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GOVERNMENT OF PAKISTAN
MINISTRY OF COMMUNICATIONS

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CAUSES OF PRE-MATURE FAILURE OF SECTIONS OF N-20
CHOWK MARI TO MUREED SHAKH

February, 2009

CONTENTS

Executive Summary

The report analyses the causes of pre-mature failure of sections of Chowk Mari to Mureed Shakh (N-20). It may be mentioned that surface treated highway pavements can be successful for all types of traffic, from the rural road that carries only few vehicles to main highways carrying thousands of vehicles a day and it provides a simple but cost-effective form of maintenance as well. Unfortunately, the attention paid to design, control, supervision and aftercare is frequently less with surface treated roads than with more expensive forms of construction. This lack of attention to details shortens the useful life of a surface treated highway.

The rehabilitated highway sections between Chowk Mari and Mureed Shakh (16 km) of National Highway N-20 (total 42 km) failed primarily because of lack of attention to planning and quality control during & after construction. The Asphaltic Triple Surface Treated (TST) layer has been virtually stripped off and Aggregates in the Water Bound Macadam layer are visible and removed at many locations. The TST layer was scrubbed from the underlying Water Bound Macadam layer due to poor bonding and embedment. At places water bound layer was also found severely affected. Photographs 1 - 5 show the picture.

The problem has been exacerbated by opening the sections of road just after construction to all types of traffic, like fast moving cars and slow moving heavy trucks. Normally, a fast moving traffic is not allowed as it 'picks up' chippings and hence the traffic is slowed at controlled speed. So is the case with multi-axle heavy vehicles which shared the same centerline path for movement in opposite direction and scrubbed the mid-road section swiftly and continuously; as shown in photographs 4-6. Usually, a light slow moving traffic is allowed at first, as it has a very positive effect because it acts like a rubber tired roller reaching and compacting those areas which were not compacted by (a straight drum) steel roller.

The material characteristics show deviation from specifications. Chippings which supply most of the stability in TST layer must have a certain degree of packing (which is achieved due to combination of different size of chippings) were found outside the specified gradation limits (30% larger than the maximum allowable size). That weakened bonding and adhesion as well as accelerated their breakdown and stripping under traffic loadings. Whereas, in the Water Bound Macadam (WBM) layer a high clay content affected bonding between TST layer and WBM layer as well as moisture levels.

It is pertinent to note that rains also affected the newly constructed highway sections, as the water ingress into newly constructed pavement physically

removed the asphalt binder from the aggregates and allowed the chippings to be dislodged easily. The aggregate & stone dust stockpiles as well as WBC layer might be saturated by continuous wet spell and a proper bond with sprayed asphalt layer could not be achieved. Weather plays an important role in construction activities which is always ignored as no weather based scheduling or rescheduling seems to have been carried out.

It was observed that due importance was not given to finish level nor proper camber was provided during the execution. Shoulders were found to be in poor condition and were either "soft" or not leveled to proper cross-sectional alignment thereby affecting the drainage as depicted in photographs 7, 8 & 9.

Workmanship is also one of the most important factors in producing good quality TST surface. It is evident from the relatively better condition of the 2nd section (31+000 - 36+500) which has many stretches of intact surface and has experienced the same environment as Section-I (26+000 - 31+000) and Section-III (36+000 - 42+000); as shown in photograph 6.

A comparison with old road (remaining 26 km) repaired with Double Surface Treatment (DST) shows no signs of damage except usual minor damages associated with surface treated roads like pot holes, raveling etc. (photograph - 10). If reconstruction / maintenance of 16 km portion were needed, then, a proper design should have been implemented.

Further more after early appearance of defects, the problem was not attended to by carrying out patching work and the pavement was allowed to deteriorate.

Last but not the least, a poor law & order situation in the site area disturbed construction work, workmanship & quality control; (Photograph 11).

Damage Control / Remedial Measures

The 16 kilometer long section of N-20 was divided into three (3) sub-sections of approximately equal length for grant of rehabilitation works to three contractors.

Since the substantial completion certificates were not issued by NHA as yet, therefore, the contractors were carrying out some repair work when the team visited the site as shown in photographs 12-14.

During the course of meeting amongst the team, NHA officials and the contractors it was agreed upon that the contractors will carry out "BITMAC - a rather refined surface treatment" work at their own cost because the same was found

performing satisfactorily and the contractors will finish the work by 31st March, 2009 as per the undertaking given by them; Annexure-I. The photographs 15-16 show Bitmac work on some sections of highway. The contractors will also carry out repair of shoulders to required standards.

NHA should ensure timely completion of quality work through the contractors without loss to the national exchequer. NHA may also look into the possibility of sealing of (well compacted & sound) shoulders to expand the carriageway width for achieving the main objective of a good quality road and for the safe movement of large number of heavy traffic that has been diverted to N-20 because of closure of Punjnad Bridge. It is emphasized that if the shoulders are not sealed and proper embankment slope is not done it may again cause serious problems.

The need for effective and efficient supervision cannot be over-emphasized, as presently no effective mechanism is available with NHA to implement quality control for maintenance works, unlike the large projects where services of consultants are hired to ensure quality.

It is also recommended that suitable administrative action may be taken by NHA under intimation to this Ministry against the design / supervision staff of NHA and contractors working on this project.

1 INTRODUCTION

This 42 kilometer long link road connecting N-5 and N-55 from Chowk Mari to Dera More (Kashmore) was taken over by National Highway Authority (NHA) from C&W Department, Govt. of Sindh and it was designated as N-20. The alignment is shown at Annexure-II. The process of federalizing this road is under progress.

National Highway Authority decided to rehabilitate 16 km section and the rest was to be repaired with DST. Therefore (03) three emergency contracts were awarded for rehabilitation in Phase-I from Chowk Mari to Mureed Shakh (KM-26+000 to KM 42+000) as given below. The details of award of contracts may be seen at Annexure-III. The financial details of the contracts awarded may be seen at Annexure-IX.

Contract No	Chainage (KM)	Date of Award	Date of Completion	Defect Liability Period
EM-PS-08-50-06	26+000-31+000	23.06.2008	23.12.2008	23.06.2009
EM-PS-08-50-07	31+000-36+500	12.06.2008	25.11.2008	11.06.2009
EM-PS-08-50-08	36+500-42+000	19.06.2008	19.12.2008	17.06.2009

According to NHA, the work at site was started immediately and 20 cm thick Water Bound Macadam (WBM) was laid in two layers as per specifications and Triple Surface Treatment (TST) was carried out on WBM layer. The typical cross-section may be seen at Annexure-IV. The specifications are placed at Annexure-V.

It was also reported by NHA that during the finishing stage of the work, heavy and continuous unprecedented rainfall occurred during the month of mid January, 2009 on 4 to 5 locations and freshly laid TST was badly damaged.

Failure of 16 km section soon after rehabilitation was reported at various forums and consequently an inquiry committee was constituted by the Ministry of Communications to ascertain the causes of pre-mature failure.

1.1 Composition of Team

The committee comprising of M/o Communications officers and NTRC engineers visited the affected highway (N-20) and carried out field surveys / tests, collected samples for laboratory testing and gathered all the relevant data / information from field offices.

2 FIELD SURVEY, SAMPLING & DATA COLLECTION

The team with the assistance of NHA officials carried out the pavement reconnaissance survey & field sampling of sections of N-20 between Chowk Mari and Mureed Shakh to determine the type, severity, and extent of distresses and their causes. The team made the visit and thoroughly inspected the road pavement, drainage & shoulder conditions and took samples for laboratory testing. The team also took photographs of the affected sections. Surface treatment samples (TST) were extracted from the distressed sections. Three pits were dug to take aggregate layer samples for evaluating their properties in NTRC laboratories. The pits also enabled observation of the underlying layer of Water Bound Macadam, like thickness, shape, packing arrangement of aggregates etc. These samples were used to determine field moisture content, gradation and other physical properties. The pits were properly refilled with suitable material and compacted. Photographs 17-19 show field sampling works.

Three days traffic count in May, 2008 before the rehabilitation work (Annexure-VI), December, 2008 during rehabilitation work (Annexure-VII) and rainfall data (Annexure-VIII) were also provided by NHA.

3 DESIGN & CONSTRUCTION SPECIFICATIONS

National Highway Authority was requested to provide the requisite design and construction specifications which are given at Annexure-V and briefly discussed below:

3.1 Cross-Section of the Highway

According to design specifications, NHA decided to rehabilitate a 16 kilometer portion of the highway by laying a Water Bound Macadam layer over the existing old road and sealing the WBM with a Triple Surface Treatment. The damaged sections of remaining 26 kilometers portion were repaired with a Double Surface Treatment wherever required. A typical cross-section is explained in the following table:

Table 2.1 Pavement Thickness

Layer Type	Thickness (cm)
Triple Surface Treatment (TST)	*
Water Bound Macadam (WBM)	20
Aggregate Base Course on Shoulders	20

*Around 20 - 30 mm, as such no thickness is specified in design codes.

3.2 Discussion on Design

A brief discussion on design is presented below.

3.2.1 Triple Surface Treatment:

Triple Surface Treatment is not a structural element hence it does not provide any strength to road. In fact the objective of surface treatment is to provide a comprehensive seal to prevent the ingress of water into the road and an acceptable riding quality surface by means of a stable mosaic of chippings securely attached to the road base. This treatment is achieved by spraying the correct amount of bitumen onto the road base followed by the appropriate amount of the correct size of chippings in three layers.

A Triple Surface treatment was proposed for the rehabilitation works. The 80-100 pen bitumen was specified for spraying the pavement surface. Different sizes of aggregates / chippings were used for triple surface treatment so as to provide an impervious dense surface.

Table 2.2.1 **Specification of Bitumen & Spray Rate, Aggregates**

Surface Treatment		Aggregate		Bituminous Material	
Type	Application	Size No	Quantity Kg / Sq. M	Quantity Liters / Sq. M	Type
Triple	First	1	24.0	1.90	(a)
				2.14	(b)
	Second	2	12.5	1.19	(a)
				1.63	(b)
	Third	3	6.5	0.68	(c)

Source: NHA Specifications

Bituminous material types are (a) asphalt cement, (b) cut-back or emulsified and (c) asphalt cement, cut back and emulsified.

3.2.2 Aggregate Gradation of Water Bound Macadam Layer (WBM)

It was informed that 20 cm water bound Macadam - Class-B was necessitated for leveling of surface rather than by deflection survey (structural requirement) or drainage requirements. The 20 cm water bound macadam 'base course' was provided over the existing TST road after making furrows in the old road surface (but 50 mm x 50 mm furrows in the existing surface can not be independently verified which is required under specifications).

Table 3.2.2 show aggregate gradation required as per specification in the WBM layer.

Table 3.2.2 Aggregate Gradation-Specification

Sieve Designation		Percentage Passing by Weight
mm	Inch	Class B
76	(3")	100
63.5	(2.1/2")	90 - 100
50	(2")	25 - 75
37.5	(1.1/2")	0 - 15
25	(1")	-
19	(3/4")	0 - 5

Fine Aggregates (Filler Material or Screenings)

Sieve Designation		Percentage Passing by Weight
mm	Inch	Class B
9.5	3/8	100
4.35	No. 4	85 - 100
0.15	No. 100	10 - 30

Source: NHA Specifications

4 FIELD & LABORATORY OBSERVATIONS

1. Except for small stretches in section two, the entire highway section of 16 kilometers has been affected. The TST layer has been stripped off from the WBM. Photographs 1- 5 show the picture.

2. The stripped off areas do not show evidence of "blacking up" which would be present if chippings had been lost through a wet weather failure soon after laying, in fact there appears to be remarkably little binder remaining on the old road surface, (Photographs 1 - 5).

3. Triple Surface Treatment samples were found to be sound where proper bonding and embedment was achieved as evident from photographs 4-6.

4. Workmanship is also one of the most important factors in producing good quality TST surface. It is evident from the condition of the 2nd section which has many stretches of intact surface and experienced the same environment as sections one and three as shown in photograph 6.

5. Improper design width of 5.5 meter and that too without sound/treated shoulders made the trucks share central part of the roadway thereby making it the most vulnerable to stripping. Photographs 4-6 & 22 depict the picture.

6. The depth of Water Bound Macadam layer was found to be as per specification at all the three pits dug for sample collection.

7. Surface depressions / removal of aggregate from Water Bound Macadam layer was observed at several locations particularly at mid point of the road as may be seen in photographs 4-5 & 22.

8. Difference in elevation between traffic lane and shoulder was seen at few locations due to cracking / breaking of the edge both on old and new highway sections; photograph 20.

9. Rolling by Steel-wheeled rollers was observed during repair works being carried out at the site and it was found that they were not following the transverse profile of the highway, leaving many spots un-compacted and vulnerable to stripping. Pneumatic tired, multi-wheeled rollers should have been recommended for the rolling/compaction of such uneven surface, as these rollers will best follow the contours of the road.

10. Chippings larger than 19 mm were on higher side and caused problem of adhesion and embedment into WBM layer.

11. It was also observed in the field survey that during the course of repair work many 'dry spots' on the surface were preventing proper bonding and embedment of TST layer (Photograph - 21).

12. Repair work was carried out by using same type of aggregate as required for WBM, in fact the choice of aggregates must conform the type & severity of damage as shown in photographs 14 & 22.

13. The highway runs on a 1-2 meters high embankment all along its route, except for certain stretches, thereby providing it protection against water level (capillary) and water flow (drainage). Photographs 6-9 & 23 show the picture.

14. Many trucks were found damaged in the 16 kilometer section as compared to none in the remaining section of the highway as shown in the photograph 9.

15. At many locations, shoulder and drainage conditions were poor as shown in photographs 3, 5, 7 & 8.

16. Affected areas were not immediately patched / rectified which accelerated deterioration of the highway as evident from photographs 2, 4-6.

17. N-20 provides a vital link between N-5 and N-55 as any other such link, both upstream and downstream of Guddu Barrage is more than 100 km away. At present due to closure of Panjnad Headworks, it has attracted more traffic as shown in photographs 24-25.

18. The Guddu Barrage Bridge is being subjected to very high truck loads and it may get damaged, also long vehicles make many narrows to enter the bridge as shown in photograph 26.

5 LABORATORY TESTING & DISCUSSION

The laboratory testing as per AASHTO, ASTM and NHA specifications included:

1. Determination of aggregate gradation of Water Bound Macadam layer.
2. Determination of aggregate gradation of the Triple Surface Treatment layer.
3. Determination of strength of Water Bound Macadam layer through Los Angeles Abrasion Test, Moisture Content (also of adjacent ground), Percent Fines, and Atterberg Limits.

5.1 Gradation of Water Bound Macadam (WBM)

The combination of a tightly keyed course aggregate with the bond produced by stone and stone dust creates a base course and is equally as good as any untreated base but if it is laid in accordance to gradation envelop given in specification. The gradation of WBM layer of three samples showed deviation from the values given in the specifications and were towards finer side.

On the other hand, there is little difference between the gradation of the material taken from the stockpile and laboratory results. This means that during the collection of samples and digging of pits, a certain quantity of coarse material was broken thereby increasing the finer material. The results are given in the Table 5.1.

Table – 5.1 Gradation of Water Bound Macadam (WBM)

Sieve Designation		Percentage Passing by Weight	Results of Lab Testing			
mm	Inch	Class B (required)	Section-I	Section-II	Section-III	Stockpile (Sample 1)
76	(3")	100	96.47	97.07	100	100
63.5	(2.1/2")	90 – 100	93.93	93.60	96.27	94.97
50	(2")	25 – 75	76.29	83.71	87.23	74.78
37.5	(1.1/2")	0 – 15	52.84	58.44	61.98	27.08
25	(1")	-	-	-	-	-
19	(3/4")	0 – 5	9.79	10.92	17.70	2.02

Fine Aggregates (Filler Material or Screenings)

Sieve Designation		Percentage Passing by Weight	Results of Lab Testing			
mm	Inch	Class B (required)	Section-I	Section-II	Section-III	Stockpile (Sample1)
9.5	3/8	100	100	100	100	100
4.35	No. 4	85 - 100	73	72	72	83
0.15	No. 100	10 - 30	7	8	10	34

Source: NHA Specifications

5.2 Gradation of Aggregate of TST Layer

The size of chippings has a great affect on the bonding and embedment into the WBM layer. The size of chippings also determines the riding quality.

