

**BEFORE THE NATIONAL GREEN TRIBUNAL, PRINCIPAL
BENCH, NEW DELHI**

ORIGINAL APPLICATION NO. 304 OF 2019

IN THE MATTER OF:

M. Haridasan

...Applicant

VERSUS

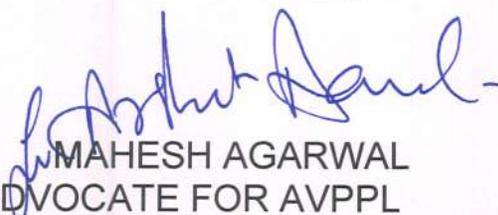
State of Kerala & Ors.

... Respondent(s)

**INDEX
VOLUME -II**

Sr. No.	Particulars	Pages
14.	<u>ANNEXURE R-13</u> :- A copy of the Blasting induced noise and vibration study report of Anna, University for period 16.03.2021-17.03.2021.	
15.	<u>ANNEXURE R-14</u> :- A copy of the GO (Ms) No. 2/2024/F&PD dated 15 February 2024.	
16.	<u>ANNEXURE R-15</u> :- A copy of the amended Kerala Minor Mineral Concession (Amendment) Rules, 2017.	
17.	Proof of service.	

FILED BY



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PLACE: NEW DELHI
DATED: 23.02.2024



VMS_5 Location : EVENT REPORT



Event Report

Date/Time MicL at 14:45:26 March 16, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo: 127 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 4687 V 2.61 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F687IWA0.ZQ0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 07:20:35 (V8.12)

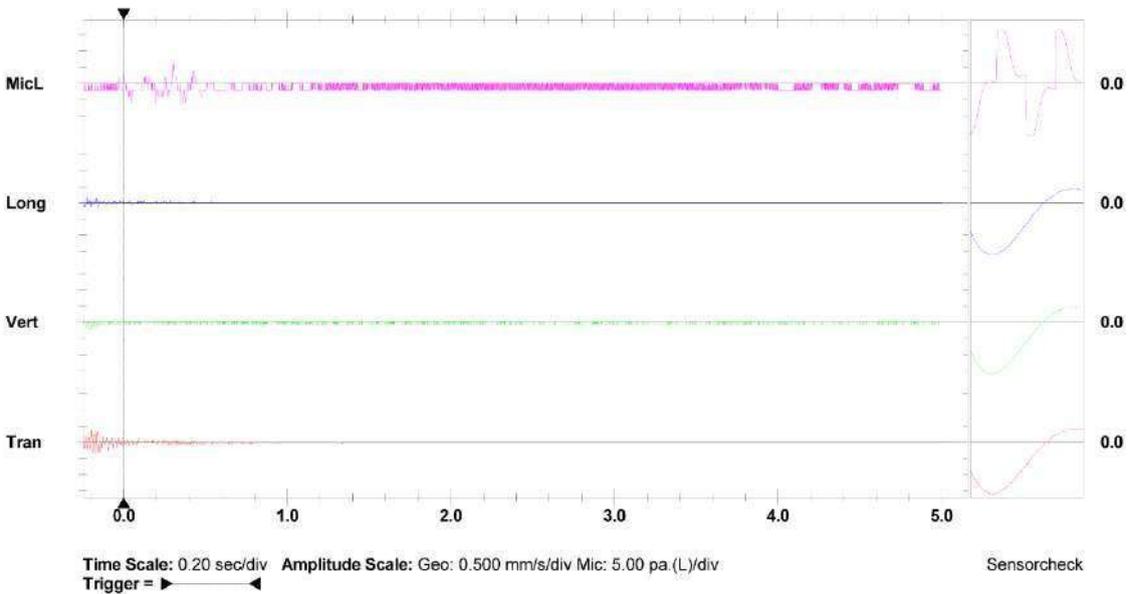
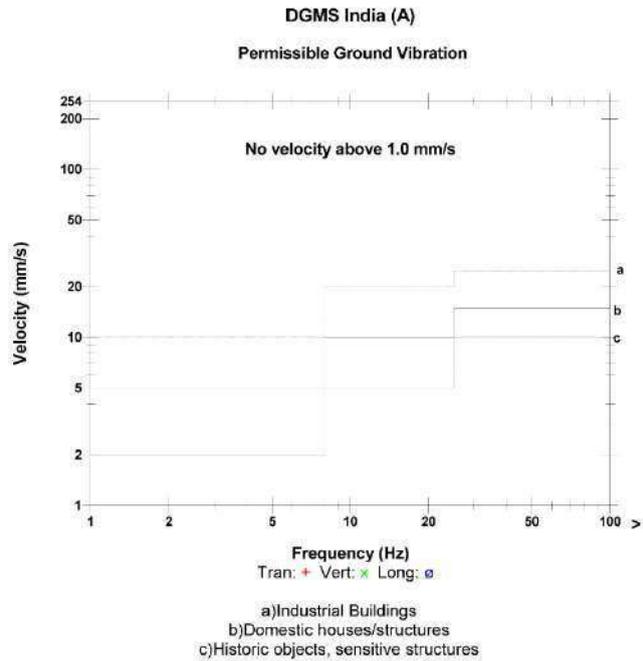
Extended Notes

