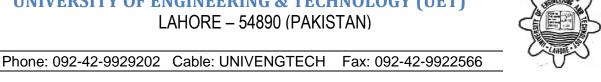
Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)



Date:----

The Executive Engineer, Highways Division,

Ref.----

Narowal.

Subject: <u>Testing of Asphalt Base Course</u>

Project: Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison,

Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1035/DB dated 10-06-2024.

Please find below the results for the tests conducted on the ABC samples provided to this laboratory on 03-07-2024 through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core	Mean Thickness	Mean Diameter	Bulk
	(cm)	(cm)	Specific Gravity
1	7.693	10.500	2.342
2	6.613	10.500	2.395
3	7.017	10.500	2.394
4	6.770	10.500	2.416
5	7.023	10.500	2.420
6	6.583	10.500	2.412
7	6.823	10.500	2.422
8	6.127	10.500	2.436
9	6.867	10.500	2.411
10	6.633	10.500	2.486
11	6.370	10.500	2.436
12	6.250	10.500	2.415
13	9.300	10.500	2.409
14	5.843	10.500	2.404
15	6.457	10.500	2.468

BITUMEN EXTRACTION TEST: (Chunk)

Bitumen Extraction Value (ASTM D-2172) 4.41%								
Gradation Analysis	Gradation Analysis							
Sieve No.	1"	3/4"	1/2"	3/8"	#4	#8	#50	#200
% Passing	100	82.01	65.01	58.02	38.02	22.02	8.01	3.03

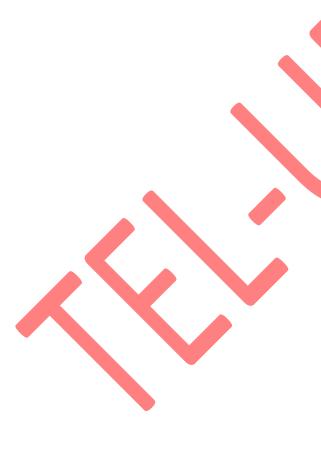
If you have further query, please do not hesitate to contact the undersigned.

Best Regards,

Director

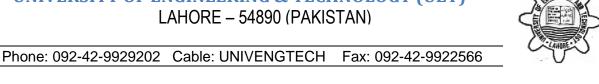
Transportation Engineering Laboratory

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)



Date:----

The Executive Engineer, Highways Division, Narowal.

Ref.----

Subject: Testing of ABC Materials (Asphalt Plant) Coarse Aggregates

Project: Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison,

Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1041/DB dated 10-06-2024.

Please find below the results for the tests conducted on the coarse aggregate samples provided to this laboratory on 03-07-2024 through your representative.

Sample # 1

1. Sieve Analysis (ASTM C-136)

Sieve Size	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	71,98	2.24	0	0

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

Specific Gravity (oven dried condition)	2.86
Specific Gravity (saturated surface dry condition)	2.87
Apparent Specific Gravity	2.90
Water Absorption (%)	0.46

3. Sodium Sulphate Soundness (ASTM C-88)

Sieve Size	Weight of	Weight of	Percentage	Weighted	
	Fraction	Fraction	Passing	Percentage	
	Before Test	After Test	Designated Sieve	Loss	
$\frac{1}{2}$ " + $\frac{3}{8}$ "	(gm)	(gm)	After Test		
/2 /8	1004.3	992.5	1.18	0.85	
	Total = 0.85%				

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

Grading Used	Los Angeles Abrasion Value
	(%)
В	15.67

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

Sieve	e Size	Individual	Weighted	Individual	Weighted
Passing	Retained	Flakiness	Flakiness Flakiness		Elongation
(in.)	(in.)	Index (%)	Index (%)	Index (%)	Index (%)
1	3/4	5.53	1.55	6.54	1.83
3/4	1/2	7.70	5.37	9.78	6.82
1/2	3/8	20.48	0.46	23.89	0.53
		Flakiness Index = 7.38%		Elongation Ind	ex = 9.18%