After extraction of bitumen, the chippings were graded through sieve analysis. The laboratory results are shown in Table - 5.2. When a comparison is made between the design specification and site samples taken for laboratory testing; a high percentage (more than 30%) of larger than specified aggregates in the TST layer was found.

Since chippings supply most of the stability in TST layer, it must have a certain degree of packing which prevents their breakdown and / or stripping under traffic loadings.

Table - 5.2 Gradation of Aggregates of TST Layer (% Passing)

Sieve No. / mm	Passing (%)	
	Sample 1	Sample 2
3/4" (19mm)	62.29	68.43
½" (12.5mm)	39.38	50.97
3/8" (9.5mm)	31.36	39.90
¼" (6.3mm)	20.92	31.88
#4 (4.75mm)	17.29	28.21

5.3 Loss Angeles Abrasion Value

Los Angeles Abrasion test was conducted on four samples, including one taken from stockpile, to determine the toughness of the crushed rock used in WBM

layer. The test was conducted as per ASTM standard C-535. The LA values of all the samples tested ranged between 27 - 33% as against the maximum allowable value of 45%.Thereby proving the suitability of coarse material for WBM layer.

5.4 Atterberg Limits Test

The Atterberg limits (plasticity index) provides a good measure of the range of moisture content over which the fine material in WBM can behave, i.e it is prone to be deformed under stress but maintaining its form when unstressed.

Material passing No. 40 sieve was separated from three samples and Atterberg limits test were run. The Plasticity Index values ranged from 13 - 24, which were well above the specification limit of not more than six (6). Therefore, the samples contained a high percentage of undesirable clay material.

5.5 Moisture Content of WBM Layer and Adjacent Ground

To determine moisture content of the WBM, samples from the pits were secured and tightly wrapped to prevent moisture loss. For comparison a sample from adjacent ground near to the shoulder was also taken. The exercise was carried out to determine the drain-ability of the WBM layer.

The fine aggregates containing clay were found to be having a moisture content of 6 - 7% as against the adjacent ground which had a moisture content of 3%. Therefore, indicating a moisture retention ability of the pavement which is not suitable for WBM layer containing significant amounts of clay.

6 FINDINGS OF THE COMMITTEE

Signs of failure on the Chowk Mari - Mureed Shakh section of National Highway N-20 started appearing soon after construction of the highway sections and their opening to traffic. There were high severity stripping throughout the length of the sections and were spread over the entire rehabilitated portion with exception of few stretches in Section-II. It was clear that once the stripping started, the traffic loading and weather caused the premature failure of highway.

6.1 Mechanism & Causes:

Triple surface treated layers generally exhibit separation/removal from underlying layers primarily due to improper bonding and embedment; the process can be quickened by the traffic and rain/water. The TST surfacing at the Chowk Mari - Murred Shakh highway sections of N-20 allowed scrubbing and stripping because of inadequate bonding and embedment. The use of large size chippings, high plasticity index of WBM, fast moving traffic, heavy multiaxle trucks and surface water that entered the pavement caused severe stripping. As a result the TST layer lost all its qualities and the underlying layer of Water Bound Macadam was exposed and also started deteriorating.

The problem was further aggravated by not immediately carrying out the patching to contain the deterioration process.

6.2 Construction Planning:

Proper planning and scheduling of work was not done. The work was scheduled to begin near the Mon Soon season (23-06-2008) and finish by the winter rainy season (23-12-2008).

6.3 Design:

If reconstruction / maintenance of 16 km portion was needed, then it should have been properly designed and implemented rather than simply providing a 20cm Water Bound Macadam Course and a TST layer.

Similarly moisture profiling of pavement layers should have been done prior to execution work.

6.4 Material Specification:

The material characteristics show deviation from specifications. Chippings which supply most of the stability in TST must have a certain degree of packing but these were found outside the specified gradation limits (30% larger than the maximum allowable size). That weakened bonding and adhesion as well as accelerated their breakdown and stripping under traffic loadings. In the WBM layer high clay content affected bonding between TST layer and WBM layer as well as the moisture levels.

6.4.1 Selection of Chippings

It should have been observed whether the specified chipping size was providing satisfactory results in the field or it needs to be changed. At least a variation should have been tried in one of the three sections. Also, it is noteworthy that freshly crushed aggregates are more prone to stripping.

6.5 Quality Control Procedures:

The primary objective of the Quality-Control Measures is to control the contractor's treatment of the construction material during construction and not after that. Despite the availability of numerous tests and specifications, considerable engineering judgment was lacking.

A simple observation of TST layer would have revealed that significant portions are not securely bonded and chippings are not adequately embedded into the underlying layer. The same could have been rectified quickly before allowing further construction. Similarly the size of chippings could have been easily determined and corrected to avoid pre-mature failure.

The aspect of ignoring the quality control on the part of the supervisors and contractors is also evident from the brief / statement and information / correspondence provided by NHA (Annex-X).

6.6 Drainage:

Before the reconstruction of the highway pavement, the first step should have been to design and / or rectify any faults in the drainage system. This work should have preferably been completed before the asphalt laying and at least after one wet season has put the drainage system to the test. It is well known that one of the most common faults in the pavement is the accumulation of surface water in the road pavement.

6.7 Timely Remedial Measures Not Taken:

Soon after the construction and opening to traffic, the sections of newly rehabilitated National Highway N-20 showed signs of failure. The small initial 'blank spots' were not sealed immediately and more surfaces got stripped due to traffic and rain water.

Secondly, and more importantly, the construction should have been stopped and design specifications including drainage conditions should have been re-evaluated and rectified.

7 RECOMMENDATIONS

Highway fail for many reasons and it must be said that most causes of failure can be controlled by a proper designing, detailed planning, efficient execution and good quality assurance practice.

After detailed field visits, field / laboratory tests, analysis of data, interactions with NHA officials & technical personnel and contractors; the committee proposes following measures.

7.1 Short-Term

- The 16 kilometer long section of N-20 was divided into three (3) subsections of approximately equal length for grant of rehabilitation works to three contractors. Since the substantial completion certificates were not issued by NHA as yet, therefore, the contractors were carrying out some repair work.

- During the course of meeting amongst the team, NHA officials and contractors it was agreed upon that the contractors will carry out "BITMAC – a rather refined surface treatment" work at their own cost because the same was found performing satisfactorily and the contractors will finish the work by 31st March, 2009 as per the undertaking given by them; Annexure-I. The contractors will also carry out repair of shoulders to required standard.

- NHA should ensure timely completion of quality work through the contractors without loss to the national exchequer. NHA may also look into the possibility of sealing of (well compacted & sound) shoulders to expand the carriageway width for achieving the main objective of a good quality road and for the safe movement of large number of heavy traffic that has been diverted to N-20 because of closure of Punjnad Bridge. It is emphasized that if the shoulders are not sealed and proper embankment slope is not done it may again cause serious problems.

- It is also suggested that the remaining 26 km section of N-20 shall not be disturbed except minor (DST) repairs.

- National Highway Authority shall develop SOP to ensure quality while carrying out the maintenance work.

- A suitable administrative action may be taken by NHA under intimation to this Ministry against the design / supervision staff and contractors working on this project.

- Monthly progress / monitoring report may be furnished to this Ministry by GM (Inspection) to ensure timely completion of quality work and satisfactory operation during the defect liability period.

7.2 Long Term

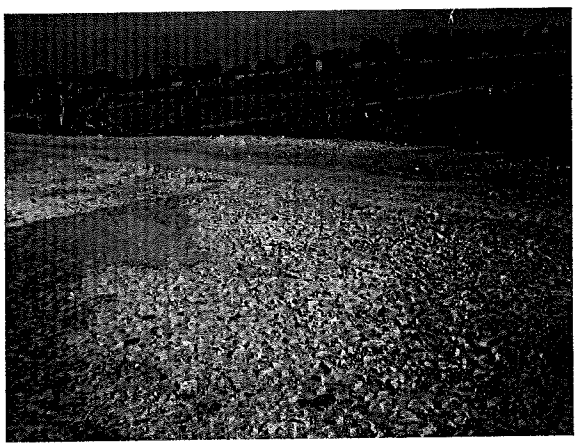
- A contingency plan must form an integral part of construction, rehabilitation and repair work by identifying possible problems and a plan for them.

- Pneumatic tyred, multi-wheeled rollers are to be recommended for the rolling / compaction for surface dressings, as these rollers will best follow the contours of the road and duplicate the action of traffic.

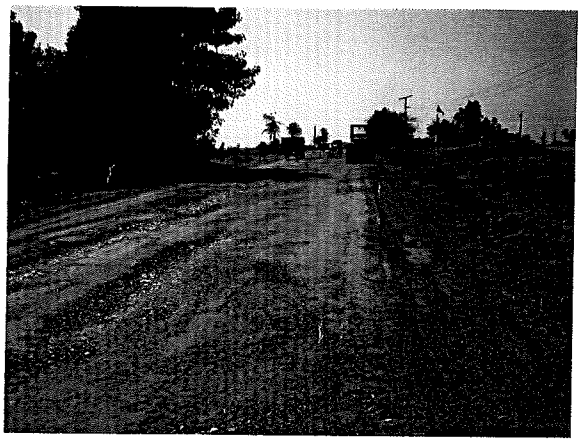
- Since the highway provides a vital link between N-5 & N-55, therefore a detailed feasibility study be carried out to strengthen this link. In the meantime, no rehabilitation work be carried out in the 26 km section, which is performing quite satisfactorily, except for minor repair work like sealing / (DST) etc.

- A bridge over Indus up or down the existing Guddu Barrage is essential to save the Barrage from the present day high axle & gross loadings which use it to cross over Indus.

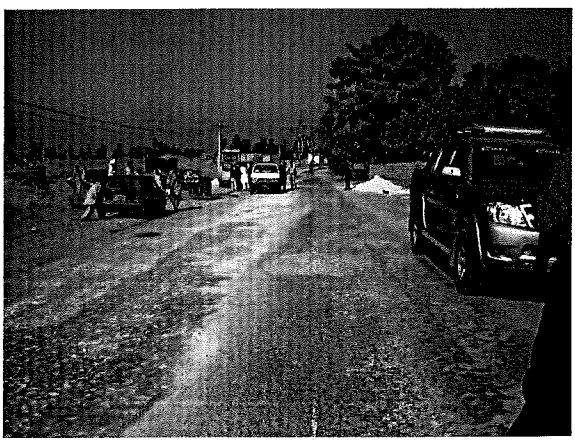
Photograph – 1 A completely stripped off section of N-20



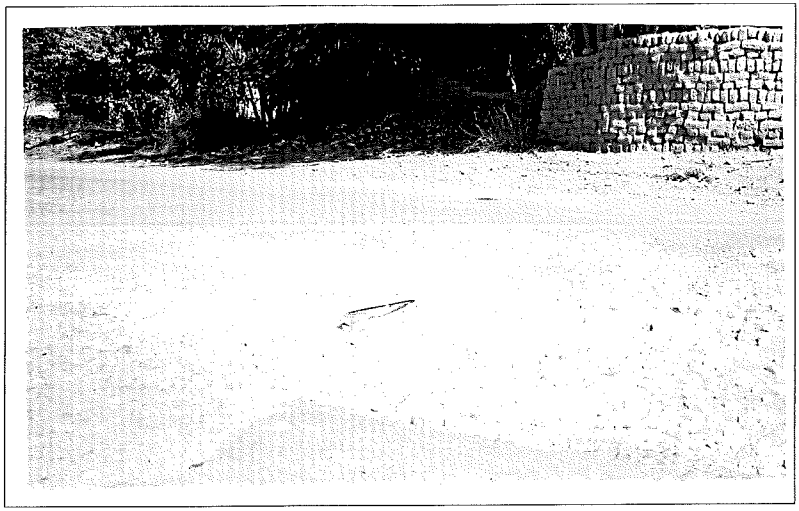
Photograph – 2 Another very severely stripped off section.



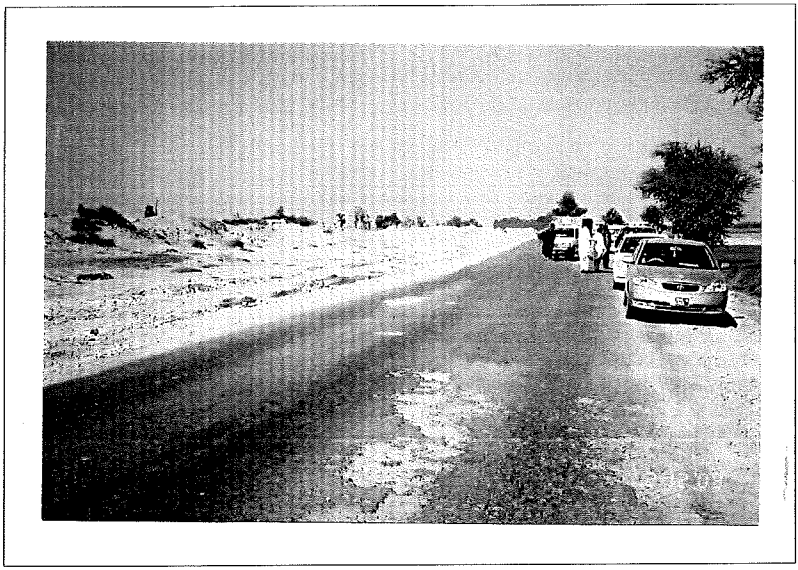
Photograph – 3 No sign of TST layer. Poor drainage conditions are also visible.



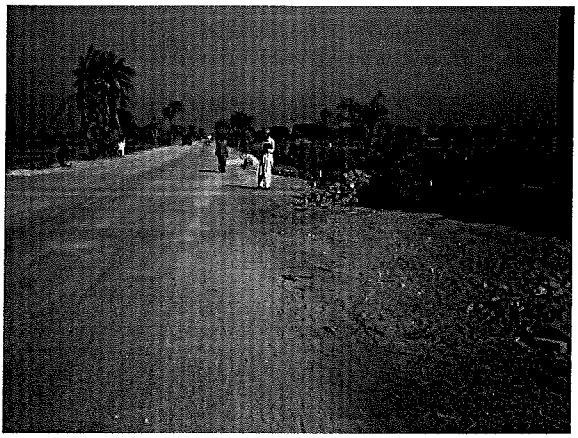
Photograph – 4 Central path affected by traffic and repair work with same size of aggregates as used in WBM layer is being carried out.



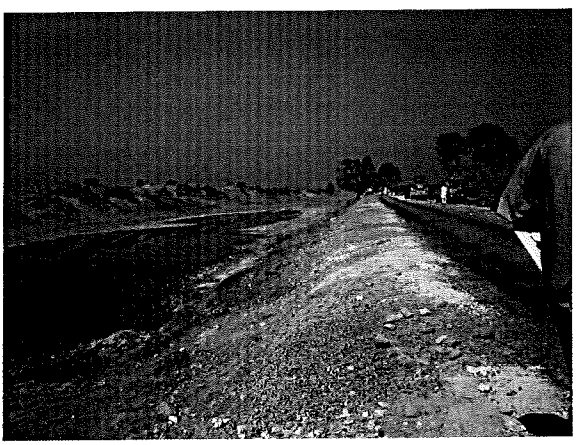
Photograph - 5 A severely damaged section, TST layer along with removal and settlement of WBM layer is visible.



Photograph - 6 A relatively less damaged section. In time repairs can save more damage.

