Transportation Engineering Laboratory (TEL)

Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Atta Farid
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Rehabilitation/Improvement of Hujra Havali Lakha Road (Length = 34.50 km)
Tehsil Depalpur, District Okara

Dear Sir,

It is with reference to your letter No. 4267/Okara/RRP-24-25/RE/78 dated 17-02-2025.
Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 10-04-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	72.26	10.05	0.77	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.71
Specific Gravity (saturated surface dry condition)	2.73
Apparent Specific Gravity	2.76
Water Absorption (%)	0.65

3. **Sodium Sulphate Soundness (ASTM C-88)**

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
2” + 1 ½”	5007.9	4982.8	0.50	0.36
	Total = 0.36%			

4. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.49

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
3	2 ½	0	0	3.87	1.07
2 ½	2	5.85	3.64	8.23	5.12
2	1 ½	8.27	0.77	14.16	1.31
1 ½	1	0	0	39.61	0.30
		Flakiness Index = 4.41%		**Elongation Index = 7.80%**	

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Atta Farid
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Rehabilitation/Improvement of Depalpur-Pipli Pahar Road (Length = 19.30 km)
Tehsil Depalpur, District Okara

Dear Sir,

It is with reference to your letter No. 4267/Okara/RRP-24-25/RE/05 dated 21-10-2024. Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 10-04-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	78.73	10.48	0.38	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.72
Specific Gravity (saturated surface dry condition)	2.73
Apparent Specific Gravity	2.76
Water Absorption (%)	0.53

3. **Sodium Sulphate Soundness (ASTM C-88)**

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
2” + 1 ½”	5009.9	4985.8	0.48	0.38
	Total = 0.38%			

4. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.00

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
3	2 ½	0	0	6.88	1.42
2 ½	2	6.08	4.15	9.26	6.32
2	1 ½	8.42	0.85	10.80	1.09
1 ½	1	0	0	49.20	0.19
		Flakiness Index = 5.00%		**Elongation Index = 9.02%**	

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Atta Farid
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Rehabilitation/Improvement of Road from Shergarh to Okara Depalpur Road at Chorasta 38/D (Length = 17.50 km) Tehsil Depalpur, District Okara

Dear Sir,

It is with reference to your letter No. 4267/Okara/RRP-24-25/RE/75 dated 17-02-2025.
Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 10-04-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	80.87	11.00	0.41	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.71
Specific Gravity (saturated surface dry condition)	2.73
Apparent Specific Gravity	2.75
Water Absorption (%)	0.59

3. **Sodium Sulphate Soundness (ASTM C-88)**

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
2” + 1 ½”	5001.3	4976.2	0.50	0.40
	Total = 0.40%			

4. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.80

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
3	2 ½	0	0	11.68	2.23
2 ½	2	4.76	3.33	7.16	5.00
2	1 ½	10.80	1.14	14.68	1.55
1 ½	1	0	0	20.00	0.08
		Flakiness Index = 4.47%		**Elongation Index = 8.86%**	

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Atta Farid
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Rehabilitation/Improvement of Kator Wala Bunga Hayat Road, Section District Pakpattan, (Length = 20.00 km) Tehsil & District Pakpattan

Dear Sir,

It is with reference to your letter No. 4834/Pakpattan/RRP-24-25/RE/03A dated 21-10-2024. Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 17-04-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	79.08	14.00	0.90	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.72
Specific Gravity (saturated surface dry condition)	2.73
Apparent Specific Gravity	2.76
Water Absorption (%)	0.51

3. **Sodium Sulphate Soundness (ASTM C-88)**

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
2” + 1 ½”	5010.3	4993.3	0.34	0.27
	Total = 0.27%			

4. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	19.50

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
3	2 ½	0	0	0	0
2 ½	2	7.12	4.63	11.28	7.34
2	1 ½	11.62	1.52	17.14	2.25
1 ½	1	0	0	24.22	0.22
		Flakiness Index = 6.15%		**Elongation Index = 9.81%**	

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Atta Farid
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Rehabilitation/Improvement of Pakpattan Pir Ghani Road, (Length = 22.00 km)
Tehsil & District Pakpattan

Dear Sir,

It is with reference to your letter No. 4834/Pakpattan/RRP-24-25/RE/05A dated 21-10-2024. Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 17-04-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	77.58	15.77	1.37	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.71
Specific Gravity (saturated surface dry condition)	2.72
Apparent Specific Gravity	2.75
Water Absorption (%)	0.50

3. **Sodium Sulphate Soundness (ASTM C-88)**

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
2” + 1 ½”	5004.4	4986.3	0.36	0.27
	Total = 0.27%			

4. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.38

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
3	2 ½	0	0	0	0
2 ½	2	7.24	4.48	11.66	7.21
2	1 ½	10.81	1.56	16.01	2.31
1 ½	1	0	0	16.66	0.23
		Flakiness Index = 6.04%		**Elongation Index = 9.75%**	

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Atta Farid
Resident Engineer,
NESPAK.