Post Event Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) at 0.049 sec
ZC Freq 9.1 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 505 mv)

	Tran	Vert	Long	
PPV	0.381	0.191	0.191	mm/s
ZC Freq	73	64	85	Hz
Time (Rel. to Trig)	-0.169	-0.197	-0.164	sec
Peak Acceleration	0.0199	0.0133	0.00663	g
Peak Displacement	0.00084	0.00003	0.00003	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.5	7.8	7.7	Hz
Overswing Ratio	3.4	3.2	3.2	

Peak Vector Sum 0.429 mm/s at -0.199 sec



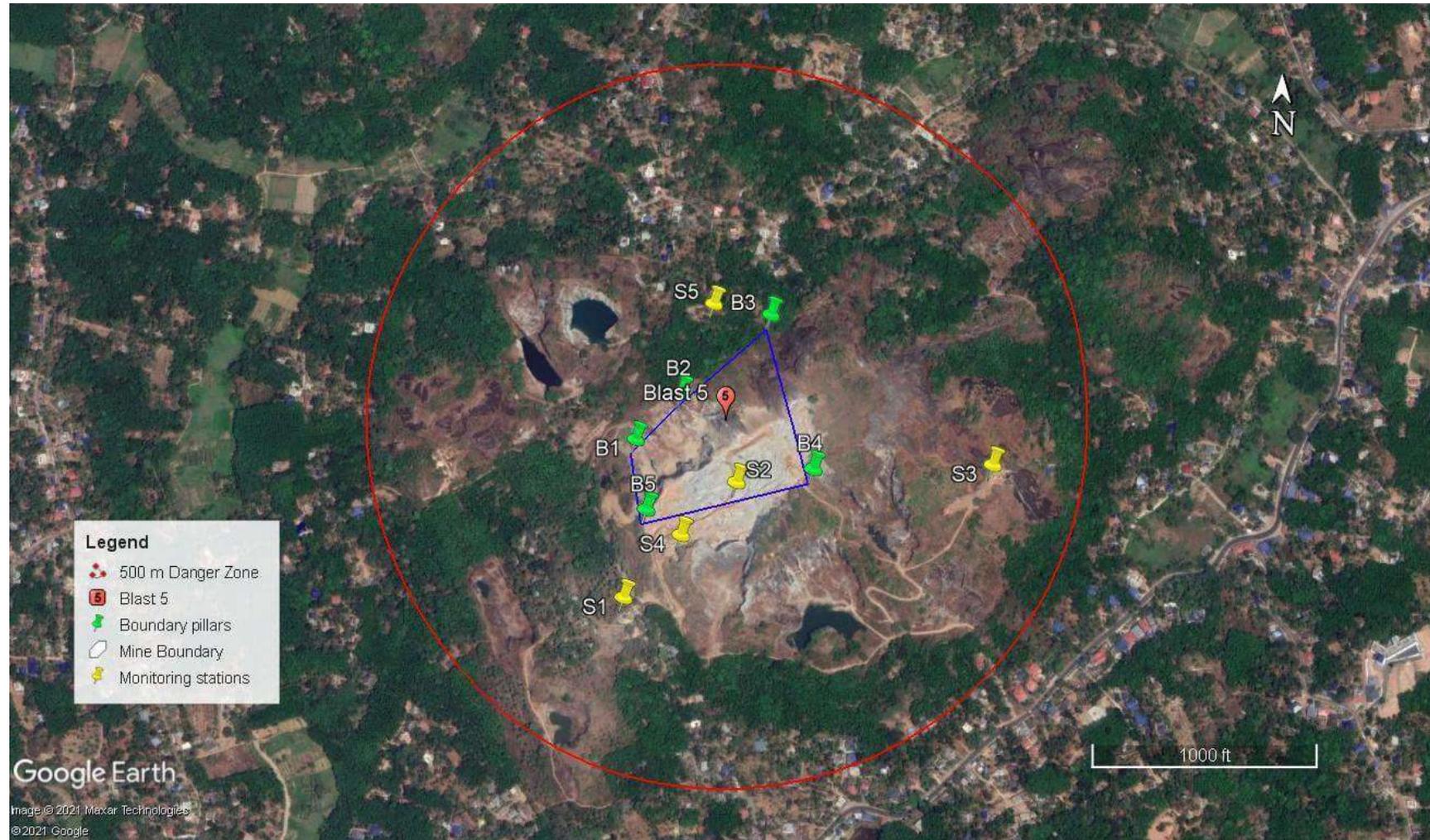


Figure 3.10 Imagery shows the location blast site 5 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry



Blast No 6: The sixth blast was conducted on 17th March, 2021 and the adopted blasting pattern and details are given in the Table 3.12 and 3.13. The Figure 3.11 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.12

Table 3.12 Co-ordinates of Blast & Instrument Locations

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise dB(A)	Type of structure/ Permissible limit
1	Blast Location (B6)			8°43'44.44"	76°50'16.85"	---		
2	VMS_1 Location	11772	80	8°43'41.81"	76°50'17.47"	9.8 Within permissible limit	30.4	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	95	8°43'44.17"	76°50'19.88"	3.41 Within permissible limit	92.6	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	174	8°43'38.74"	76°50'16.72"	2.11 Within permissible limit	6.9	Not belonging to the owner, maximum value is 5 mm/s
5	VMS_4 Location	4688	170	8°43'48.033 "	76°50'12.81"	0.778 Within permissible limit	52.4	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	165	8°43'47.04"	76°50'12.20"	0.683 Within permissible limit	73.4	Not belonging to the owner, maximum value is 5 mm/s