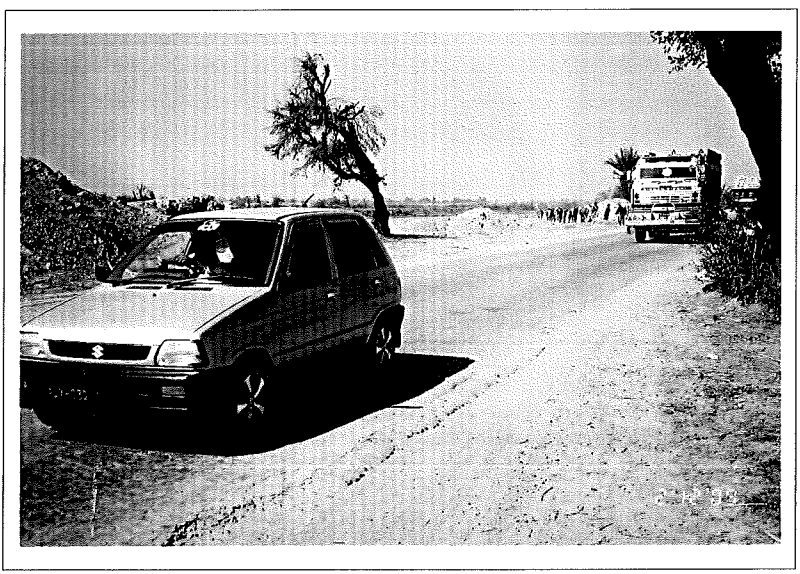


Photograph - 7 A recently repaired section but improper camber and raised shoulders are visible.

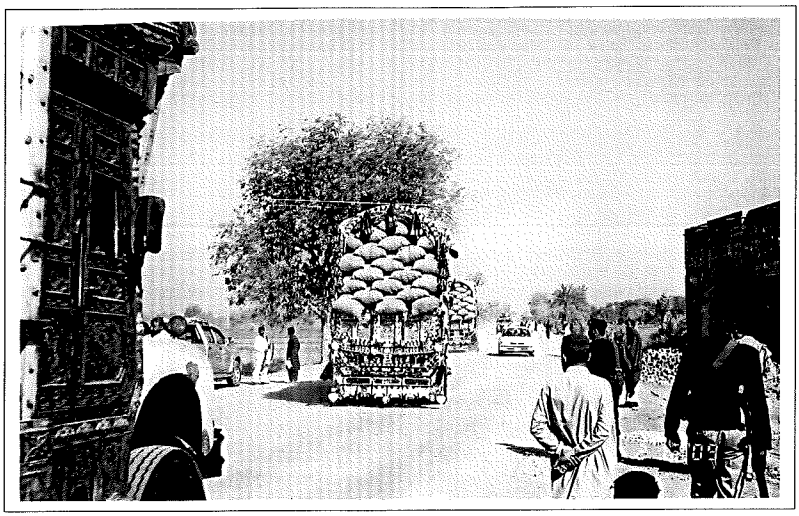


Photograph - 8 Poor shoulder condition which would affect drainage.

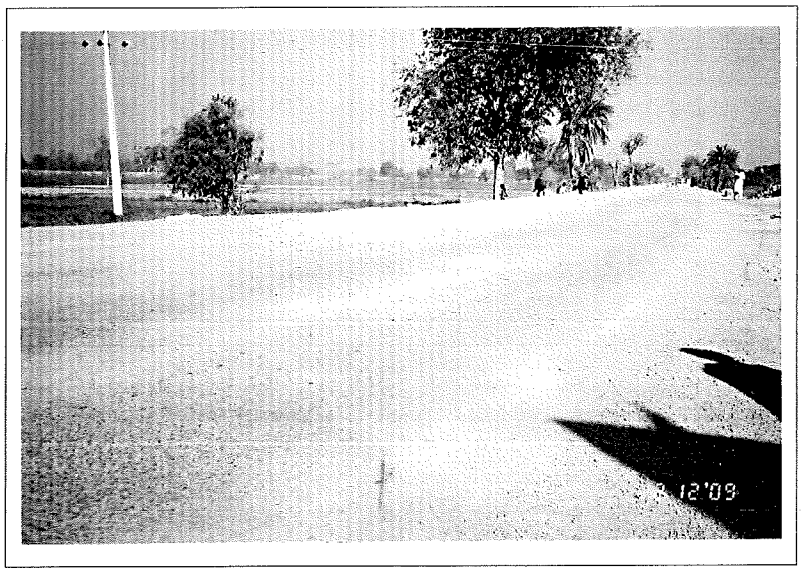
Photograph – 9 A truck stuck up in 'soft' shoulder in the damaged section of N-20



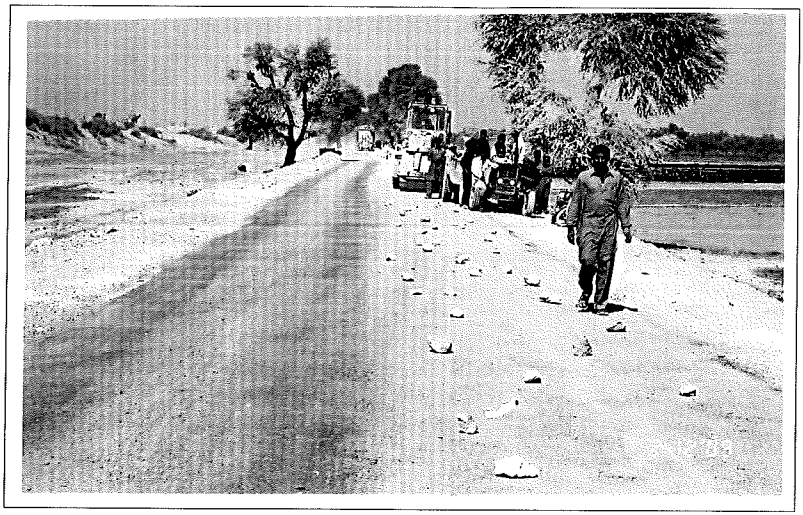
Photograph – 10 A 'good' section of the old road (26 km) improved with DST.



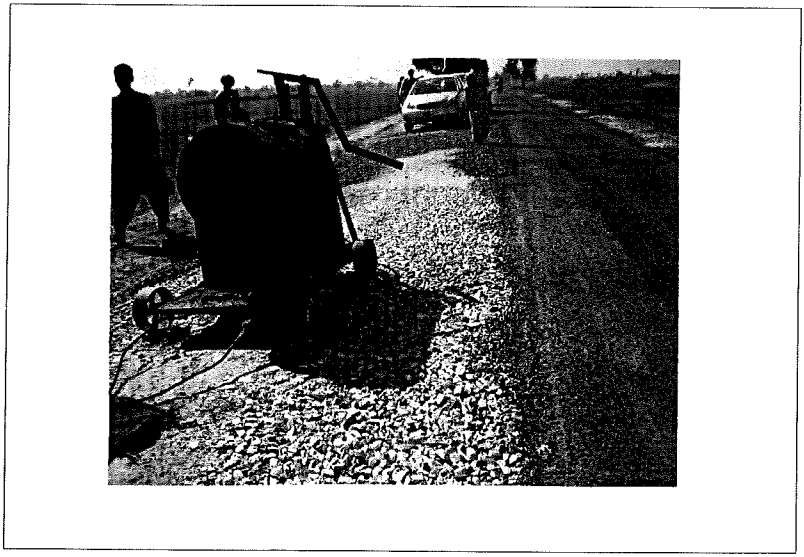
Photograph – 11 Heavily commercial traffic as well as police personnel are visible in this photograph.



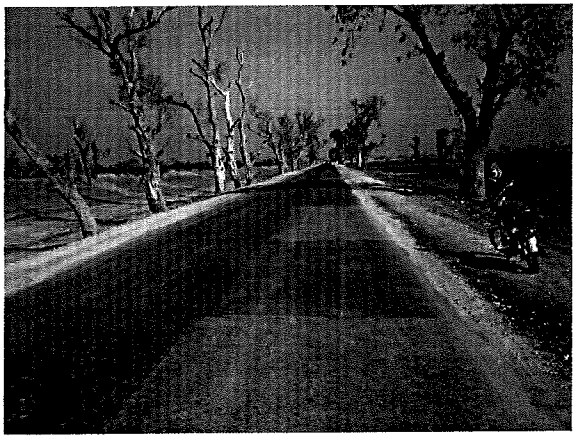
Photograph – 12 A newly repaired section of N-20



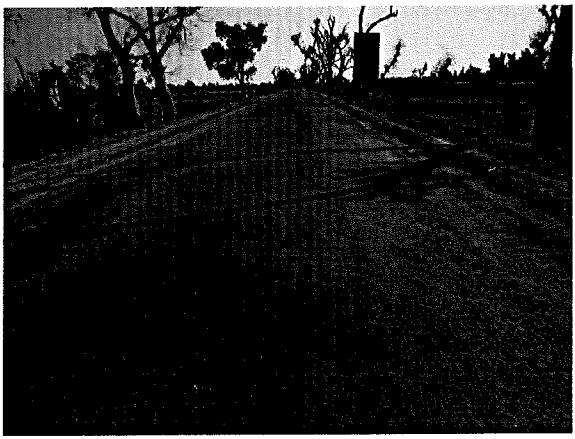
Photograph – 13 Repair work on a section of N-20 is under progress while one side is open to traffic.



Photograph – 14 Repair work at the failed section is in progress (Aggregates are being spread to fill the depressions in the WBM layer, later TST will be carried out



Photograph – 15 A section repaired with 'Bitmac'.

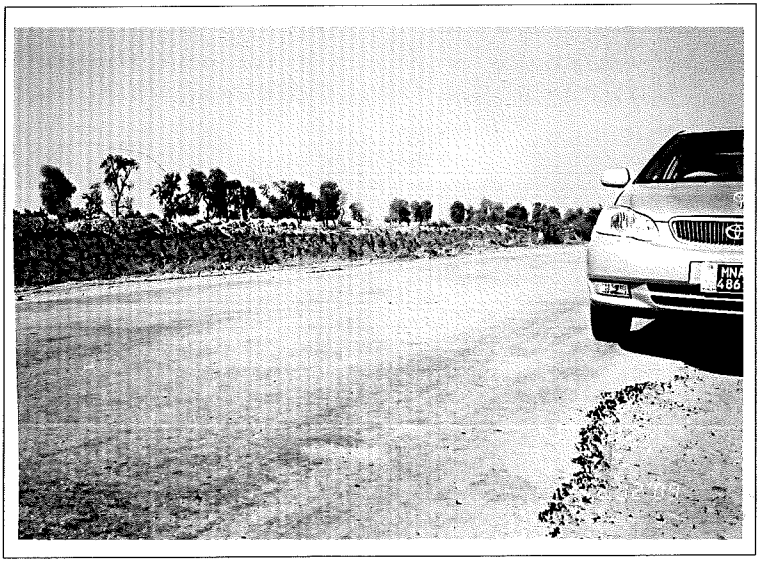


Photograph – 16 Another section of N-20 repaired with Bitmac.

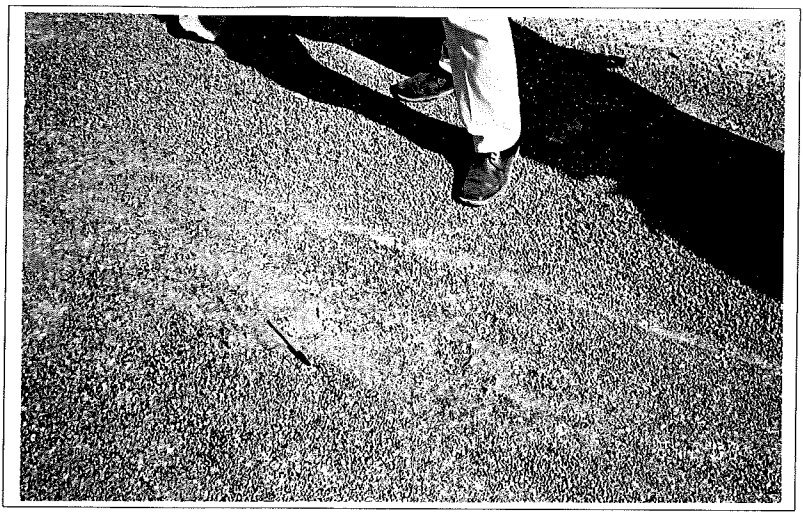
Photograph – 17 Collection of Triple Surface Treatment Sample from pit.

Photograph – 18 Collection of Water Bound Macadam layer Sample from pit.

Photograph - 19 Collection of Sample to determine Moisture content of Water Bound Macadam layer



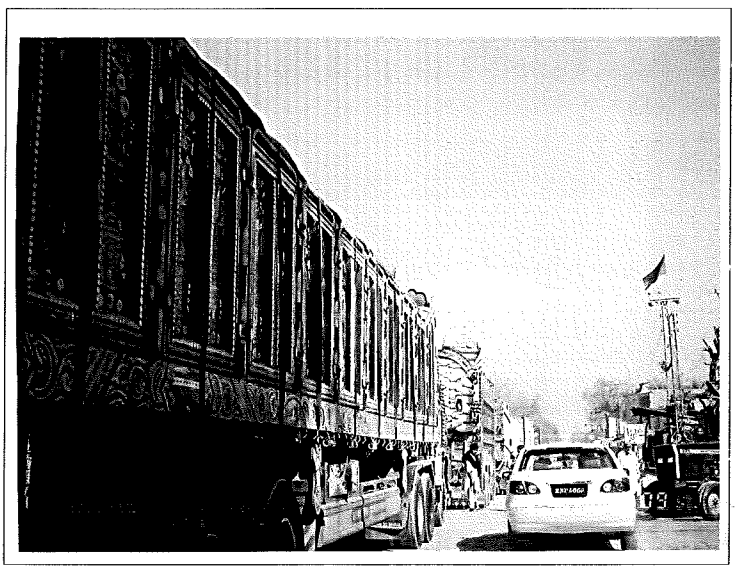
Photograph- 20 A relatively good section of old highway however broken edge requires immediate repairs



Photograph - 21 Repair work in progress but still proper bonding & embedment is not achieved

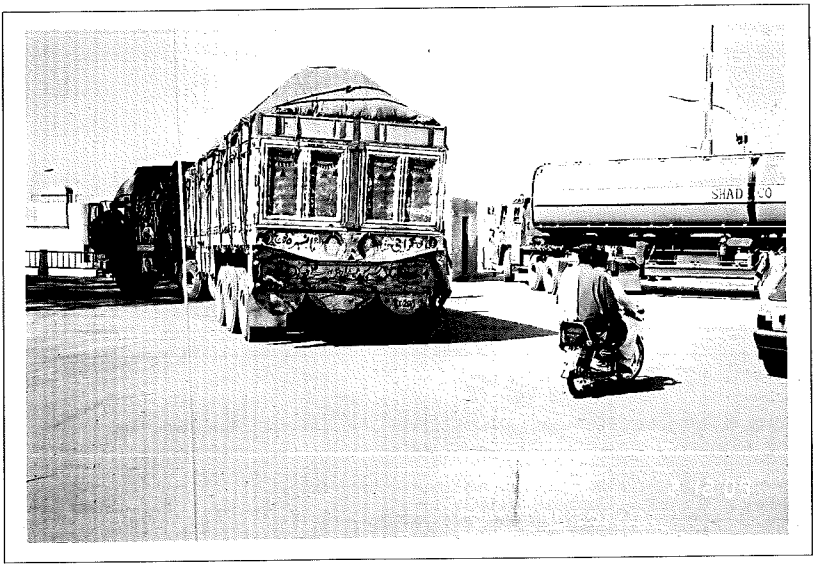
Photograph - 22 Repair work carried out with same size of aggregates for WBM layer.

Photograph – 23 High embankment



Photograph–24 A large queue of Trucks, stuck up in the town of Mureed Shakh

Photograph – 25 A large queue of Trucks stuck up to cross the Guddu Barrage



Photograph-26 Tr ucks have to make several to and fro movements to enter the Bridge

Annexure-I

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عزت مآب جناب چیئرمین

انکوائری کمیٹی برائے **N-20** لنک روڈ

عنوان: تفصیل بابت شکایت **N-20** لنک روڈ

جناب عالیٰ!