Subject: **Testing of Water Bound Macadam**
Rehabilitation/Improvement of Gamber-Pakpattan Road, (Length = 26.10 km) Tehsil & District Okara

Dear Sir,

It is with reference to your letter No. 4267/Okara/RRP-24-25/RE/80 dated 17-02-2025.
Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 17-04-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	78.36	15.35	1.39	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.73
Specific Gravity (saturated surface dry condition)	2.74
Apparent Specific Gravity	2.76
Water Absorption (%)	0.46

3. **Sodium Sulphate Soundness (ASTM C-88)**

Sieve Size	Weight of Fraction Before Test (gm)	Weight of Fraction After Test (gm)	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
2” + 1 ½”	5002.4	4985.4	0.34	0.26
	Total = 0.26%			

4. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	19.75

5. Flakiness & Elongation Index (BS 812: Part 105)

Sieve Size		Individual Flakiness Index (%)	Weighted Flakiness Index (%)	Individual Elongation Index (%)	Weighted Elongation Index (%)
Passing (in.)	Retained (in.)				
3	2 ½	0	0	0	0
2 ½	2	6.85	4.32	11.82	7.45
2	1 ½	10.38	1.45	16.37	2.29
1 ½	1	4.53	0.06	20.34	0.28
		Flakiness Index = 5.83%		**Elongation Index = 10.02%**	

If you have further query, please do not hesitate to contact the undersigned.

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Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Saddam Hussain
Material Engineer,
NESPAK, Lahore.

Subject: **Testing of Crush Material**
Rehabilitation of Road Under WASA Scheme, Improvement of Water Supply/Sewerage System in UC 228, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/11/SH/01/1427 dated 30-04-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	1”	¾”	½”	3/8”	#4
%age Passing	100	100	49.83	6.90	0.13

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.84
Specific Gravity (saturated surface dry condition)	2.85
Apparent Specific Gravity	2.86
Water Absorption (%)	0.29

3. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
B	15.79

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Saddam Hussain
Material Engineer,
NESPAK, Lahore.

Subject: **Testing of Sub-base Material**
Rehabilitation of Road Under WASA Scheme, Improvement of Water Supply/Sewerage System in UC 228, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/11/SH/01/1429 dated 30-04-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	82.44	66.11	54.00	44.99	37.74

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.67
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.75
Water Absorption (%)	1.14

3. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
A	28.00

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Saddam Hussain
Material Engineer,
NESPAK, Lahore.

Subject: **Testing of Sub-base Material**
Rehabilitation of Road Under WASA Scheme, Improvement of Water Supply/Sewerage System in UC 239, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/11/SH/01/1502 dated 26-05-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 30-05-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	98.17	80.06	64.28	52.30	44.59	37.65

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.65
Specific Gravity (saturated surface dry condition)	2.68
Apparent Specific Gravity	2.73
Water Absorption (%)	1.09

3. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
A	28.50

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

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LAHORE – 54890 (PAKISTAN)

Phone: 092-42-9929202 Cable: UNIVENGTECH Fax: 092-42-9922566

Ref.---------- Date:----------

Mr. Saddam Hussain
Material Engineer,
NESPAK, Lahore.

Subject: **Testing of Water Bound Macadam Material**
Rehabilitation of Road Under WASA Scheme, Improvement of Water Supply/Sewerage System in UC 239, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/11/SH/01/1503 dated 26-05-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory on 30-05-2025 through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3”	2 ½”	2”	1 ½”	1”	¾”	½”	3/8”	#4
%age Passing	100	86.96	25.14	0.92	0	0	0	0	0

2. **Specific Gravity & Water Absorption (ASTM C-127)**

Specific Gravity (oven dried condition)	2.71
Specific Gravity (saturated surface dry condition)	2.73
Apparent Specific Gravity	2.76
Water Absorption (%)	0.65

3. **Los Angeles Abrasion Value Test (ASTM C-131/535)**

Grading Used	**Los Angeles Abrasion Value (%)**
1	20.10

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Best Regards,

Director
Transportation Engineering Laboratory

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE – 54890 (PAKISTAN)

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Ref.---------- Date:----------

Mr. Saddam Hussain
Material Engineer,
NESPAK, Lahore.

Subject: **Testing of Sand (Local)**
Rehabilitation of Road Under WASA Scheme, Improvement of Water Supply/Sewerage System in UC 228, Nishter Zone, Lahore

Dear Sir,

It is with reference to your letter No. 43101/11/SH/01/1428 dated 30-04-2025.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

1. **Sieve Analysis (ASTM C-136)**

Sieve Size	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.68	99.10	98.27	97.30	81.72	10.54	1.99

2. **Fineness Modulus (ASTM C-142)**

Fineness Modulus (%)	1.13

3. **Specific Gravity & Water Absorption (ASTM C-128)**

Specific Gravity (OD)	2.65
Specific Gravity (SSD)	2.67
Apparent Specific Gravity	2.70
Water Absorption (%)	0.75

If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director
Transportation Engineering Laboratory

Note:
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