Table 3.13 Details of Blast Parameters

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	60	0.625	1.875	37.5

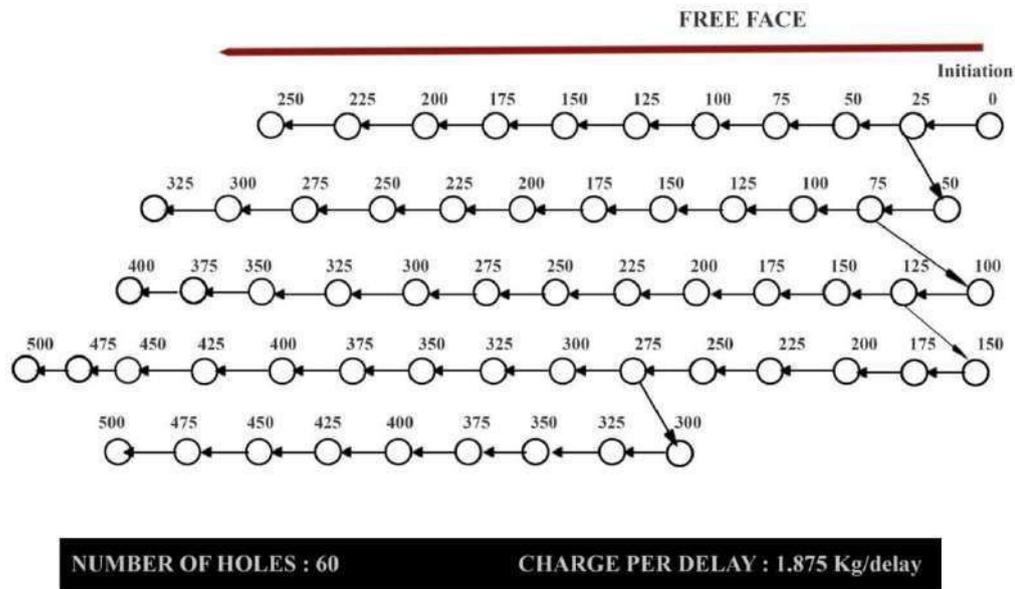


Figure 3.11 Schematic diagram of adopted blasting pattern for the blast 6