مؤدبانہ گذارش ہے کہ **N-20** لنک روڈ پر تین عدد ایمرجنسی کنٹریکٹ جون **2008**ء میں مندرجہ ذیل تفصیل کے مطابق شروع کیے گئے۔

Contract No	Chainage (KM)	Date of Award	Date of Completion	Defect Liability Period
EM-PS-08-50-06	26+000-31+000	23.06.2008	23.12.2008	23.06.2009
EM-PS-08-50-07	31+000-36+500	12.06.2008	12.12.2008	12.06.2009
EM-PS-08-50-08	36+500-42+000	19.06.2008	19.12.2008	19.06.2009

1) پرانے روڈ کی اوسط چوڑائی **5.5** میٹر تھی۔ اور تمام روڈ کی حالت انتہائی ابتر تھی۔ ٹریفک کا گزرنا محال تھا اس لئے مندرجہ بالا تینوں کنٹریکٹ کے ٹینڈر لگائے گئے اور ان میں صرف 20cm بیس کورس (WBM) اور TST ایمرجنسی طور پر شامل کی گئی۔

2) محکمہ کی طرف سے جون 2008ء کے وسط میں Commencement Letter ملنے کے فوراً بعد کام شروع کر دیا گیا اور (WBM) کو دو تہوں میں Specification کے مطابق مکمل کیا گیا۔ اور مکمل Compaction کی گئی۔ جو کہ موقع پر چیک بھی کی جا سکتی ہے۔ ہمارے تمام کام کو محکمہ کی فیلڈ لیبارٹری نے بارہا چیک کیا اور تمام مطلعقہ افسران کے زیر نگرانی کام کیا گیا۔

3) بدقسمتی سے جب کام مکمل ہونے کے قریب تھا تو غیر متوقع طور پر نومبر سے وسط جنوری تک کم از کم پانچ چھ دفعہ لگاتار طوفانی بارشیں ہوئیں جن کا دورانیہ لگاتار **96** گھنٹے تک بھی رہا جس کے بعد زبردست دھند اور ابر آلود موسم بھی کئی ہفتوں تک رہا۔ جسکی وجہ سے تازہ کی گئی (TST) سرفیسنگ کو کافی نقصان ہوا۔ جسکی مندرجہ ذیل اہم وجاہات ہیں:۔

☆ تازہ (TST) سرفیسنگ کو نسبتاً زیادہ گرم موسم اور مکمل وقت نہ مل سکا۔

☆ زبردست لگاتار بارشیں، دھند اور ابر آلود موسم کا ہونا۔ جنکو قریبی اضلاع میں حکومت نے آفت زدہ ایریا قرار دیا ہے۔

☆ N-20 لنک روڈ کے ساتھ دونوں اطراف زیر زمین پانی کی بلند سطح (High Water Table)

☆ N-55 اور N-5 کے سندھ ریجن کے حصوں کی بارش کے دوران مکمل بربادی کی وجہ سے تمام بھاری ٹریفک کا N-20 لنک روڈ سے گزرنا۔

☆ اس وقت ہیڈ پنجند کی سلیب ٹوٹی ہوئی ہے اور ٹریفک بند ہے۔ لہٰذا تمام میٹریل سخی سرور سے ظاہر پیر، اباڑو، صادق آباد، رحیم یار خان اور سندھ کے علاقوں کو اسی روڈ سے گذر رہا ہے۔ جس کی وجہ سے اس روڈ پر لوڈ اچانک بڑھ گیا۔ جو کہ روڈ کے موجودہ Structure کیلئے انتہائی نقصان دہ ہے۔

☆ محترمہ بے نظیر بھٹو شہید کی برسی کے موقع پر تمام بڑے قافلوں اور بھاری ٹریفک کا N-20 سے گزرنا۔

4) جناب اعلیٰ! لگاتار بارشوں اور اوورلوڈنگ ٹریفک کے گزرنے کی وجہ سے روڈ کا خراب ہونا ایک قدرتی آفت ہے جو کہ انسان کے بس سے باہر ہے۔ اور اسکی وجہ سے پورے پاکستان کے تمام صوبوں کے تازے بنے ہوئے روڈ اس سے کہیں زیادہ خراب ہوئے ہیں۔ البتہ ہم نے محکمہ کی ہدایت پر موسم کے ٹھیک ہوتے ہی فوراً Rectification شروع کر دی ہے۔ اور اس وقت تینوں Contracts پر کام جاری ہے جو تقریباً 31 مارچ تک مکمل ہو جائے گا۔

5) جناب اعلیٰ! بہ رضائے الٰہی ہمارا کافی نقصان ہوا ہے۔ اور ہمیں اپنی کمپنی کی ساکھ کی خاطر یہ ہماری ذمہ داری ہے۔ کہ ہم چلتے ہوئے کام کے کسی بھی نقص کو دور کریں اور Defect Liability Period تک اس کے پابند ہیں۔ اور ہم محکمہ سے گذارش کرتے ہیں کہ محکمہ ہمارے نقصانات کو مدنظر رکھتے ہوئے ہماری مدد بھی کرے۔

6) آخر میں NHA کو مؤدبانہ گذارش ہے کہ روڈ کی موجودہ چوڑائی جو کہ 5.5 میٹر ہے اور موجودہ ہیوی دورویہ ٹریفک کیلئے انتہائی غیر موزوں ہے۔ اور روڈ کے خراب ہونے کا خطرہ ہے۔ اس لئے NHA جلد از جلد اس کا تدارک کرے۔ تاکہ ہم کسی مزید نقصان سے بچ سکیں۔

شکریہ

M/S Mustafa Enterprises
EM-PS-08-50-06

M/S United Enger. Assoc.
EM-PS-08-50-07

M/S Abdul Sattar Bhayo
EM-PS-08-50-08

LINEAR PLAN (ROUTE MAP)

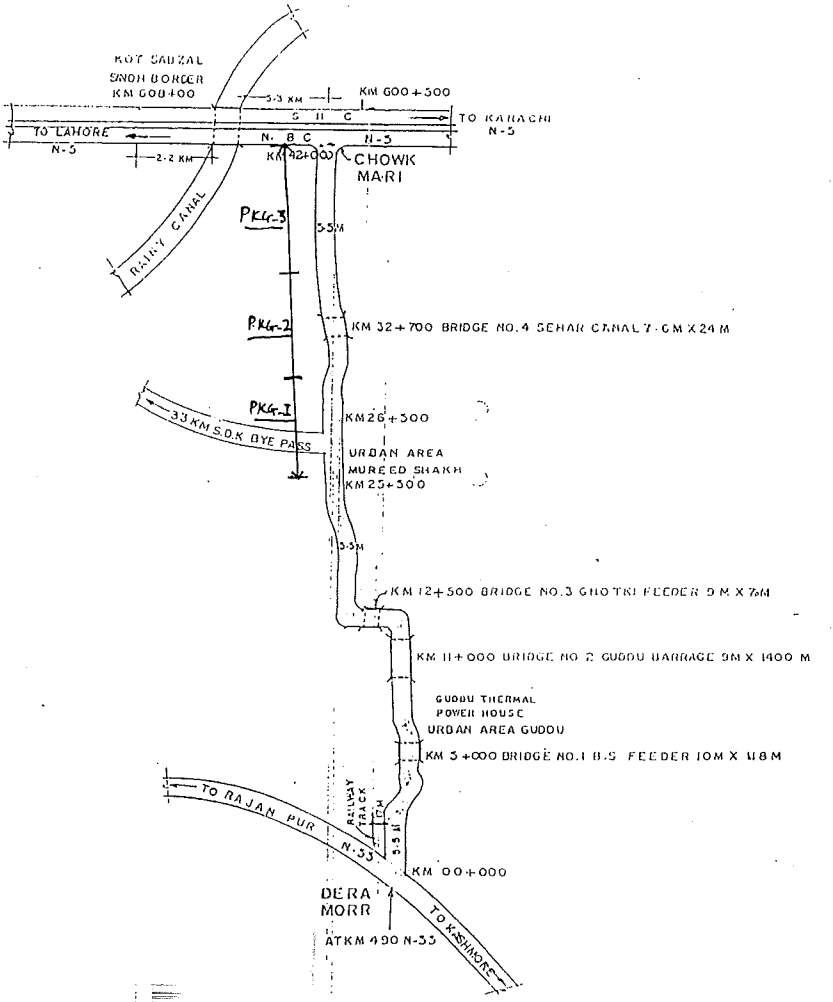
DERA MORR (N-55) TO CHOWK MORI (N-5)

LENGTH = KM 42 + 000 (AVG. WIDTH 5·50 M, AVG: BERMS 2 M)

BRIDGES = 7 NOS

CULVERTS = 23 NOS

LENGTH OF GUDDU BARRAGE = 1400 M



→ N-5

→ N-55

→ N-20 (42 KMS)

NATIONAL HIGHWAY AUTHORITY-NATIONAL HIGHWAY AUTHORITY

نیشنل ہائی وے اتھارٹی (ریجنل آفس پنجاب ساؤتھ)

ٹینڈر نوٹس

(1) این ایچ اے پنجاب ساؤتھ ریجن کے پری کوالیفائیڈ ٹھیکیداران جو مالی سال 08-2007ء کیلئے اندراجی فیس جمع کروا چکے ہوں سے پیریاڈک مینٹیننس (سٹرکچرل) تال پارہ اور ایمرجنسی مینٹیننس کنٹریکٹس کے ٹھیکہ جات کیلئے سربمہر ٹینڈرز مطلوب ہیں۔

(2) کنٹریکٹس کی تفصیل بمطابق ذیل ہے:

S#	Contract No.	Location	Route	Engineer's Estimate	Earnest Money
1.	EM-PS-08-50-06	Km 26-31	N-20	19,379,134/-	390,000
2.	EM-PS-08-50-07	Km 31-36+500	N-20	19,695,958/-	395,000
3.	EM-PS-08-50-08	Km 36+500-42+000	N-20	19,985,145/-	400,000
4.	PS-PS-08-30-08	Km 711+900-715+500	N-55	41,153,887/-	825,000
5.	TP-PS-07-80-03	Km 547/548	N-55	48,837,179/-	980,000
6.	EM-PS-07-50-11	Generator Rooms	-	258,574/-	5,500
7.	EM-PS-07-50-12	Km 666/667	N-55	1,203,718/-	25,000

(3) خواہشمند فرمیں/ٹھیکیداران این ایچ اے پنجاب ساؤتھ ریجن کے ساتھ پیشگی اہلیت کے ثبوت کے ہمراہ کمپنی پیڈ پر درخواستیں جمع کرانے پر اور ٹینڈر فیس مبلغ -/1000 روپے فی ٹینڈر بشکل ڈیمانڈ ڈرافٹ/پے آرڈر بحق جنرل منیجر (پنجاب ساؤتھ) نیشنل ہائی وے اتھارٹی، ملتان (ناقابل واپسی) کی ادائیگی پر بتاریخ 21 مئی 2008ء تک اوقات کار کے دوران دفتر ڈائریکٹر (مینٹیننس) سے ٹینڈر دستاویزات خرید سکتے ہیں۔

(4) ٹینڈر دستاویزات این ایچ اے ویب سائٹ www.nha.gov.pk سے ڈاؤن لوڈ کی جا سکتی ہیں اور اس صورت میں ٹینڈر فیس (ہر ایک ٹینڈر کیلئے) مندرجہ بالا فارم کے مطابق مع ثبوت پیشگی اہلیت برائے این ایچ اے پنجاب ساؤتھ ریجن، این ایچ اے میں ٹینڈر داخل کرتے وقت اس کے ساتھ لف کریں۔

(5) ٹینڈر دستاویزات خریدتے وقت زر امانت کیلئے کال ڈیپازٹ رسید (سی ڈی آر) بحق جنرل منیجر (پنجاب-ساؤتھ) این ایچ اے ملتان دکھانا ہوگی اور اصل سی ڈی آر ٹینڈر دستاویزات کے ساتھ منسلک کرنا ہوگی۔

(6) ٹینڈرز بتاریخ 23 مئی 2008ء کو 12:00 بجے دوپہر تک وصول کیے جائیں گے اور اسی روز 12:30 بجے بعد دوپہر این ایچ اے [illegible] خواہاں ٹھیکیداران یا ان کے مجاز نمائندگان کی موجودگی میں کھولے جائیں گے۔

(7) ٹھیکیداران باضابطہ دستخط شدہ اور مہر لگی ٹینڈر دستاویزات اصل ہمراہ ایک نقل علیحدہ علیحدہ لفافہ جس پر اصل اور نقل کی واضح نشاندہی کی گئی ہو میں جمع کرائیں گے۔ اگر ٹینڈر دہندگان مذکورہ بالا طریقہ کے مطابق اپنے ٹینڈر جمع کروانے میں ناکام ہوتے ہیں تو یہ non-responsive خیال کئے جائیں گے۔

PID(L) 1528

(8) نیشنل ہائی وے اتھارٹی کو اختیار ہے کہ بلا اظہار وجوہ کسی ایک یا تمام ٹینڈرز کو مسترد کر دے۔

NHA

ڈپٹی ڈائریکٹر/جنرل منیجر (پنجاب-ساؤتھ)
نیشنل ہائی وے اتھارٹی، شیر شاہ روڈ، گارڈن ٹاؤن، ملتان۔
فون نمبر: 061-6538579 فیکس نمبر: 061-6537902

NATIONAL HIGHWAY AUTHORITY-NATIONAL HIGHWAY AUTHORITY

خبریں 6-5-08

24. Competent Authority approved estimate for Repairing, Widening and Reconditioning of Road linking N-5 with N-55 from Km 26 to 31 (N-20) vide Para-21/ante. Tenders were forwarded to Director General (PID), Lahore. Tender Notice appeared in the daily "Khabrian" on 06.5.2008 **(Annex-A)**. Members of tender opening and evaluation committee were informed through letter No. 5(70)Dir(Maint)/(P-S)/NHA/2007/2307 dated 12.5.2008 **(Annex-B)**.

25. Accordingly, on the request of prospective firms, bid documents were issued to the interested firms who were prequalified in the respective category of maintenance. Subsequently, as per bid opening schedule, bids were opened by the designated committee in the presence of contractors or their representatives who chose to attend **(Annex-C)**. Bid opening/evaluation committee comprises of:

a.	Mr. Muhammad Bashir General Manager (Punjab-South)	Chairman
b.	Mr. Naveed Iqbal Wahlah, Director (Maintenance) Punjab-South	Member
c.	Mr. Tariq Moosa Memon Dy. Director (Maint) NHA, R Y Khan	Member
c.	Mr. Malak Ram Asstt. Director (Accounts) NHA, Multan On behalf of DD (Accounts)	Member

26. Detailed evaluation of substantially responsive bids was carried out as per procedure prescribed and arithmetic corrections were made where deemed necessary. Comparison of bids follow as under:

Engineer's Estimate: Rs.19,379,134.00

S.#	Name of Contractors	Bid Cost (Rs.)	% above/ below	Status
1	M/s Mustafa Enterprises	23,254,961.00	20% above	1st lowest
2	M/s Arsalan Bros.	24,611,501.00	27% above	2nd lowest
3	M/s Ali Enterprises	26,741,267.00	37.99% above	3rd lowest

27. Subsequently, lowest bidder M/s Mustafa Enterprises has offered 10.1% rebate on their bid (**Annex-D**). After exclusion of rebate offered by the contractor the final calculated bid price of M/s Mustafa Enterprises is **Rs.21,297,668.00** which is **9.9% above** the Engineer's Estimate.

28. As per NHA Code 2005. Chapter-III, table III-5 General Manager (Punjab-South) is competent to approve tenders upto Rs.30 Million and offered bid price upto 10% above Engineer's Estimate.