Sample # 2

1. Sieve Analysis (ASTM C-136)

Sieve Size	3/4"	1/2"	3/8"	#4
%age Passing	100	56.73	10.62	0

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

Specific Gravity (oven dried condition)	2.85
Specific Gravity (saturated surface dry condition)	2.86
Apparent Specific Gravity	2.89
Water Absorption (%)	0.55

3. Sodium Sulphate Soundness (ASTM C-88)

Sieve Size	Weight of	Weight of	Percentage	Weighted	
	Fraction	Fraction	Passing	Percentage	
	Before Test	After Test	Designated Sieve	Loss	
1/2" + 3/8"	(gm)	(gm)	After Test		
/2 /8	1004.3	991.7	1.26	1.13	
	Total = 1.13%				

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

Grading Used	Los Angeles Abrasion Value
	(%)
В	16.21

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

Sieve	e Size	Individual	Weighted	Individual	Weighted
Passing	Retained	Flakiness	Flakiness	Elongation	Elongation
(in.)	(in.)	Index (%)	Index (%)	Index (%)	Index (%)
3/4	$^{1}/_{2}$	8.26	3.58	8.59	3.72
1/2	3/8	9.29	4.28	10.83	4.99
3/8	1/4	9.19	0.98	10.28	1.09
		Flakiness Index = 8.84%		Elongation Ind	ex = 9.80%

Sample # 3

1. Sieve Analysis (ASTM C-136)

Sieve Size	3/8"	#4
%age Passing	100	56.92

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

Specific Gravity (oven dried condition)	2,86
Specific Gravity (saturated surface dry condition)	2.88
Apparent Specific Gravity	2.91
Water Absorption (%)	0.50

3. Sodium Sulphate Soundness (ASTM C-88)

	Sieve Size	Weight of	Weight of	Percentage	Weighted			
ŀ		Fraction	Fraction	Passing	Percentage			
		Before Test		Designated Sieve	Loss			
	#4	(gm)	(gm)	After Test				
		300.9		288.9 3.99				
			Total = 1.72%					

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

Grading Used	Los Angeles Abrasion Value
	(%)
C	16.41

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

Sieve Size		Individual	Weighted	Individual	Weighted	
Passing	Retained	Flakiness Flakiness		Elongation	Elongation	
(in.)	(in.)	Index (%)	Index (%)	Index (%)	Index (%)	
3/8	1/4	5.70	5.70	6.60	6.60	
		Flakiness Inc	dex = 5.70%	Elongation Inde	ex = 6.60%	

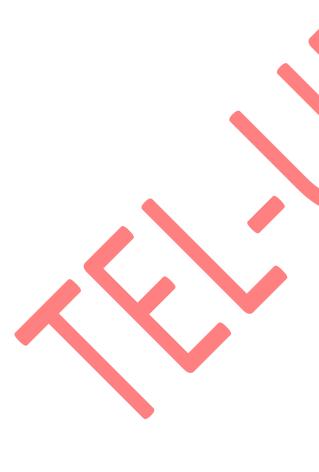
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Best Regards,

Director

Transportation Engineering Laboratory

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)



Date:----

The Executive Engineer, Highways Division,

Narowal.

Ref.----

Testing of Sub-base Material New (Dina Quarry) Subject:

(RD 1398+00 – 1546+00) & (RD 777+00 – 1095+00)

Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison, Project:

Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1049/DB dated 10-06-2024.

