50.00	0.15	C	7.50
K1160+290 SAN ROQUE BR	YELLOW	134.00	0.15	C	20.10
K1193+994 MASLOG BR II	YELLOW	98.00	0.15	C	14.70
K1194+868 CALAYUGAN BR	YELLOW	112.00	0.15	C	16.80
K1197+074 INIGUIHAN BR	YELLOW	106.00	0.15	C	15.90
TOTAL					**90.00**

	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	SUBMITTED:	REVIEWED:	RECOMMENDING	APPROVED:	SHEET NO.
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS & HIGHWAYS REGIONAL OFFICE NO. 8 SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE ABS COMPOUND, MAASIN, MAASIN CITY	REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	THERMOPLASTIC SCHEDULE	MELVILLE TOCMO ENGINEER III	JOSE RUPERTO K. RICE CHIEF, MAINTENANCE SECTION	DENNIS E. OGAS CHIEF, PLANNING & DESIGN SECTION	GIDEON CLARADO ASSISTANT DISTRICT ENGINEER	MARIANO T. ROJAS DISTRICT ENGINEER	9/34

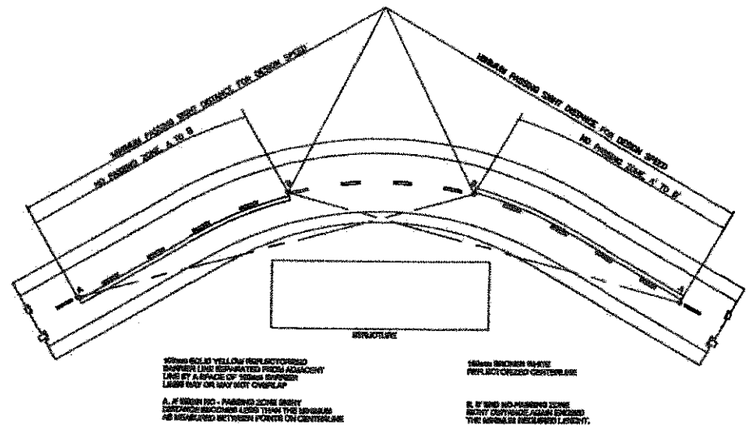


1A TWO LANE PAVEMENT MARKING

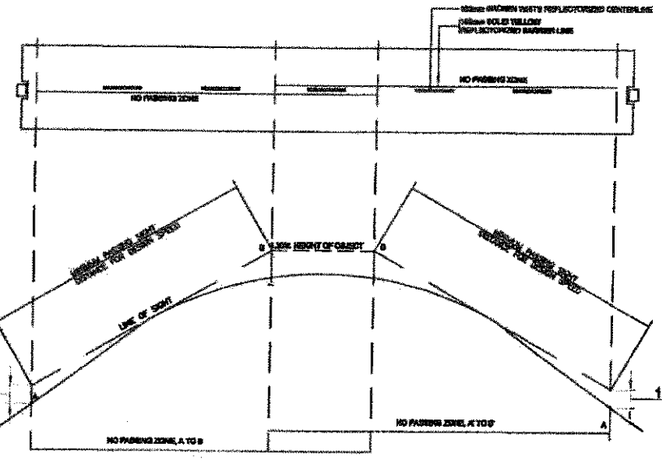


DESIGN SPEED (KPH)	MINIMUM PASSING SIGHT DISTANCE M
30	200
40	280
50	345
60	407
70	485
80	541
90	605
100	670
110	728
120	795