29. RECOMMENDATIONS

In view of bid evaluation report, bid opening committee unanimously recommends the award of contract **(EM-PS-08-50-06) on N-20 at Km 26-31** in favour of **M/s Mustafa Enterprises** amounting **Rs.21,297,668.00** being **9.9%** above Engineer's Estimate of **Rs.19,379,134.00**

30. Submitted for approval of para-29/N, please.

Malak Ram

(Malak Ram)
Asstt. Director (Accounts)
On behalf of D.D (Accounts)
NHA, Multan

(Tariq Moosa Memon)
Dy. Director (Maintenance)
NHA, R.Y Khan

(Naveed Iqbal Wahlah) 2/6/08
Director (Maintenance)
NHA, (Punjab-South)

General Manager (Punjab-South)

31. Para # 29/N approved.

02/6/08

32

2/6/08

PA

33. Letter of Acceptance placed below for favour of Syndicate, please.

24. Competent Authority approved estimate for Repairing, Widening and Reconditioning of Road linking N-5 with N-55 from Km 31 to 36+500 (N-20) vide Para-21/ante. Tenders were forwarded to Director General (PID), Lahore. Tender Notice appeared in the daily "Khabrian" on 06-5-2008 (**Annex-A**). Members of tender opening and evaluation committee were informed through letter No. 5(70)Dir(Maint)/(P-S)/NHA/2007/2307 dated 12.5.2008 (**Annex-B**).

25. Accordingly, on the request of prospective firms, bid documents were issued to the interested firms who were prequalified in the respective category of maintenance. Subsequently, as per bid opening schedule, bids were opened by the designated committee in the presence of contractors or their representatives who chose to attend (**Annex-C**). Bid opening/evaluation committee comprises of:

a.	Mr. Muhammad Bashir General Manager (Punjab-South)	Chairman
b.	Mr. Naveed Iqbal Wahlah, Director (Maintenance) Punjab-South	Member
c.	Mr. Tariq Moosa Memon Dy. Director (Maint) NHA, R Y Khan	Member
e.	Mr. Malak Ram Asstt. Director (Accounts) NHA, Multan On behalf of DD (Accounts)	Member

26. Detailed evaluation of substantially responsive bids was carried out as per procedure prescribed and arithmetic corrections were made where deemed necessary. Comparison of bids follow as under:

Engineer's Estimate: Rs.19,695,958.00

S.#	Name of Contractors	Bid Cost (Rs.)	% above/ below	Status
1	M/s United Engg Associates	24,029,069.00	22% above	1st lowest
2	M/s Indus Builders	24,226,028.00	23% above	2nd lowest
3	M/s Mustafa Enterprises	24,324,508.00	23.5% above	3rd lowest
4	M/s A S Bhayo	24,619,948.00	25% above	4th lowest

COMPARATIVE STATEMENT OF CONTRACT NO.EM-PS-08-50-07

Province/Region (Punjab-South)
REACH: KM 31-36+500 (N-20)
Engineer's Estimate: Rs 19,695,958/-

Date of Opening: May 23, 2008
Opening Time: 1230 hours

S.No.	Name of Contractor/Firm	Name of Representative Attending Opening	Signature of Representative	% (+) above Or (-) below	As received Net Bid Amount Rs.	After Arithmetic Checking Correct Bid Amount Rs.	Remarks
1.	Mustafa Enst.	Jawaid Zahid		+ 23.5%	24,324,508-00	24,324,508-00	
2.	United Engg Assn	Engr Farhad		+ 22%	24,029,069-00	24,029,069-00	
3.	Indus Builders	M. Nawaz		+ 23%	24,226,028-00	24,226,028-00	
4.	AS Bhayo	Abdul Sattar		+ 25%	24,619,948-00	24,619,948-00	

COMMITTEE MEMBERS

General Manager (Punjab-South)_____
(Chairman)

Director (Maint/RAMS) HQ_____
Member

Dy. Director (Maint), DG Khan 23/05/08
Member

Dy. Director (Accounts), Multan 23/05/08
Member

Director (Maint), Punjab-South 23/5
(Member)

Dy. Director (Maint), Multan 23/5/08
Member

Dy. Director (Maintenance), R Y Khan 23/5
Member

COMPARATIVE STATEMENT OF CONTRACT NO.EM-PS-08-50-06

Province/Region (Punjab-South)
REACH: KM 26-31 (N-20)
Engineer's Estimate: Rs 19,379,134/-

Date of Opening: May 23, 2008
Opening Time: 1230 hours

S.No.	Name of Contractor/Firm	Name of Representative Attending Opening	Signature of Representative	% (+) above Or (-) below	As received Net Bid Amount Rs.	After Arithmetic Checking Correct Bid Amount Rs.	Remarks
1.	Mustafa Est	Mustafa Enterprise		+20%	23,254,961/-	23,254,961/-	
2.	Arsalan Bros.	M. Siddique		+27%	24,611,501/-	24,611,501/-	
3.	Ali Est	Waqar Ali M/s Ali Enterprises	M. Ali	+37.99%	26,741,267/-	26,741,267/-	

COMMITTEE MEMBERS

General Manager (Punjab-South)_____
(Chairman)

Director (Maint/RAMS) HQ_____
Member

Dy. Director (Maint), DG Khan_____ 23/05/08
Member

Dy. Director (Accounts), Multan_____ 23/05/08
Member

Director (Maint), Punjab-South_____ 23/5
(Member)

Dy. Director (Maint), Multan_____ 23/5/08
Member

Dy. Director (Maintenance), R Y Khan_____ 23/5
Member

24. Competent Authority approved estimate for Repairing, Widening and Reconditioning of Road linking N-5 with N-55 from Km 36+500 to 42+000 (N-20) vide Para-21/ante. Tenders were forwarded to Director General (PID), Lahore. Tender Notice appeared in the daily "Khabrian" on 06-5-2008 (**Annex-A**). Members of tender opening and evaluation committee were informed through letter No. 5(70)Dir(Maint)/(P-S)/NHA/2007/2307 dated 12.5.2008 (**Annex-B**).

25. Accordingly, on the request of prospective firms, bid documents were issued to the interested firms who were prequalified in the respective category of maintenance. Subsequently, as per bid opening schedule, bids were opened by the designated committee in the presence of contractors or their representatives who chose to attend (**Annex-C**). Bid opening/evaluation committee comprises of:

a.	Mr. Muhammad Bashir General Manager (Punjab-South)	Chairman
b.	Mr. Naveed Iqbal Wahlah, Director (Maintenance) Punjab-South	Member
c.	Mr. Tariq Moosa Memon Dy. Director (Maint) NHA, R Y Khan	Member
c.	Mr. Malak Ram Asstt. Director (Accounts) NHA, Multan On behalf of DD (Accounts)	Member

26. Detailed evaluation of substantially responsive bids was carried out as per procedure prescribed and arithmetic corrections were made where deemed necessary. Comparison of bids follow as under:

Engineer's Estimate: Rs.19,985,145.00

S.#	Name of Contractors	Bid Cost (Rs.)	% above/ below	Status
1	M/s A S Bhayo	24,581,728.00	23% above	1st lowest
2	M/s Habib Const Co	24,931,468.00	24.75% above	2nd lowest
3	M/s Mustafa Enterprises	25,181,283.00	26% above	3rd lowest
4	M/s M. Sajjad	25,481,060.00	27.5% above	4th lowest
5	M/s Arsalan Bros.	25,880,762.00	29.5% above	5th lowest

27. Subsequently, lowest bidder M/s Abdul Sattar Bhayo has offered 14% rebate on his bid (**Annex-D**). After exclusion of rebate offered by the contractor the final calculated bid price of M/s Abdul Sattar Bhayo is **Rs.21,783,808.00** which is **9% above** the Engineer's Estimate.

28. As per NHA Code 2005. Chapter-III, table III-5 General Manager (Punjab-South) is competent to approve tenders upto Rs.30 Million and offered bid price upto 10% above Engineer's Estimate.

29. **RECOMMENDATIONS**

In view of bid evaluation report, bid opening committee unanimously recommends the award of contract **(EM-PS-08-50-08) on N-20 at Km 36+500-42+000** in favour of **M/s Abdul Sattar Bhayo** amounting **Rs.21,783,808.00** being 9% above Engineer's Estimate of **Rs.19,985,145.00**

30. Submitted for approval of para-29/N, please.

(Malak Ram)
Asstt. Director (Accounts)
On behalf of D.D (Accounts)
NHA, Multan

(Tariq Moosa Memon)
Dy. Director (Maintenance)
NHA, R.Y Khan

2/6/08
(Naveed Iqbal Wahlah)
Director (Maintenance)
NHA, (Punjab-South)

General Manager (Punjab-South)

31. Para # 29/N approved.
02/6/8

32. 2/6/08
PA

33. Letter of Acceptance placed below for favour

COMPARATIVE STATEMENT OF CONTRACT NO.EM-PS-08-50-08

Province/Region (Punjab-South)
REACH: KM 36+500-42+000 (N-29)
Engineer's Estimate: Rs 19,985,145/-

Date of Opening: May 23, 2008
Opening Time: 1230 hours

S.No.	Name of Contractor/Firm	Name of Representative Attending Opening	Signature of Representative	% (+) above Or (-) below	As received Net Bid Amount Rs.	After Arithmetic Checking Correct Bid Amount Rs.	Remarks
1.	M. Sajjad	M. Sajjad		+27.5%	25,481,060-00	25,481,060-00	
2.	A S Bhaye	Abdul Sattar		+23%	24,581,728-00	24,581,728-00	
3.	Awlay Bros.	M. Siddique		+29.5%	25,880,762-00	25,880,762-00	
4.	Mustafa Ent.	Jawaid Iqbal		+26%	25,181,283-00	25,181,283-00	
5.	Habib Const Co	Amir Sami		+24.75%	24,931,468-00	24,931,468-00	
6							

COMMITTEE MEMBERS

General Manager (Punjab-South)_____
(Chairman)

Director (Maint/RAMS) HQ_____
Member

Dy. Director (Maint), DG Khan 23/05/08
Member

Dy. Director (Accounts), Multan 23/05/08
Member

Director (Maint), Punjab-South (Member) 23/5/08

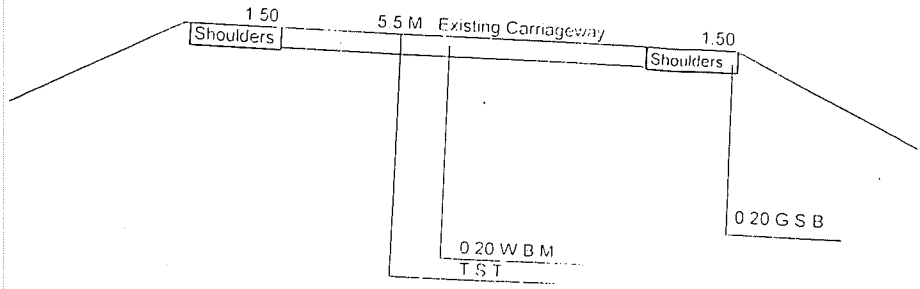
Dy. Director (Maint), Multan 23/5/08
Member

Dy. Director (Maintenance), R Y Khan
Member

-40-

X-Section

Murced Shakh to Chowk Mari (N-20) KM 26 to KM 31



(Syed Ishrat Ali)
Sub. Engineer (Maint)
NHA, Rahim Yar Khan

(Tariq Moosa Memon)
Deputy Director (Maint)
NHA, Rahim Yar Khan

-4/-

Annexure-IV

SPECIFICATIONS

ITEM 201 GRANULAR SUBBASE

201.1 DESCRIPTION

This item shall consist of furnishing, spreading in one or more layers and compacting granular subbase according to the specifications and drawings and/or as directed by the Engineer.

201.2 MATERIAL REQUIREMENTS

Granular subbase material shall consist of natural or processed aggregates such as gravel, sand or stone fragment and shall be clean and free from dirt, organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable subbase.

The material shall comply to the following grading and quality requirements:

a) The subbase material shall have a gradation curve within the limits for grading A, B, and C given below. However grading A may be allowed by the Engineer in special circumstances.

Grading Requirements for Subbase Material

Sieve Designation		Mass Percent Passing Grading	
mm	Inch	A	B
60.0	(2 1/2)	100	--
50.0	(2)	90-100	100
25.0	(1)	50-80	55-85
9.5	(3/8)	--	40-70
4.75	No. 4	35-70	30-60
2.0	No. 10	--	20-50
0.425	No. 40	--	10-30
0.075	No. 200	2-8	5-15

The Coefficient of Uniformity D60/D10 shall be not less than 3, where D60 and D10 are the particle diameters corresponding to 60% and 10%, respectively, passing (by weight) in a grain size analysis, curve.

b) The Material shall have a CBR value of at least 50%, determined according to AASHTO T-193. The CBR value shall be obtained at a density corresponding to Ninety eight (98) percent of the maximum dry density determined according to AASHTO T-180 Method-D.

c) The coarse aggregate material retained on sieve No. 4 shall have a percentage of wear by the Los Angeles Abrasion (AASHTO T-96) of not more than fifty (50) percent.

d) In order to avoid intrusion of silty and clayey material from the subgrade in the subbase, the ratio D15 (Subbase)/D85 (Subgrade) should be less than 5.

Where D85 and D15 are the particle diameters corresponding to eighty five (85) % and fifteen (15) %, respectively, passing (by weight) in a grain size analysis, curve.

e) The fraction passing the 0.075 mm (No. 200) sieve shall not be greater than two third of the fraction passing the 0.425 mm (No. 40) sieve. The fraction passing the 0.425 mm sieve shall have a liquid limit of not greater than 25 and a plasticity index of 6 or less.

f) If over-size is encountered, screening of material at source, shall invariably be done, no hand picking shall be allowed, however hand picking may be allowed by the Engineer, if over-size quantity is less than 5% of the total mass.

g) Sand equivalent for all classes shall be 25 min.

201.3 CONSTRUCTION REQUIREMENTS

201.3.1 Spreading

Granular subbase shall be spread on approved subgrade layer as a uniform mixture. Segregation shall be avoided during spreading and the final compacted layer shall be free from concentration of coarse or fine materials.

Granular subbase shall be deposited on the roadbed or shoulders in a quantity which will provide the required compacted thickness without resorting to spotting, picking up or otherwise shifting the subbase material. In case any material is to be added to compensate for levels, the same shall be done after scarifying the existing material, to ensure proper bonding of additional material.

When the required thickness is fifteen (15) cm or less, the aggregates may be spread and compacted as one layer, but in no case shall a layer be less than seven and one half (7.5) centimeters thick. Where the required thickness is more than 15 cm, the aggregates shall be spread and compacted in 2 or more layers of approximately equal thickness, but in any case the maximum compacted thickness of one layer shall not exceed 15 cm. All subsequent layers shall be spread and compacted in a similar manner.

Granular subbase shall be spread with equipment that will provide a uniform layer conforming to the specified item both transversely and longitudinally within the tolerances as specified in "Table for Allowable Tolerances" in these specifications. No hauling or placement of material will be permitted when, in the judgment of the Engineer, the weather or road conditions are such that the hauling operation will cause cutting or rutting of subgrade or contamination of sub base material.

201.3.2 Compaction Trials

Prior to commencement of granular subbase operation, contractor shall construct a trial length, not to exceed, five hundred (500) meters and not less than two hundred (200) meters with the approved subbase material as will be used during construction to determine the adequacy of the contractor's equipment, loose depth measurement necessary to result in the specified compacted layer depths, the field moisture content, and the relationship between the number of compaction passes and the resulting density of the material. For details, refer to clause 1.20 (General) of these specifications.

201.3.3 Compaction

The moisture content of subbase material shall be adjusted prior to compaction, by watering with approved sprinklers mounted on trucks or by drying out, as required, in order to obtain the specified compaction.

The subbase material shall be compacted by means of approved vibrating rollers or steel wheel rollers (rubber tyred rollers may be used as a supplement), progressing gradually from the outside towards the centre, except on superelevated curves, where the rolling shall begin at the low side and progress to the high side. Each succeeding pass shall overlap the previous pass by at least one third of the roller width. While the rolling progresses, the entire surface of each layer shall be properly shaped and dressed with a motor grader, to attain a smooth surface free from ruts or ridges and having proper section and crown. Rolling shall continue until entire thickness of each layer is thoroughly and uniformly compacted to the specified density.

Any area inaccessible to rolling equipment shall be compacted by means of hand guided rollers, plate compactors or mechanical tampers, where the thickness in loose layer shall not be more than 10 cm.