Please find below the results for the tests conducted on the coarse aggregate sample provided to this laboratory on 03-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	2"	1 ½"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	89.39	54.05	23.85	1.01	0.19	0

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

Specific Gravity (oven dried condition)	2.68
Specific Gravity (saturated surface dry condition)	2.70
Apparent Specific Gravity	2.74
Water Absorption (%)	0.79

3. Sodium Sulphate Soundness (ASTM C-88)

Sieve Size	Weight of	Weight of	Percentage	Weighted		
	Fraction	Fraction Fraction Passing		Percentage		
	Before Test	After Test	Designated Sieve	Loss		
1" + 3/4"	(gm)	(gm)	After Test			
74	1501.3	1484.3	1.13	0.74		
	Total = 0.74%					

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

Grading Used	Los Angeles Abrasion Value
	(%)
A	25.65

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

Sieve Size		Individual	Weighted	Individual	Weighted	
Passing	Retained	Flakiness	Flakiness	Elongation	Elongation	
(in.)	(in.)	Index (%)	Index (%)	Index (%)	Index (%)	
2	1 ½	3.61	0.38	5.09	0.54	
1 1/2	1	6.89	2.43	8.62	3.04	
1	3/4	9.00	2.72	10.14	3.06	
3/4	1/2	10.64	2.43	11.09	2.53	
1/2	3/8	0	0	43.89	0.36	
3/8	1/4	0	0	59.62	0.11	
		Flakiness Inc	dex = 7.96%	Elongation Ind	ex = 9.64%	

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

Best Regards,

Director

Transportation Engineering Laboratory

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)



Date:----

The Executive Engineer, Highways Division,

Ref.----

Narowal.

Subject: **Testing of Water Bound Macadam**

(RD 1398+00 – 1546+00) & (RD 1778+00 – 1884+00) & (RD 777+00 – 1095+00)

Widening/Improvement of Road from Sialkot Cantt to Jassar Garrison, Project:

Length = 69.00 km in District Narowal

Dear Sir,

It is with reference to your letter No. 1046/DB dated 10-06-2024.

Please find below the results for the tests conducted on the coarse aggregate sample provided to this laboratory on 03-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	3"	2 ½"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4
%age Passing	100	62.30	8.98	0.56	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)	2.75
Apparent Specific Gravity	2.78
Water Absorption (%)	0.68

3. Sodium Sulphate Soundness (ASTM C-88)

	3009.3	4909.2	Total = 0.25%	
2 1 1 /2	5009.3	4989.2	0.40	0.25
2" + 1 ½"	(gm)	(gm)	After Test	
	Before Test	After Test	Designated Sieve	Loss
	Fraction	Fraction	Passing	Percentage
Sieve Size	Weight of	_	Percentage	Weighted

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

Grading Used	Los Angeles Abrasion Value
	(%)
1	20.08

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

Sieve	Sieve Size		Weighted	Individual	Weighted
Passing	Retained	Flakiness	Flakiness	Elongation	Elongation
(in.)	(in.)	Index (%)	Index (%)	Index (%)	Index (%)
3	2 1/2	8.96	3.38	0	0
2 1/2	2	15.51	8.27	11.59	6.18
2	1 1/2	11.34	0.95	12.14	1.02
1 1/2	1	6.00	0.03	12.58	0.07
		Flakiness Inc	dex = 12.63%	Elongation Ind	ex = 7.27%

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

Best Regards,

Director

Transportation Engineering Laboratory

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE - 54890 (PAKISTAN)



Date:-----

The Assistant Director (Tech) Anti-Corruption Establishment, Dera Ghazi Khan.

Ref.----

Subject: Testing of Asphalt Concrete Sample

Testing of Sample Collected During Site Visit in Connection with Enquiry Bearing

No. 368/24

Dear Sir.

It is with reference to your letter No. 122-ADT dated 06-07-2024.

Please find below the results for the tests conducted on the asphalt concrete sample provided to this laboratory on 11-07-2024 through your representative.

BULK SPECIFIC GRAVITY OF COMPACTED ASPHALT (ASTM D2726):

Core	Mean Thickness	Mean Diameter	Bulk Specific
	(cm)	(cm)	Gravity
RD 742 + 00 (C/S)	6.800	10.610	2.392

BITUMEN EXTRACTION TEST:

Bitumen Extracti	on Valu	e (ASTI	<i>A D-217</i>	2)					3	3.58%	
Gradation Analys	is										
Sieve No.	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	82.33	59.49	44.51	33.77	24.35	15.90	12.22	8.70	5.13	2.58

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

Best Regards,

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Director

Transportation Engineering Laboratory

Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE - 54890 (PAKISTAN)



Ref	Date:

Mr. Muhammad Sagib Haider Assistant Resident Engineer, Package-III (PCP), Jhang.

