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. Muhammad Shafiq
Assistant Resident Engineer,
Package-III (PCP) Kamalia.

Subject: **Testing of Coarse Aggregate**
Improvement of Sewerage System and Construction of Waste Water Treatment Plant (WWTP) Kamalia City
Package 02 – Disposal Station & Force Main Kamalia City

Dear Sir,

It is with reference to your letter No. MMP/1095/Kamalia/DW/78/2024 dated 09-12-2024. Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

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

Specific Gravity (oven dried condition)	2.66
Specific Gravity (saturated surface dry condition)	2.68
Apparent Specific Gravity	2.69
Water Absorption (%)	0.40

2. **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
$1/2" + 3/8"$	1002.9	993.1	0.98	0.98
	Total = 0.98%			

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

Grading Used	**Los Angeles Abrasion Value (%)**
B	15.57

4. **Angularity No. (BS 812: Part 1)**

Angularity No.	10

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.)				
$^3/_4$	$^1/_2$	8.25	8.03	8.99	8.75
$^1/_2$	$^3/_8$	0	0	29.89	0.77
		Flakiness Index = 8.03%		**Elongation Index = 9.52%**	

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. Muhammad Shafiq
Assistant Resident Engineer,
Package-III (PCP) Kamalia.

Subject: **Testing of Fine Aggregate**
Improvement of Sewerage System and Construction of Waste Water Treatment Plant (WWTP) Kamalia City
Package 02 – Disposal Station & Force Main Kamalia City

Dear Sir,

It is with reference to your letter No. MMP/1095/Kamalia/DW/79/2024 dated 09-12-2024. 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	98.87	98.34	97.45	96.51	45.74	6.31	1.13

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

Fineness Modulus (%)	1.57

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

Specific Gravity (OD)	2.64
Specific Gravity (SSD)	2.66
Apparent Specific Gravity	2.70
Water Absorption (%)	0.86

4. **Organic Impurities (ASTM C-40)**

Organic Impurities	Nil

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. M. Waseem Azhar
Assistant Director (Q.C.D),
WASA,
LDA,
Lahore.

Subject: **Testing of Crush (M/s Future Pipe Industry, Lahore)**

Dear Sir,

It is with reference to your letter No. QCD/2486 dated 11-12-2024.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

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

Specific Gravity (oven dried condition)	2.81
Specific Gravity (saturated surface dry condition)	2.82
Apparent Specific Gravity	2.85
Water Absorption (%)	0.50

2. **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
$1/2" + 3/8"$	1002.2	990.4	1.18	0.84
	Total = 0.84%			

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

Grading Used	Los Angeles Abrasion Value (%)
B	16.40

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. M. Waseem Azhar
Assistant Director (Q.C.D),
WASA, LDA, Lahore.

Subject: **Testing of Sand (M/s Future Pipe Industry, Lahore)**

Dear Sir,

It is with reference to your letter No. QCD/2487 dated 11-12-2024.
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	99.80	99.43	99.12	84.42	17.41	8.34	1.82

2. **Percentage of Silt and Clay (ASTM D-1140)** *Wet Sieving*

Silt and Clay (%)	3.74

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

Fineness Modulus (%)	1.92

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

Specific Gravity (OD)	2.65
Specific Gravity (SSD)	2.67
Apparent Specific Gravity	2.71
Water Absorption (%)	0.78

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. M. Waseem Azhar
Assistant Director (Q.C.D),
WASA, LDA, Lahore.

Subject: **Testing of (Harrow) Sand (M/s Future Pipe Industry, Lahore)**

Dear Sir,

It is with reference to your letter No. QCD/2485 dated 11-12-2024.
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	½"	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	98.89	95.86	90.82	80.21	63.96	27.15	5.79	1.07

2. **Percentage of Silt and Clay (ASTM D-1140)** *Wet Sieving*

Silt and Clay (%)	1.78

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

Fineness Modulus (%)	2.37

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

Specific Gravity (OD)	2.67
Specific Gravity (SSD)	2.69
Apparent Specific Gravity	2.73
Water Absorption (%)	0.79

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. M. Waseem Azhar
Assistant Director (Q.C.D),
WASA,
LDA,
Lahore.

Subject: **Testing of Crush (M/s Universal RCC Pipe Factory)**

Dear Sir,

It is with reference to your letter No. QCD/2547 dated 16-12-2024.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

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

Specific Gravity (oven dried condition)	2.82
Specific Gravity (saturated surface dry condition)	2.83
Apparent Specific Gravity	2.85
Water Absorption (%)	0.40

2. **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
$1/2" + 3/8"$	1006.4	995.3	1.10	0.87
	Total = 0.87%			

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

Grading Used	Los Angeles Abrasion Value (%)
B	15.99

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. M. Waseem Azhar
Assistant Director (Q.C.D),
WASA, LDA, Lahore.