If the layer of subbase material, or part thereof does not conform to the required finish, the Contractor shall, at his own expense, rework, water, and recompact the material before succeeding layer of the pavement structure is constructed.

Immediately prior to the placing of first layer of base course the subbase layer (both under the traveled way and the shoulders) shall conform to the required level and shape. Prior to placing the succeeding layers of the material, the top surface of each layer shall be made sufficiently moist to ensure bond between the layers. The edges or edge slopes shall be bladed or otherwise dressed to conform to the lines and dimensions shown on the plans.

No material for construction of the base shall be placed until the subbase has been approved by the Engineer.

201.3.4 **Compaction requirements**

The relative compaction of each layer of the compacted subbase shall not be less than Ninety eight (98) percent of the maximum dry density determined according to AASHTO T-180 Method-D. The field density shall be determined according to AASHTO T-191 or other approved method. For all materials, the field density thus obtained shall be adjusted to account for oversize particles (retained on 19 mm sieve) as directed by the Engineer Also for adjustment of any material retained on 4.75 mm sieve, AASHTO Method T-224 shall be used

201.3.5 **Moisture Content Determination**

As it is customary in the project laboratories that small samples of materials are placed in ovens for moisture determination for proctor, following precautions are necessary to ensure proper compaction results.

a) Same size of sample is placed in oven for moisture determination in case of laboratory density (Proctor) and field density.

b) Moisture content for calculation of field density and proctor shall be observed on material passing 4.75 mm sieve.

201.3.6 **Tolerance**

The subbase shall be compacted to the desired level and cross slopes as shown on the drawings. The allowable tolerance shall be according to the "Table for Allowable Tolerances" in these specifications.

201.4 **MEASUREMENT AND PAYMENT**

201.4.1 **Measurement**

The quantity of subbase to be paid for shall be measured by the theoretical volume in place as shown on the drawings or as directed and approved for construction by the Engineer, placed and accepted in the completed granular subbase course. No allowance will be given for materials placed outside the theoretical limits as shown on the cross-sections.

201.4.2 Payment

The accepted quantities measured as provided above shall be paid for at the contract unit price per cubic meter of granular subbase, for the Pay Item listed below and shown in the Bill of Quantities, which price and payment shall constitute full compensation for furnishing all materials, hauling, placing, watering, rolling, labour, equipment, tools and incidentals necessary to complete the item. 202.1

Pay Item No.	Description	Unit of Measurement
201	Granular Subbase	CM

202.2

ITEM 206 WATER BOUND MACADAM BASE

206.1 DESCRIPTION

This work shall consist of furnishing and placing one or more courses of clean crushed stone base mechanically interlocked by rolling, and voids thereof filled with screening and binding material with the assistance of water, laid on a prepared subgrade, sub base, or existing pavement in conformity with the lines, grades and cross-sections shown on the drawings.

Unless otherwise directed by the Engineer this item of work may be applied to road structure or shoulders.

206.2 MATERIAL REQUIREMENTS

Coarse aggregates either crushed or broken stone shall conform to the quality requirements as specified hereunder, except that no CBR testing will be required. The gradation curve of the coarse aggregate shall be within the envelop limits given below:-

Sieve Designation		Percent Passing by weight		
mm	Inch	Class A	Class B	Class C
102	(4")	100	–	–
89	(3.1/2:)	90 - 100	–	–
76	(3")	–	100	–
63.5	(2.1/2")	25 - 60	90 - 100	100
50	(2")	–	25 - 75	90 - 100
37.5	(1.1/2")	0 - 15	0 - 15	35 - 70
25	(1")	–	–	0 - 15
19	(3/4")	0 - 5	0 - 5	0 - 5
12.5	(1/2")	–	–	–

Fine aggregate (filler material or screenings) shall consist of crushed stone screenings or any other fine material approved by the Engineer. It shall be free from clay lumps, dirt and other objectionable material. The fine aggregate shall be of the following gradation.

Sieve Designation		Percent Passing by weight
mm	Inch	
9.5	3/8	100
4.35	No. 4	85-100
0.15	No. 100	10-30

The material passing No. 40 sieve shall have a liquid Limit of not more than twenty five (25) and a Plasticity Index of not more than six (6).

206.2.1 **Physical Requirements**

The additional physical requirements of coarse aggregates for water bound macadam will satisfy the following limits -

a. Loss Angeles Abrasion Value Max 45%
b. Flakiness Index Max 15%
c. The loss when subject to five cycles of the Sodium Sulphate Soundness test (AASHTO T-104) shall be less than twelve (12).

206.2.2 **Binding Material**

Binding material to prevent raveling of water bound macadam shall consist of a fine grained material passing 100 percent through 425 micron sieve and possessing P.I value of four to nine (4-9) when the Water Bound Macadam (WBM) is to be used as a surfacing course, and upto 6 when WBM is being adopted as sub-base/base course with bituminous surfacing. If lime stone formations are available nearby, lime stones dust or as directed by the Engineer, may be used fully employed for this purpose.

206.3 **CONSTRUCTION REQUIREMENTS**

206.3.1 **Equipment**

Any combination of machines or equipment that will produce the results meeting these specifications may be used with the approval of the Engineer. These include mechanical spreaders, water sprinklers and rollers/compactors.

206.3.2 **Structure Preparation**

Preparation of surface for water bound macadam, shall be carried out in the same manner as for aggregate base course item 202.3.1.

Where the existing road surface is black topped, 50 mm x 50 mm furrows shall be cut in the existing surface at one (1) meter intervals at forty five (45) degree to the centre line of the carriage-way before proceeding with the laying of coarse aggregates.

Before starting with WBM Construction, necessary arrangements shall be made for the lateral confinement of aggregates. One method is to construct side shoulders in advance to a thickness corresponding to the compacted layer of the WBM course. After shoulders are ready, there inside edges may be trimmed vertical and the included area cleaned of all spilled material thereby setting the stage for spread of coarse aggregates. The practice of constructing WBM in a trench section excavated in the finished formation must be avoided.

206.3.3 **Spreading and Compaction**

Crushed stone shall be deposited and spread on the prepared surface to the proper depth so that the compacted layer will not exceed two and a half (2.1/2) times the thickness of maximum aggregate size. Each layer shall be inspected thoroughly before rolling to detect high or low spots. Crushed stones shall be added or shifted to provide a true surface. The course aggregate layer, after being laid to proper thickness, shall be lightly rolled sufficient only to establish the required grade and level of the stones.

Spreading of the coarse aggregates shall be followed by rolling with a smooth wheel roller weighing at least 10 tons. Rolling shall begin at the lower edge of the shoulders to lock the stones firmly at the edge, then progress gradually towards the centre line. Rolling shall continue until the aggregate is well keyed and does not creep ahead of the roller.

In no case, shall coarse aggregates be stored in heaps directly on the area where these are to be laid nor shall the hauling over a partly completed base be permitted, however dumpers shall be allowed at the construction area where the material will be spreaded quickly after dumping.

Following the initial rolling, dry screenings shall be applied uniformly over the surface. Dry rolling shall be continued while screenings are being applied. The surface shall be swept with mechanical or hand brooms to aid spreading of the screenings.

When the interstices in the coarse aggregate are filled with screenings, the surface shall be sprinkled with water until it is saturated. The rolling, sprinkling and application of additional screenings shall continue until a grout is formed that fills all the voids and forms a wave of grout in front of the roller.

When more than one layer is required to complete the Macadam base course to the thickness shown on the drawings, each layer shall be constructed as before prescribed.

206.3.4 **Construction Control Testing**

Tests for compliance with the requirements of Item 206.2 will be made as often as deemed necessary and to the satisfaction of the Engineer.

206.3.5 **Maintenance**

The completed base course shall be maintained in an acceptable condition until the necessary subsequent treatment is applied.

206.4 MEASUREMENT AND PAYMENT

206.4.1 Measurement

The quantity of Water Bound Macadam Base to be paid for shall be measured by the theoretical volume in place, as shown on the Drawings or as directed and approved for construction by the Engineer, placed and accepted in the completed Waterbound Macadam Base Course. No allowance will be given for materials placed outside the theoretical limits shown on the cross-sections.

206.4.2 Payment

The accepted quantities measured as provided above shall be paid for at the contract unit price per cubic meter of Water Bound Macadam Base, for the pay items listed below and shown in the Bill of Quantities, which price and payment shall constitute full compensation for furnishing all materials, hauling, placing, watering, rolling, labour, equipment, tools and incidentals necessary to complete this item.

Pay Item No.	Description	Unit of Measurement
206a	Water Bound Macadam Base with Coarse Agg: Class A	CM
206b	Water Bound Macadam Base with Coarse Agg: Class B	CM
206c	Water Bound Macadam Base with Coarse Agg: Class C	CM

ITEM 304

BITUMINOUS SURFACE TREATMENT AND SEAL COAT./ PAD COAT

304.1 **DESCRIPTION**

This work shall consist of one or more applications of asphaltic material and one or more covers of aggregates or an application of asphaltic material without aggregates applied in accordance with these specifications and in conformity with the lines and width shown on the typical cross-sections or as established by the Engineer.

304.2 **MATERIAL REQUIREMENTS**

304.2.1 **Aggregate**

Aggregate shall consist of clean, dry, hard, durable, tough, angular, sound crushed stone or crushed gravel of uniform quality, and free from dirt, clay and other objectionable matter. Aggregates from only the sources of established adhesion properties would be used. The percentage of wear by the Los Angeles Abrasion test (AASHTO T-96) shall not be more than forty (40). Aggregate crushing value (ACV) when tested as per BS-812 (1990) shall not exceed 25%. When subjected to five (5) cycles of sodium-sulfate soundness testing as determined by AASHTO T-104, it shall have a weight loss of not greater than ten (10) percent. The moisture content in the aggregate applied directly to the surface of the bituminous material shall not exceed three (3) percent by weight plus one-half (1/2) the water absorption of the aggregate at the time of delivery to the Project. In no case shall free moisture be drawing from the truck bed.

The portion of aggregate retained on the 9.5 mm (3/8 inch) sieve shall not contain more than fifteen (15) percent of particles by weight of flat or elongated, or both, that the ratio between the maximum and the minimum dimensions exceeds 2.5:1. Flakiness Index, tested under BS-812 (1990) part 105, shall be 25 (max) for nominal size 18 mm and 12 mm and 30 (max) for nominal size 9mm.

The nominal sizes of aggregates used for surface treatment; shown against table 304-1 shall be as under:

Size No. 1 – Nominal size 18 mm
Size No. 2 – Nominal size 12 mm
Size No .3 – Nominal size 9 mm
Size No. 4 – Nominal size 6 mm

The nominal size are defined in the table below:

Nominal Size (mm)	Specified Size *			
	Passing		Retained	
	Sieve (mm)	%age	Sieve (mm)	%age
18	19	100	12.5	85
12	12.5	100	9.5	85
9	9.5	100	6.3	85
6	6.3	100	4.75	85

* By convention, this item defines a fraction of material within the respective sieves.

For Material passing 3/8" Sieve, following Table shall be used:

Sieve Designation		Percent Passing by Weight			
mm	Inch	Size No. 1	Size No. 2	Size No. 3	Size No. 4
9.5	3/8	0–15	0-10	–	–
4.75	No. 4	0–5	0–5	0–10	–
2.38	No. 8	–	–	0–5	0–5
1.18	No. 16	–	–	–	0–3
0.075	No. 200	0–2	0–2	0–1	0–1

304.2.2 **Asphaltic Material**

The asphaltic material shall conform to the requirements of Item 301 'Asphaltic Materials'. The type shall be one of the following, as shown in the Bill of Quantities or ordered by the Engineer. Spraying temperature shall be as shown against each type.

Table: Spraying Temperatures (°C) for Surface Treatments

Asphalt Type / Grade	Spraying Temperature Surface Treatments
a. Asphalt Cements	
AC-2.5	130 min.
AC-5	140 mn.
AC-10	140 mn.
AC-20	145 min.
AC-40	150 min.
AR-1000	155 min.
AR-2000	140 min.
AR-4000	145 min.
AR-8000	145 min.
AR-16000	–
200-300 pen.	130 min.
120-150 pen.	130 min.
85-100 pen.	140 min.
60-70 pen.	145 min.
40-50 pen.	150 min.
b. Emulsified Asphalts	
RS-1	20-60
RS-2	50-85
MS-1	20-70
MS-2	–
MS-2h	–
HFMS-1	20-70
HFMS-2	–
HFMS-2h	–
HFMS-2s	–
SS-1	–
SS-1h	–
CRS-1	50-85
CRS-2	50-85
CMS-2	–
CMS-2h	–
CSS-1	–
CSS-1h	–

Asphalt Type / Grade	Spraying Temperature Surface Treatments
c. Cutback Asphalts (RC, MC, SC)	
30 (MC only)	30 min.
70	50 min.
250	75 min.
800	95 min.
3000	110 min.

304.3 CONSTRUCTION REQUIREMENTS

At the time of the application, the weather shall be warm and dry, and the road surface shall be clean and dry. Spraying shall not be done unless the road temperature is above twenty (20) degree C for at least one hour prior to the commencement of spraying operations, and the temperature shall not be less than twenty (20) degree C during the spraying. Prior to applying the asphaltic material, dirt and other objectionable materials shall be removed from the surface and surface shall be primed as per item 302. If so directed by the Engineer, the surface shall be cleaned by power brooming or wire brush until all loose and foreign materials are removed.

304.3.1 Equipment

Equipment shall conform in all respects to the provisions under Item 302.3.1. The equipment shall be operated by the manpower specially trained for this work. Necessary safety arrangement for the workers, equipment and traffic shall be ensured during the operations.

304.3.2 Preparation of Surface

Irregularities and surface damage e.g. pot-holes, depressions, raveling, shall be corrected prior to surface dressing. The Engineer shall also satisfy himself that fundamental pavement defects e.g. base failure, drainage problems etc. have been remedied before surface dressing is attempted. Areas, which are excessively rich in bitumen e.g. 'bleeding', shall be cut out and patched. All patches, however, occasioned shall be thoroughly compacted, sealed and blinded with crusher dust before opening to traffic for several days before surface dressing commences.

Immediately prior to the application of binder all dirt, dust are foreign material shall be removed by thorough brooming and / or the use of compressed air. Adhering mud or other soiling may be removed using water and brushes, the general use of water to wash the road shall not be permitted.

304.3.3 Application of Asphaltic Materials

Asphalt cement, liquid asphalt and emulsified asphalt shall be applied by means of pressure distributor manual or automatic at the temperature specified for the type and grade of asphalt being used. The rates of application shall be within the ranges given in Table 304-1.

The spread of bituminous materials shall be at least ten (10) cm more than the width to be covered by the aggregate from the spreading device. The distributor shall be moving forward at proper application speed at the time the spray bar is opened. Any skipped areas or deficiencies shall be corrected in an approved manner. Junctions of spreads shall be carefully made to assure a smooth riding surface. The length of spread of bituminous material shall not exceed than that which trucks loaded with cover coat material can immediately cover. Under no circumstances shall operations proceed in such manner that bituminous material will be allowed to chill, set up, dry, or otherwise impair retention of the cover coat.

The distributor when not spreading shall be so designed that the spray bar or mechanism will not drip bituminous material on the surface of the traveled way. Distribution of the bituminous material shall be so regulated and sufficient bituminous material left in the distributor at the end of each application, so that there will be a uniform distribution of bituminous material. In no case shall the distributor be allowed to expel air with the bituminous material thereby causing uneven coverage. The angle of the spray nozzles and the height of the spray bar shall be so adjusted and frequently checked that uniform distribution is ensured. The distribution shall cease immediately upon any clogging or interference of any nozzle and corrective measures shall be taken before distribution is resumed.

304.3.4 Spreading of Aggregate

Immediately after applying the asphaltic material, dry aggregate shall be uniformly and evenly distributed over the treated surface from an approved mechanical aggregate spreader or any other means approved by the Engineer. The truck carrying the aggregate shall move backward as it spreads same, so as to prevent the tyres of the truck and the mechanical aggregate spreader from driving directly on the newly sprayed asphalt. No portion of the binder shall remain uncovered for a period in excess of twenty (20) minutes after spraying.