Subject: **Testing of Bitumen**

Construction of New Disposal Station Zone – I in Jhang City PCP

Dear Sir,

It is with reference to your letter No. JHANG/NDZ-I/1095/35 dated 13-07-2024. Please find below the results of tests conducted on the bitumen sample provided to this laboratory on 22-07-2024 through your representative.

Sr.#	Laboratory Tests	Results
1	Penetration (ASTM D-5)	96 Units
2	Ductility (ASTM D-113)	Above 100 cm
3	Softening Point (ASTM D-36)	46.5°C
4	Flash Point (ASTM D-92)	292°C
5	Fire Point (ASTM D-92)	320°C
6	Specific Gravity Value (ASTM D-70)	1.015
7	Loss on Heating Value (ASTM D-6)	0.234%

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

Best Regards,

Note:

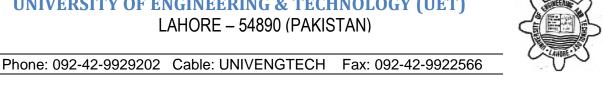
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Director

Transportation Engineering Laboratory

Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)



Mr. Muhammad Sagib Haider Assistant Resident Engineer, Package-III (PCP), Jhang.

Ref.----

Subject: **Testing of Sand**

Construction of New Disposal Station Zone – I in Jhang City PCP

Dear Sir,

It is with reference to your letter No. JHANG/NDZ-I/PKG03/35 dated 13-07-2024. Please find below the results of tests conducted on the sand sample provided to this laboratory on 25-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
%age Passing	100	99.14	96.36	91.12	80.35	64.23	27.11	5.52	1.17

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

Specific Gravity (OD)	2.68
Specific Gravity (SSD)	2.70
Apparent Specific Gravity	2.73
Water Absorption (%)	0.70

3. Moisture Content (ASTM C-566)

Moisture Content (%) 13.88	Moisture Content (%)	13.88
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If you have further query, please do not he sitate to contact the undersigned.

Best Regards,

Director

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)



Date:----

Mr. Saquib Akram Resident Engineer, NESPAK, Lahore.

Ref.----

Testing of Water Bound Macadam Material Subject:

Construction of Road from Natha Singh Pind to Leel Pind. Lahore

Dear Sir,

It is with reference to your letter No. 3772/103/LDA-Leel Pind/SA/04/03 dated 11-07-

Please find below the results for the tests conducted on the WBM sample provided to this laboratory on 25-07-2024 through your representative.

1. Sieve Analysis (ASTM C-136)

Sieve Size	3"	2 1/2"	2"	1 1/2"
%age Passing	100	62.74	8.39	0

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

	Grading Used	Los Angeles Abrasion Value (%)
	1	20.04

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

Best Regards,

Director

Transportation Engineering Laboratory

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Department of Civil Engineering (CED)

UNIVERSITY OF ENGINEERING & TECHNOLOGY (UET)

LAHORE – 54890 (PAKISTAN)



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

Mr. Tanveer Ahmed Lab. Manager, Alpha Housing, Faisalabad.

Testing of Bitumen Subject:

Dear Sir,

It is with reference to your letter No. Nil dated 25-07-2024.

Please find below the results of tests conducted on the bitumen sample provided to this laboratory through your representative.

Sr.#	Laboratory Tests	Results
1	Penetration (ASTM D-5)	65 Units
2	Softening Point (ASTM D-36)	48.6°C
3	Flash Point (ASTM D-92)	290°C
4	Fire Point (ASTM D-92)	327°C

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

Best Regards,

Director

Transportation Engineering Laboratory

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