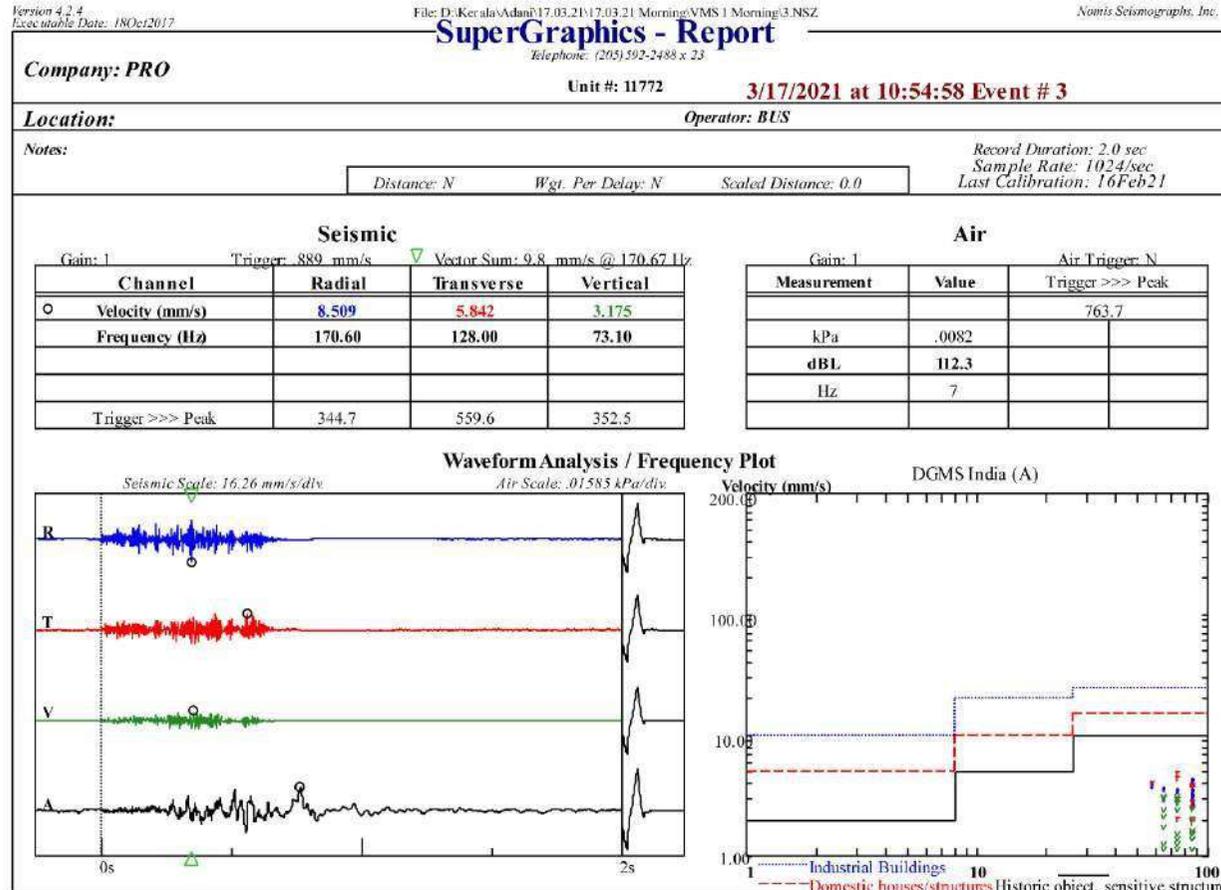
Post Blast Observations

During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 to 12 m which is considered to be normal.
- A drop of about 0.75 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.12 & 3.13.**