Immediately after spreading of the aggregate, the treated surface shall be rolled with a self-propelled pneumatic-tyre roller having a minimum contact pressure of 2.8 Kg/square centimeter. A steel-wheeled roller weighing between six (6) to eight (8) tons may be used as a second roller. Rolling shall continue only until a smooth, thoroughly compacted surface is obtained. Procedures of starting, stopping, or turning of any piece of equipment which results in displacement of the cover material or damage to the seal courses be prohibited.

Any place where binder shows on the surface shall be covered with additional aggregate and further rolled and broomdragged until an even surface results, and does not adhere to wheels of vehicles. Overlapping the applications of cover material shall be avoided and all spillage shall be removed from the surface.

The quantity of aggregates to be applied shall be within the ranges specified in Table 304.1.

304.3.5 **Maintenance of Traffic**

Detouring of highway traffic for this work on running road will not be provided for or permitted, except when authorized by the Engineer. All construction operations shall be coordinated to result in the least practicable delay of traffic. One way traffic shall be maintained and traffic speeds restricted to fifteen (15) Km per hour. The contractor shall provide flagmen, warning signs, barricades, and a sufficient number of pilot cars to control traffic through the bituminous sealing operations when so directed by the Engineer. Pilot cars shall be used to lead the traffic through the areas of all distribution and sealing operations. Pilot cars shall be light "Pick up" trucks or other approved vehicles and shall be equipped with signs reading "PILOT

CAR - DO NOT PASS" in both English and Urdu languages. Two (2) signs shall be mounted on the vehicles so as to be clearly visible from both directions. One (1) flagman shall be stationed immediately ahead of the application of the bituminous material and one (1) flagman immediately behind the section being rolled Suitable speed limit signs shall be displayed, and the signs shall move forward with the flagman as the work progresses.

No separate payment shall be made for conformance to this paragraph. All these items being considered subsidiary to the item (s) given in the Bill of Quantities.

304.3.6 **Working Period**

All work shall be so conducted that the work of applying asphalt and aggregate and of all rolling shall be completed during the time from sunrise to sunset and under favorable weather conditions as determined by the Engineer.

304.3.7 **Maintenance of completed work**

When directed by the Engineer, the Contractor will be required to add bituminous material or aggregate or both to the portion of road identified for such purpose on the project. Furnishing additional bituminous material and furnishing, spreading, dragging and rolling of additional aggregate will not be paid for separately but will be considered as subsidiary work pertaining to the relevant item of "Bituminous Surface Treatment".

304.3.8 **Opening to Traffic and after-care**

There shall be no delay in opening a completed surface dressing to traffic at a controlled speed. Prior to opening to traffic any spillage of aggregates shall be removed and any binder drips or wind blown contamination shall be dusted with crusher waste. After 2-3 days under traffic, excess stone will be removed by brushing.

304.3.9 **Pad Coat**

To ensure chipping retention when surface dressing a very hard surface, a pad coat consisting of application of an initial binder spray followed by 6 mm. chipping will be applied. After stabilizing of pad coat under traffic, the appropriate surface dressing will be applied.

304.4 MEASUREMENT AND PAYMENT

304.4.1 Measurement

The quantity of surface treatment to be paid for shall be measured in square meter within the theoretical line in place as shown on drawing. No allowance will be given for material placed outside the theoretical limits of finished surfacing whether placed for, due to requirement of contractor's operations or placed out side the limits due to inadequate control.

304.4.2 Payment

The aggregate and asphaltic material measured as stated above shall be paid for at the contract unit price per square meter for a particular item listed below and shown on the bill of quantities, which payment shall be full compensation for furnishing all labour, materials, tools equipment and incidental for performing all the work in the construction of bituminous surface treatment or seal coat complete in place and according to specification, including priming of surface.

Pay Item No.	Description	Unit of Measurement
304 a	Single Surface Treatment	SM
304 b	Double surface Treatment	SM
304 c	Triple Surface Treatment	SM
304 d	Seal Coat / Pad Coat	SM

TABLE 304-1

Quantities of Materials for Bituminous Surface Treatments

Surface Treatment		Aggregate		Bituminous Material	
Type	Application	Size No.	Quantity Kg. /Sq.M	Quantity Litres / Sq.M	Type
Single	Single	2	12.5	1.19	(a)
				1.63	(b)
Double	First	1	24.0	1.90	(a)
				2.14	(b)
	Second	3	12.5	1.19	(a)
				1.63	(b)
Tripple	First	1	24.0	1.90	(a)
				2.14	(b)
	Second	2	12.5	1.19	(a)
				1.63	(b)
	Third	3	6.5	0.68	(c)
Seal Coat / Pad Coat with Aggregate		4	4	0.5	(c)

Notes:-

i) Bituminous material types are (a) asphalt cement, (b) cut-back or emulsified and (c) asphalt cement, cut-back and emulsified.

ii) Quantities of bituminous material may be varied by the Engineer by ± 15% depending on site conditions.

iii) Prime coat shall be applied prior to the surface treatment for the newly constructed pavement at the rate as specified in the item 302.3.2.

NATIONAL HIGHWAY AUTHORITY

MAINTENANCE UNIT RAHIM YAR KHAN

Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Trailors	Remarks
1	1500- 1600	60	56	11	32	4	
2	1600-1700	66	49	16	32	2	
3	1700-1800	71	52	11	29	2	
4	1800-1900	68	58	11	49	3	
5	1900-2000	40	40	13	42	2	
6	2000-2100	35	21	8	30	3	
7	2100-2200	15	13	4	19	1	
8	2200-2300	17	9	6	17	1	
9	2300-2400	12	2	1	23	2	
10	0000-100	3	1	Nil	26	2	
11	100-200	1	Nil	1	8	Nil	
12	200-300	Nil	Nil	Nil	21	1	
13	300-400	2	3	3	10	Nil	
14	400-500	1	9	10	17	1	
15	500-600	8	11	8	45	3	
16	600-700	21	18	1	38	2	

Traffic data count for 24 hours for up and down side.

(Syed Ishrat Ali)
S.E. Engineer Officer
NHA Rahim...

(Tariq Moosa Memon)
Deputy Director (Main...
NHA Rahim...

-58-

Annexure-VI
Traffic Data May, 2008
(before rehabilitation)

NATIONAL HIGHWAY AUTHORITY

MAINTENANCE UNIT RAHIM YAR KHAN

Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Tralers	Remarks
17	700-800	38	56	10	49	1	
18	800-900	49	74	9	49	10	
19	900-1000	57	69	10	14	Nil	
20	1000-1100	53	61	6	20	1	
21	1100-1200	52	63	9	30	3	
22	1200-1300	65	68	11	32	3	
23	1300-1400	53	59	16	53	Nil	
24	1400-1500	31	72	20	43	2	
	Grand Total	829	889	210	765	49	

Traffic data count for 24 hours for up and down side

(Syed Ishrat Ali)
Sub Engineer (Maint)
NHA, RYKhan

(Tariq Moosa Memon)
Deputy Dir
NHA, Rahim

(1/5)

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN

Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Trailors	Remarks
Dated: 16.02.2009							
1	1600-1700	62	38	5	62	64	
2	1700-1800	51	50	7	76	72	
3	1800-1900	49	47	7	59	63	
4	1900-2000	68	26	3	55	67	
5	2000-2100	35	15	1	81	69	
6	2100-2200	3	6	1	61	51	
7	2200-2300	19	7	3	46	49	
8	2300-2400	9	4	2	41	65	
9	0000-0100	1	1	3	47	47	
10	0100-0200	Nil	1	Nil	43	58	
11	0200-0300	Nil	Nil	Nil	54	63	
12	0300-0400	Nil	Nil	Nil	49	66	
13	0400-0500	Nil	4	8	41	53	
14	0500-0600	1	9	3	65	62	
15	0600-0700	14	39	10	48	61	

* Traffic data count for 72 hours for up and down side.

(Syed Ishrat Ali)
Sub Engineer (Maint)
NHA, R.Y.Khan

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan

Annexure-VII
Traffic Data December, 2008
(during rehabilitation)

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN

Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Trailors	Remarks
16	0700-0800	18	58	6	62	60	
17	0800-0900	37	63	11	73	58	
18	0900-1000	58	59	16	63	59	
19	1000-1100	53	56	15	65	71	
20	1100-1200	53	62	28	67	48	
21	1200-1300	45	59	41	67	57	
22	1300-1400	52	73	7	71	43	
23	1400-1500	57	60	15	57	49	
24	1500-1600	46	55	12	61	73	
Dated: 17.02.2009							
25	1600-1700	61	49	14	78	68	
26	1700-1800	73	42	11	58	71	
27	1800-1900	71	41	11	53	65	
28	1900-2000	47	59	14	78	64	
29	2000-2100	23	28	3	49	62	
30	2100-2200	16	8	1	43	49	

-19-

* Traffic data count for 72 hours for up and down side.

(Syed Ishrat Ali)
Sub Engineer (Maint)
NHA, R.Y.Khan

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan

(315)

NATIONAL HIGHWAY AUTHORITY

MAINTENANCE UNIT RAHIM YAR KHAN

Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Trailors	Remarks
31	2200-2300	11	5	Nil	43	48	
32	2300-2400	8	5	Nil	44	62	
33	0000-0100	6	Nil	Nil	39	49	
34	0100-0200	2	1	3	39	56	
35	0200-0300	4	2	Nil	47	61	
36	0300-0400	3	1	Nil	54	62	
37	0400-0500	Nil	3	2	34	39	
38	0500-0600	5	7	Nil	36	44	
39	0600-0700	14	46	4	49	64	
40	0700-0800	13	66	7	53	59	
41	0800-0900	42	69	12	66	53	
42	0900-1000	53	61	10	41	63	
43	1000-1100	53	61	18	70	67	
44	1100-1200	52	45	11	43	46	
45	1200-1300	65	71	8	52	59	
46	1300-1400	46	77	10	43	36	
47	1400-1500	54	78	13	61	46	
48	1500-1600	67	58	10	45	48	

* Traffic data count for 72 hours for up and down side.

(Syed Ishrat Ali)
Sub Engineer (Maint)
NHA, R.Y.Khan

(Muhamamd Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN
Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Trailors	Remarks
Dated: 18.02.2009							
49	1600-1700	64	40	6	52	39	
50	1700-1800	53	53	9	56	46	
51	1800-1900	52	49	8	53	51	
52	1900-2000	70	28	4	54	53	
53	2000-2100	37	16	1	51	43	
54	2100-2200	4	8	2	65	46	
55	2200-2300	22	9	4	49	47	
56	2300-2400	11	6	3	47	43	
57	0000-0100	1	1	3	65	46	
58	0100-0200	Nil	2	Nil	63	54	
59	0200-0300	1	2	1	59	63	
60	0300-0400	Nil	Nil	Nil	80	57	
61	0400-0500	1	6	10	65	59	
62	0500-0600	2	10	6	71	69	
63	0600-0700	18	42	13	53	43	

* Traffic data count for 72 hours for up and down side.

(Syed Ishrat Ali)
Sub Engineer (Maint)
NHA, R.Y.Khan

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN

Traffic Data Count (Link road connecting N-55 Dera More Kashmore to N-5 Chowk Mari (N-20)

S. No	Time (PST)	Cars/Jeeps	Wagons	Tractor Trollies	Truck/ Buses	Trailors	Remarks
64	0700-0800	23	64	8	69	49	
65	0800-0900	43	67	17	79	67	
66	0900-1000	68	67	20	69	47	
67	1000-1100	57	61	20	69	43	
68	1100-1200	59	67	32	71	54	
69	1200-1300	49	63	46	72	59	
70	1300-1400	57	77	9	76	63	
71	1400-1500	41	64	19	61	47	
72	1500-1600	51	59	16	67	77	
	Total	**2304**	**2536**	**623**	**4148**	**4034**	

* Traffic data count for 72 hours for up and down side.

(Syed Ishrat Ali)
Sub Engineer (Maint)
NHA, R.Y.Khan

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan

Govt: OF Pakistan
Pakistan meteorological Department-
Aeromet-obsy: Sukkur Airport

No. Suk. Aero-DATA-02(2)/2004/39 Dt: 13-02-09

Subject: Issuence of rainfall data from 01 December 08 to 10th Feb. 2009.

Reference Deputy Director (maint) NHA, Rahim Yar Khan No. 49 dated 13-Feb-2009.

The above subject- data is as under:

Ten days rainfall from 01-12-08 to 10-12-2008

51.8 m.m

Ten days rainfall from 11-12-08 to 20-12-2008

62.4 m.m

Total rain fall in the month of December 08 51.8 mm
62.4 mm
Dec. 2008 → 114.2 mm

Total rainfall in the month of Jan. 2009 10.6 mm
Total " " " " " Feb 2009 0.0 mm

Submitted for your kind information as desired.

OFFICER INCHARGE
AEROMET OBSERVATORY
SUKKUR AIRPORT

The Deputy Director (maint)
NHA

FINANCIAL DETAILS OF THE CONTRACT AWARDED

S#	Contract No	Name of Contractor	Date of Award	Date of Commencement	Contract Amount	Date of Completion	Payment Status		
							Payment Made	Balance Amount	Retention Money Amount
1	EM-PS-08-50-06 N-20 km 26 to 31	Mustafa Enterprises	23-06-2008	24-06-2008	21,297,551.00	24.12.2008	20,463,150.00	834,401.00	1,023,158.00
2	EM-PS-08-50-07 N-20 km 31 to 36+500	United Engineers Associates	12.6.2008	13.6.2008	21,645,858.00	12.12.2008	21,055,567.00	456,312.00	1,052,778.00
3	EM-PS-08-50-08 N-20 km 36+500 to 42	Abdul Sattar Bhayo	19.6.2008	20.6.2008	21,783,808.00	18.12.2008	20,866,168.00	1,043,308.00	917,640.00

Source: NHA

Annexure-IX

NATIONAL HIGHWAY AUTHORITY
Punjab-South

Subject **COMPLAINT AGAINST THE USE OF SUB-STANDARD MATERIAL OF NEWLY CONSTRUCTED ROAD FROM CHOWK MARI TO DERA MORE, TEHSIL OBAWRO DISTRICT GHOTKI**

Reference:- Telephonic conversation dated 4th February, 2009.

As directed, a brief note of aforementioned, Design Criteria, Tender Documents , Measurement Books (Original), Field Test Reports, List of Supervisory staff, and other correspondence are placed below for kind perusal, please.

2. As for as PC-I is concerned, the same is not applicable as the cost of each project is below than Rs.50.million.

3. Submitted, please.

(NAZIR AHMED BHAYO)
Director (Maintenance) Punjab-South

Desp. No. 53 Dir (M)/P-S/NHA Dated 04/02/09

General Manager (Operations) NHA, HQ

4- The requisite Documents may Please be forwarded to the Inquiry committee accordingly.

GM Inspection / Dir. Maint. 6/2/09

5- The above documents are placed in the file as desired please.

6/2/09

Deputy Secretary (MOC)

D. No. 322 G.M. (Insp.) NHA Dated 6-02-09

NATIONAL HIGHWAY AUTHORITY
PUNJAB-SOUTH REGION

Brief on N-20 Works
EM-PS-08-50-6, 7 & 8

This vital link road between N-5 and N-55 was taken over from the Provincial Government of Sindh 22.11.2007. This route has been named as N-20. The 80% of heavy cargo trucks coming from Balochistan and leading towards up country use this route. The pavement has bituminous treated surface, ridding quality is very poor and road is bumpy. Potholes were present and reveling was observed. This narrow and distressed road can not accommodate/sustain heavy traffic volume.