Subject: **Testing of (Harrow) Sand (M/s Future Pipe Industry)**

Dear Sir,

It is with reference to your letter No. QCD/2647 dated 27-12-2024.
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	½"	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.58	96.54	91.49	80.79	64.47	27.21	5.28	1.00

2. **Percentage of Silt and Clay (ASTM D-1140)** *Wet Sieving*

Silt and Clay (%)	1.61

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

Fineness Modulus (%)	2.35

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

Specific Gravity (OD)	2.67
Specific Gravity (SSD)	2.69
Apparent Specific Gravity	2.73
Water Absorption (%)	0.83

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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:----------

Dr. Mansoor Ahmad Hashmi
Team Leader,
NESPAK,
Lahore.

Subject: **Testing of Fine Aggregate**
Installation of Telemetry System for Real-Time Discharge Monitoring at 27 Key Sites on Indus Basin Irrigation System (IBIS)
Contract No. IBIS-PSDP (1170)/ICB-01

Dear Sir,

It is with reference to your letter No. 4641/061/MAH/01/262 dated 20-12-2024.
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	½"	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	97.48	91.87	82.86	66.08	47.73	27.78	4.72	1.19

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

Fineness Modulus (%)	2.81

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
#4 to #8	100	98.9	1.10	0.10
#8 to #16	100	98.8	1.20	0.20
#16 to #30	100	99.1	0.90	0.17
#30 to #50	100	99.0	1.00	0.20
				Total = 0.67%

4. **Organic Impurities (ASTM C-40)**

Organic Impurities	Nil

5. Clay Lumps and Friable Particles (ASTM C-142)

Clay Lumps and Friable Particles (%)	0.58

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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:----------

Dr. Mansoor Ahmad Hashmi
Project Manager/Team Leader,
NESPAK,
Lahore.

Subject: **Testing of Coarse Aggregates**
Installation of Telemetry System for Real-Time Discharge Monitoring at 27 Key Sites on Indus Basin Irrigation System (IBIS)
Contract No. IBIS-PSDP (1170)/ICB-01

Dear Sir,

It is with reference to your letter No. 4641/061/MAH/01/261 dated 20-12-2024.
Please find below the results for the tests conducted on the aggregate samples provided to this laboratory through your representative.

Coarse Aggregates

Sakhi Sarwar (1" Down)

Sieve Analysis (ASTM C-136)

Sieve Size	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	98.25	14.99	0	0	0

Sakhi Sarwar (¾" Down)

Sieve Analysis (ASTM C-136)

Sieve Size	1"	¾"	½"	3/8"	#4
%age Passing	100	44.78	0.31	0	0

Sakhi Sarwar (½" Down)

Sieve Analysis (ASTM C-136)

Sieve Size	1"	¾"	½"	3/8"	#4
%age Passing	100	96.01	40.32	2.25	0

Mixed Sample

1. **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	2.74
Water Absorption (%)	1.27

2. **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
$1/2" + 3/8"$	1001.3	987.2	1.41	0.72
	Total = 0.72%			

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

Grading Used	**Los Angeles Abrasion Value (%)**
A	24.49

4. **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.)**				
1 ½	1	0	0	0	0
1	$3/4$	6.99	3.36	7.71	3.70
$3/4$	$1/2$	8.25	3.20	8.63	3.35
$1/2$	$3/8$	6.39	0.76	8.67	1.04
$3/8$	$1/4$	0	0	38.50	0.27
		Flakiness Index = 7.32%		**Elongation Index = 8.36%**	

5. **Clay Lumps and Friable Particles (ASTM C-142)**

Clay Lumps and Friable Particles (%)	0.35

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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:----------

Dr. Mansoor Ahmad Hashmi
Project Manager/Team Leader,
NESPAK,
Lahore.

Subject: **Testing of Coarse Aggregate**
Installation of Telemetry System for Real-Time Discharge Monitoring at 27 Key Sites on Indus Basin Irrigation System (IBIS)
Contract No. IBIS-PSDP (1170)/ICB-01

Dear Sir,

It is with reference to your letter No. 4641/061/MAH/01/259 dated 20-12-2024.
Please find below the results for the tests conducted on the aggregate sample provided to this laboratory through your representative.