1B PAVEMENT MARKING APPLICATION OF NO PASSING ZONES



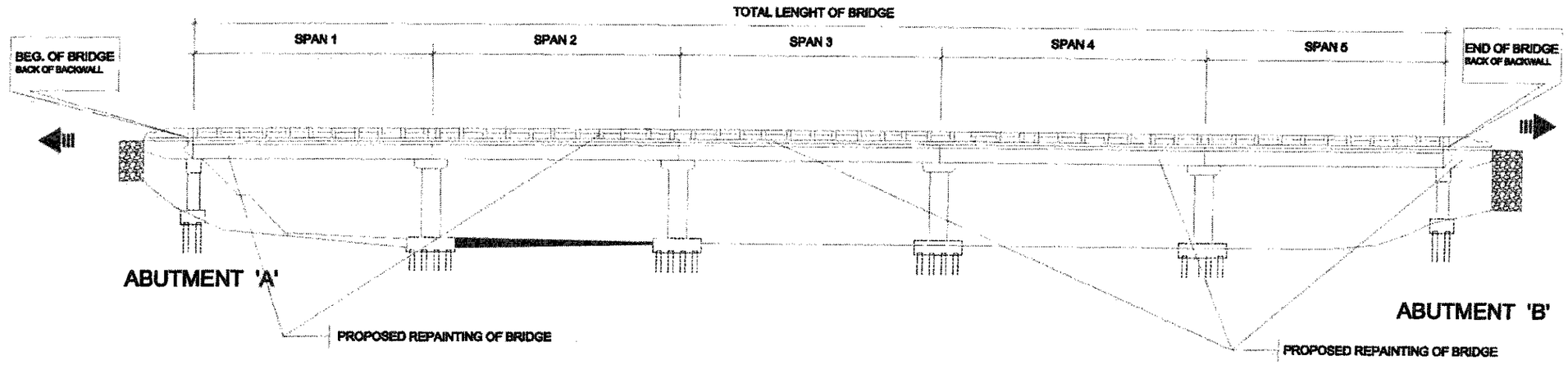
1C METHOD OF LOCATING AND DETERMINING THE LIMIT OF NO – PASSING ZONES ON HORIZONTAL CURVES



1D METHOD OF LOCATING AND DETERMINING THE LIMIT OF NO – PASSING ZONES ONVERTICAL CURVES

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS
SOUTHERN LEYTE DISTRICT ENGINEERING OFFICE
REGIONAL OFFICE NO. VIII
MAASIN CITY, SOUTHERN LEYTE
CERTIFIED TRUE/PHOTOCOPY
JUNARD K. LAGO
C AND M CAPATAZ

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS & HIGHWAYS REGIONAL OFFICE NO. 8 SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE ABB COMPOUND, ISAWAN, MAASIN CITY	PROJECT NAME AND LOCATION: REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	SHEET CONTENTS: PAVEMENT MARKINGS PASSING ZONES ON HORIZONTAL AND VERTICAL CURVES	PREPARED: MELVIN P. TOCMO ENGINEER III	SUBMITTED: JOSE RUPERTO E. RICH CHIEF, MAINTENANCE SECTION	REVIEWED: DENNIS F. ORAIS CHIEF, PLANNING DIVISION SECTION	RECOMMENDING GIDEON G. GUACHO ASSISTANT DISTRICT ENGINEER	APPROVED: [illegible] DISTRICT ENGINEER	SHEET NO. 10 / 34



GENERAL ELEVATION

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS
REGIONAL OFFICE NO. 8
SOUTHERN LEYTE 1st DISTRICT ENGINEERING OFFICE
ABS COMPOUND, IBARRA, MAASIN CITY

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	SUBMITTED:	REVIEWED:	RECOMMENDING	APPROVED:	SHEET NO.
REPAIR / MAINTENANCE OF NATIONAL ROADS AND BRIDGES SOUTHERN LEYTE	GENERAL ELEVATION	MELVIN P. TOCMO Engineer III	JOSE RUPERTO K. RUIZ CHIEF, MAINTENANCE SECTION	DENNIS B. ORAIS CHIEF, PLANNING & DESIGN SECTION	GIDEON C. BACRO ASSISTANT DISTRICT ENGINEER	MARIETOM L. ROJAS DISTRICT ENGINEER	11 34

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS
SOUTHERN LEYTE 1ST DISTRICT ENGINEERING OFFICE
REGIONAL OFFICE NO. 8
MAASIN CITY, SOUTHERN LEYTE
CERTIFIED TRUE/PHOTOCOPY
JONARIE K. LAGO
CADD OPERATOR