2. To keep the route trafficable three (03) number emergency contracts were procured after completing all codal formalities. The carriageway was strengthened on the design criteria/scope of work containing:

- WBM 20 cm thick in 2 layers at 5.5 meter width
- TST at 5.5 meter width
- Shoulder: Granular sub Base 1.5 meter wide

3. Details of contracts & payments made along with copy of MBs, Test reports and drawings and contract documents are also enclosed at **Annex-A**

4. The works were at final stage on all the three (03) contracts in question. Sudden, uninterrupted rains created reveling the TST work and created settlement on different locations by the movement of the heavy loaded vehicles during rain. It is further mentioned that due to rain route N-55 damaged & the traffic normally plying on N-55 also moved to this route which also enlarge the damages on N-20.

5. It is apprised that works were at final stage but not yet finalized and the defect liability period has not yet started. So in accordance with the currency of contract, contractors are already started the rectification works in their respective contracted reaches. Correspondence with Dy. Director (Maint) and Contractors concerned are also attached at **Annex-B**.

Design Criteria
N-20 Works

The road was constructed on the parameters set forth by the approved design. Details given below:

- WBM 20 cm thick in 2 layers at 5.5 meter width
- TST at 5.5 meter width
- Shoulder: Granular sub Base 1.5 meter wide

LIST OF SUPERVISORY STAFF

1. **Mr. Tariq Moosa Memon**
   Dy. Director (Maintenance) NHA, Rahim Yar Khan

2. **Syed Ishrat Ali Shah**
   Sub-Engineer NHA, Rahim Yar Khan

NATIONAL HIGHWAY AUTHORITY
(PUNJAB-SOUTH REGION)

Garden Town, Chowngi No.23,
Sher Shah Road, Multan
Phone No.061-6515470
Fax No. 061-6515471

No. /Dir(Miant)Punjab-South)/NHA/2009/ 19 January 19 ,2009

Deputy Director (Maintenance),
National Highway Authority,
Rahimyar Khan.

Subject:- **SITE INSPECTION OF GENERAL MANAGER (P-S).**

During the site inspection General Manager (Punjab-South) on 17.01.2009 has taken serious notice regarding the road condition of Maintenance Unit R.Y. Khan specially the recently improvement works of N-20.

2. You are therefore required to get the defective portion of N-20 repaired through the respective contractors on emergency basis to avoid inconvenience to road users.

3. This should be treated most urgent.

(NAZIR AHMED BHAYO) 19/01
Director (Maintenance)
Punjab-South

MF

Copy to:-

- General Manager (Punjab-South) NHA, Multan.

NATIONAL HIGHWAY AUTHORITY
(PUNJAB-SOUTH REGION)

Reminder-II

Garden Town, Chowngi No.23,
Sher Shah Road, Multan
Phone No.061-6515470
Fax No. 061-6515471

No. /Dir(Maint)Punjab-South)/NHA/2008/2317 December 29, 2008

M/s Abdul Sttar Bhayo,
Kashmore.

Subject:- **CONTRACT NO.EM-PS-08-50-08 (KM 36+500 TO KM 42+000) ON N-20.**

Reference:- Correspondence resting with this office letter No.5(c)/Dir(Maint) (P-S)/NHA/2008/2733 dated 20.12.2008

During site inspection of N-20 on dated 26.12.2008, it has been seriously observed that the damaged section was not rectified despite several times verbal as well as written instructions. In this regard you are once again strictly directed that to undertake and complete the rectification of defective works for smooth flow of traffic without any further delay.

(NAZIR AHMED BHAYO)
Director (Maintenance)
Punjab-South

M/F

Copy to:-

- General Manager (Punjab-South) NHA, Multan.
- Deputy Director (Maintenance) R.Y. Khan. ... He is strictly directed to ensure rectification of works and report.

NATIONAL HIGHWAY AUTHORITY
OFFICE OF THE DIRECTOR (MAINTENANCE)
PUNJAB-SOUTH REGION

Garden Town, Shershah Road,
Multan.
Tel. 6515472, Fax: 6515471

No. 5 (C)Dir(Maint)/(P-S)/NHA/2008/2785 December 20 ,2008

M/s Abdul Sattar Bhayo, Kashmore

Subject: REPAIR/RECTIFICATION OF SITE DURING THE DEFECT LIABILITY PERIOD (CONTRACT NO. EM-PS-08-50-08) N-20

This is in continuation to Dy. Director (Maintenance) letter No.DD/Maint/NHA/RYK/2008/4406 dated 16th December, 2008. You are hereby strictly directed to rectify the work (TST) without any delay.

2. This may be treated as **Most Urgent**.

20/12

(NAZIR AHMED BHAYO)
Director (Maintenance)
(Punjab-South)

M/F

CC:

General Manager (Punjab-South) NHA, Multan
Dy. Director (Maintenance) Rahim Yar Khan

Keep close liaison with contractors and get work rectified immediately.

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN
206-A,Block-Z,Scheme #.2 Gulshan-e-Iqbal Rahim Yar Khan
Office Ph:068-5877751,Fax:068-5877751

No.DD/Maint/NHA/RYK/2008/6446-6

16th December, 2008

M/s Abdul Sattar Bhayo
Kashmore.

Subject: **REPAIR/ RECTIFICATION OF SITE DURING THE DEFECT LIABILITY PERIOD (CONTRACT NO. EM-PS-08-50-08) N-20**

It is to inform that during recent rains the Triple Surface Treatment carried out by your firm badly damaged at several places in your contract reach which you have done two month back in contract No: EM-PS-08-50-08 (N-20). As per contract the defect liability period expires on 19.06.2009 accordingly.

You are therefore directed to repair/ rectify the damaged Triple Surface Treatment as per contract obligation.

In case of non-compliance of the above, rectification/ repairs shall be done at your risk and cost.

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan.

Copy for information to:

- General Manager (Punjab-South) NHA, Multan
- Director (Maintenance) P-S, NHA, Multan
- Office Copy

NHA
NATIONAL HIGHWAY AUTHORITY
(PUNJAB-SOUTH REGION)

Garden Town, Chowngi No.23,
Sher Shah Road, Multan
Phone No.061-6515470
Fax No. 061-6515471

No. /Dir(Miant)Punjab-South)/NHA/2008/2815 December ,2008

M/s Mustafa Enterprises,
Karachi.

Subject:- **CONTRACT NO.EM-PS-08-50-60 (KM 26 TO KM 31) ON N-20.**

Reference:- Correspondence resting with this office letter No.5(c)/Dir(Maint) (P-S)/NHA/2008/2733 dated 20.12.2008

During site inspection of N-20 on dated 26.12.2008, it has been seriously observed that the damaged section was not rectified despite several times verbal as well as written instructions. In this regard you are once again strictly directed that to undertake and complete the rectification of defective works for smooth flow of traffic without any further delay.

(NAZIR AHMED BHATTI)
Director (Maintenance)
Punjab-South

M/F

Copy to:-

1. General Manager (Punjab-South) NHA, Multan.
2. Deputy Director (Maintenance) R.Y. Khan. ... He is strictly directed to ensure rectification of works and report.

NHA

NATIONAL HIGHWAY AUTHORITY
OFFICE OF THE DIRECTOR (MAINTENANCE)
PUNJAB-SOUTH REGION

Garden Town, Shershah Road,
Multan.
Tel. 6515472, Fax: 6515471

No. 5 (C)Dir(Maint)/(P-S)/NHA/2008/9783 December 20 ,2008

M/s Mustafa Enterprises, Karachi

Subject: REPAIR/RECTIFICATION OF SITE DURING THE DEFECT LIABILITY PERIOD (CONTRACT NO. EM-PS-08-50-06) N-20

This is in continuation to Dy. Director (Maintenance) letter No.DD/Maint/NHA/RYK/2008/4404 dated 16th December, 2008. You are hereby strictly directed to rectify the work (TST) without any delay.

2. This may be treated as **Most Urgent**.

(NAZIR AHMED BHAYO)
Director (Maintenance)
(Punjab-South)

MIF

CC:

- General Manager (Punjab-South) NHA, Multan
- Dy. Director (Maintenance) Rahim Yar Khan

Keep close liaison with contractors and get work rectified immediately

NHA

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN
266-A,Block-Z,Scheme #.2 Gulshan-e-Iqbal Rahim Yar Khan
Office Ph:068-5877751,Fax:068-5877751

No.DD/Maint/NHA/RYK/2008/4404 16th December, 2008

M/s Mustafa Enterprises
Karachi.

Subject: **REPAIR/ RECTIFICATION OF SITE DURING THE DEFECT LIABILITY PERIOD (CONTRACT NO. EM-PS-08-50-06) N-20**

It is to inform that during recent rains the Triple Surface Treatment carried out by your firm badly damaged at several places in your contract reach which you have done two month back in contract No: EM-PS-08-50-06 (N-20). As per contract the defect liability period expires on 23.06.2009 accordingly.

You are therefore directed to repair/ rectify the damaged Triple Surface Treatment as per contract obligation.

In case of non-compliance of the above, rectification/ repairs shall be done at your risk and cost.

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan.

Copy for information to:

- General Manager (Punjab-South) NHA, Multan
- Director (Maintenance) P-S, NHA, Multan
- Office Copy

NATIONAL HIGHWAY AUTHORITY
(PUNJAB-SOUTH REGION)

Garden Town, Choungi No.23,
Sher Shah Road, Multan
Phone No.061-6515470
Fax No. 061-6515471

No. /Dir(Miant)Punjab-South)/NHA/2008/3816 December 29 ,2008

M/s United Engineer Associates,
Rahim Yar Khan.

Subject:- **CONTRACT NO.EM-PS-08-50-07 (KM 31 TO KM 36+500) ON N-20.**

Reference:- Correspondence resting with this office letter No.5(c)/Dir(Maint) (P-S)/NHA/2008/2733 dated 20.12.2008

During site inspection of N-20 on dated 26.12.2008, it has been seriously observed that the damaged section was not rectified despite several times verbal as well as written instructions. In this regard you are once again strictly directed that to undertake and complete the rectification of defective works for smooth flow of traffic without any further delay.

(NAZIR AHMED BHAYO)
Director (Maintenance)
Punjab-South

MF

Copy to:-

- General Manager (Punjab-South) NHA, Multan.
- Deputy Director (Maintenance) R.Y. Khan. ... He is strictly directed to ensure rectification of works and report.

NATIONAL HIGHWAY AUTHORITY
OFFICE OF THE DIRECTOR (MAINTENANCE)
PUNJAB-SOUTH REGION

Garden Town, Shershah Road,
Multan.
Tel. 6515472, Fax: 6515471

No. 5 (C)Dir(Maint)/(P-S)/NHA/2008/2784 December 20 ,2008

M/s United Engineering Associates, Rahim Yar Khan

Subject: **REPAIR/RECTIFICATION OF SITE DURING THE DEFECT LIABILITY PERIOD (CONTRACT NO. EM-PS-08-50-07) N-20**

This is in continuation to Dy. Director (Maintenance) letter No.DD/Maint/NHA/RYK/2008/4405 dated 16th December, 2008. You are hereby strictly directed to rectify the work (TST) without any delay.

2. This may be treated as **Most Urgent**.

M/F

(NAZIR AHMED BHAYO)
Director (Maintenance)
(Punjab-South)

CC:

- General Manager (Punjab-South) NHA, Multan
- Dy. Director (Maintenance) Rahim Yar Khan

Keep close liaison with contractors and get work rectified immediately.

NATIONAL HIGHWAY AUTHORITY
MAINTENANCE UNIT RAHIM YAR KHAN
206-A,Block-Z,Scheme # 2 Gulshan-e-Iqbal Rahim Yar Khan
Office Ph:068-5877751,Fax:068-5877751

16th December, 2008

No.DD/Maint/NHA/RYK/2008/4405

M/s United Engineering Associates
Rahim Yar Khan.

Subject: **REPAIR/ RECTIFICATION OF SITE DURING THE DEFECT LIABILITY PERIOD (CONTRACT NO. EM-PS-08-50-07) N-20**

It is to inform that during recent rains the Triple Surface Treatment carried out by your firm badly damaged at several places in your contract reach which you have done two month back in contract No: EM-PS-08-50-07 (N-20). As per contract the defect liability period expires on 25.05.2009 accordingly.

You are therefore directed to repair/ rectify the damaged Triple Surface Treatment as per contract obligation.

In case of non-compliance of the above, rectification/ repairs shall be done at your risk and cost.

17/12

(Muhammad Hasnain Ali)
Deputy Director (Maint)
NHA, Rahim Yar Khan.

Copy for information to:

- General Manager (Punjab-South) NHA, Multan
- Director (Maintenance) P-S, NHA, Multan
- Office Copy

NATIONAL HIGHWAY AUTHORITY
(PUNJAB-SOUTH REGION)

Garden Town, Choungi No..:3,
Sher Shah Road, Multan
Phone No.061-6538327
Fax No. 061-6537902

No.Dir(Maint)/(Punjab-South)/NHA/2008/2607 September 24, ,2008

Mr. Tariq Moosa Memon,
Deputy Director (Maintenance),
National Highway Authority,
R.Y. Khan.

Subject:- **LACK OF SUPERVISION**

Briefly, the public representatives of the area are complaining to this office that old tree crops are being cut by the some thieves on N-20. Reportedly approximate 20 (twenty) numbers trees were found stolen from the either sides of this vital link between N-5 and N-55. Such cutting of trees seems in collaboration of contractors staff mobilized at site.

2. Moreover, it is further noticed that the frequent site visits are also not conducting by you and respective supervisors which reflect your lethargic attitude. The same has already been pointed out vide this office letter No.Dir(Maint)/(Punjab-South)/NHA/2008/2586 dated 13th September 2008.

3. Being a field officer, your are required to improve your efficiency with regard to site inspections for on gonging works/schemes as well as proper monitoring of NHA assets. It may also be emphasised to ensure the completion of ongoing works strictly in adherence with recognized standards.

4. Furthermore, the theft of trees on N-20 may also be investigated and compliance report be forwarded to this office within a week.

(NAZIR AHMED BHAYO)
Director (Maintenance)

MIF

Copy to:-

- General Manager (Punjab-South) NHA, Multan.

Subject: **TOUR NOTE**

Undersigned conducted site visit of N-70, N-55, N-20 & N-5 from 19.7.2008 to 21.7.2008.

Following observations are hereby put up for kind consideration, please:

N-70

i) Construction of rigid pavement is in Muzaffargarh urban area at two locations i.e Ghaneshna canal to Fayyaz Park ii) Thal Chowk.

iii) Filling of potholes between M.Garh Canal to Ghazi Ghat Chowk.

iv) Highway safety (chevron board is required) at sharp curve and high embankment.

v) Widening of Drahma Canal Bridge at Km 78+100 (N-70) is required due to (Narrow bridge, parapet damaged due to accident)

vi) Rehabilitation of road at Km 91-108 (N-70) is required due to worst condition of road.

vii) Rehabilitation & widening of road Km 108-122 is required.

viii) Road condition is very poor at Km 148+400-148+830 (A/Dy. Director (Maint) informed that estimate has already been submitted for approval to NHA, HQ with request that NHA HQ may be approached for approval of Engineer's Estimate.

ix) Km 151/152 causeway rigid pavement, retaining wall required (A/Dy. Director (Maint) informed that estimate has already been submitted for approval at NHA, HQ with request that NHA HQ may be approached for approval of Engineer's Estimate.

x) Km 152+900 widening of bridge (Tahli bridge) required.

xi) Km 161+500 widening of bridge required.

xii) Km 161-165 (retendering of emergency maintenance contract, negotiation should be

carried out with 2nd lowest bidder for EM-PS-08-50-02)

xiii) Km 172-174 (retendering of emergency maintenance contract required)

N-20

While site inspection of N 20, following comments offered:

i) Contractors at N-20 working at their own will and no field staff from NHA is available there. It is further added that there is no responsible person from contractor's side is present at site. No proper arrangements for free flow Traffic was arranged and traffic was blocked at site. No flagman is available.

ii) The contractors are dumping the material on road side and lying 2nd & final layer of material through tractors without proper level/camber.

iii) Oversize WBM has also been dumped at site. There is no active control of field staff or from contractors at site.

2. Submitted for kind information, please.

(NAZIR AHMED BHAYO)
Director (Maintenance) Punjab-South

General Manager (Punjab-South)