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.69
Apparent Specific Gravity	2.71
Water Absorption (%)	0.36

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

Grading Used	Los Angeles Abrasion Value (%)
B	22.12

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. Rashid Kamran
Resident Engineer,
NESPAK, Lahore.

Subject: **Testing of Fine Aggregate (Chenab Sand)**
Construction of Electric Bus Depot at Green Town, Lahore

Dear Sir,

It is with reference to your letter No. 4792/13/RK/05/05 dated 18-12-2024.
Please find below the results for the tests conducted on the sand 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	99.80	99.30	98.76	98.04	82.32	11.35	2.10

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

Fineness Modulus (%)	1.10

3. **Clay Lumps and Friable Particles (ASTM C-142)**

Clay Lumps and Friable Particles (%)	2.18

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.

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. Umair Sarwar
Deputy Director (M&I) Pb-North,
National Highway Authority, Lahore.

Subject: **Testing of Samples**
Construction of Service Road PM-2020-21-PN-07
(km 1409 to km 1414 + 350 NBC/SBC)

Dear Sir,

It is with reference to your letter No. DD (M&I)/Pb-N/NHA/2025/206 dated 22-01-2025. Please find below the results for the tests conducted on the cores and chunks of asphalt concrete and samples of aggregates provided to this laboratory through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core #	Mean Thickness (cm)	Mean Diameter (cm)	Bulk Specific Gravity
1	5.897	9.400	2.389
2	5.877	9.400	2.359
3	7.097	9.400	2.416
4	5.810	9.400	2.374
5	6.277	9.400	2.382
6	6.460	9.400	2.355
7	6.833	9.400	2.394
8	6.090	9.400	2.391
9	6.747	9.400	2.367
10	8.117	9.400	2.380

BITUMEN EXTRACTION TEST: (Asphalt Mix Samples/Chunks)

Asphalt Wearing Course: Sample # 1

Bitumen Extraction Value (ASTM D-2172)					**4.33%**		
Gradation Analysis							
Sieve No.	¾”	½”	3/8”	#4	#8	#50	#200
% Passing	100	95.05	84.16	69.15	35.17	9.76	3.62

Asphalt Wearing Course: Sample # 2

Bitumen Extraction Value (ASTM D-2172)							**4.35%**
Gradation Analysis							
Sieve No.	¾"	½"	3/8"	#4	#8	#50	#200
% Passing	100	94.25	83.08	68.14	35.84	11.39	4.56

Testing on Coarse Aggregates

WBM

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

Sieve Size	3 ½"	3"	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	97.30	72.18	14.61	1.32	0	0	0	0	0

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.69
Apparent Specific Gravity	2.70
Water Absorption (%)	0.29

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

Grading Used	**Los Angeles Abrasion Value (%)**
1	16.76

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

Sieve Size		**Individual Flakiness Index (%)**	**Weighted Flakiness Index (%)**
Passing (in.)	**Retained (in.)**		
3 ½	3	0	0
3	2 ½	6.23	1.57
2 ½	2	4.68	2.69
2	1 ½	5.94	0.79
1 ½	1	0	0
		Flakiness Index = 5.05%	

Sub-base

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

Sieve Size	2"	1 ½"	1"	¾"	½"	3/8"	#4
%age Passing	100	70.24	32.07	24.47	22.38	21.79	21.45

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

Specific Gravity (oven dried condition)	2.70
Specific Gravity (saturated surface dry condition)	2.71
Apparent Specific Gravity	2.73
Water Absorption (%)	0.46

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

Sieve Size		**Individual Flakiness Index (%)**	**Weighted Flakiness Index (%)**
Passing (in.)	**Retained (in.)**		
2	1 ½	11.71	4.44
1 ½	1	6.13	2.98
1	3/4	1.70	0.16
3/4	1/2	4.62	0.12
1/2	3/8	4.27	0.03
3/8	1/4	6.24	0.03
		Flakiness Index = 7.76%	

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

Best Regards,

Director
Transportation Engineering Laboratory

Note:
1. This test report is based solely on the particular sample(s) supplied by the client and should not be reproduced in parts.
2. Sampling has not been performed by Transportation Engineering Laboratory (TEL), UET and TEL-UET does not accept the responsibility that the sample(s) supplied is/are truly representative sample(s) of any batch or stock or entire project.
3. While TEL-UET agrees to take every reasonable precaution to ensure validity of its test results, it assumes no liability thereof beyond the amount of the fee charged for the analysis or test.
4. The party shall assume full responsibility for the ethical use of the results in the test reports and the TEL-UET shall be held free from any and all claims which may result from the use of such data by client or others.
5. This test report shall not be reproduced wholly or in parts unless negotiated.