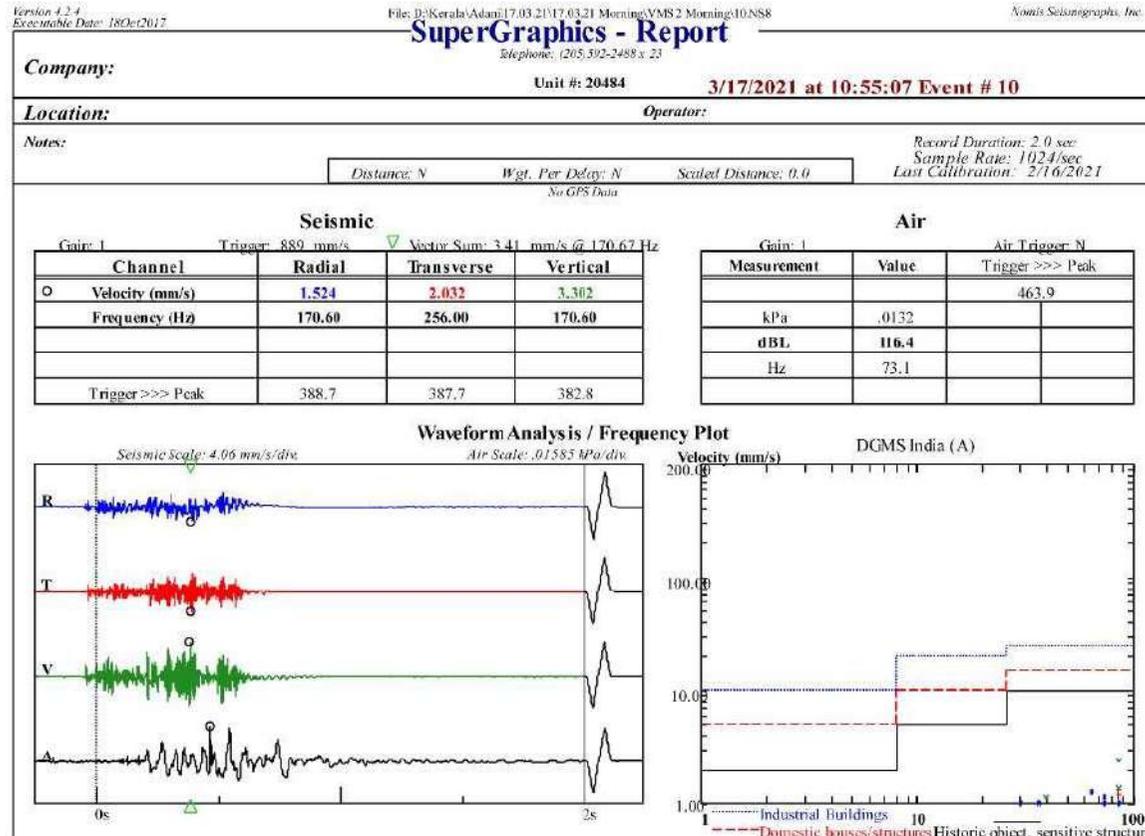


VMS_66 Location : EVENT





VMS_67 Location : EVENT





VMS_68 Location : EVENT



Event Report

Date/Time Long at 10:53:35 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 5993 V 2.61 MiniMate
Battery Level 6.6 Volts
Calibration March 1, 2021 by UES New Delhi
File Name G993IWBK.XB0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 05:03:19 (V8.12)

Extended Notes

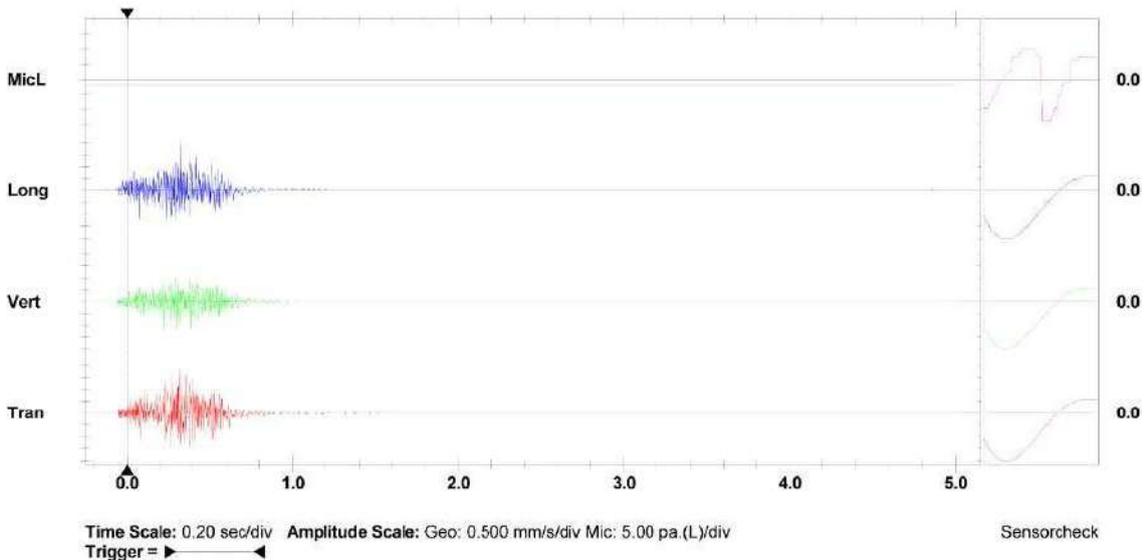
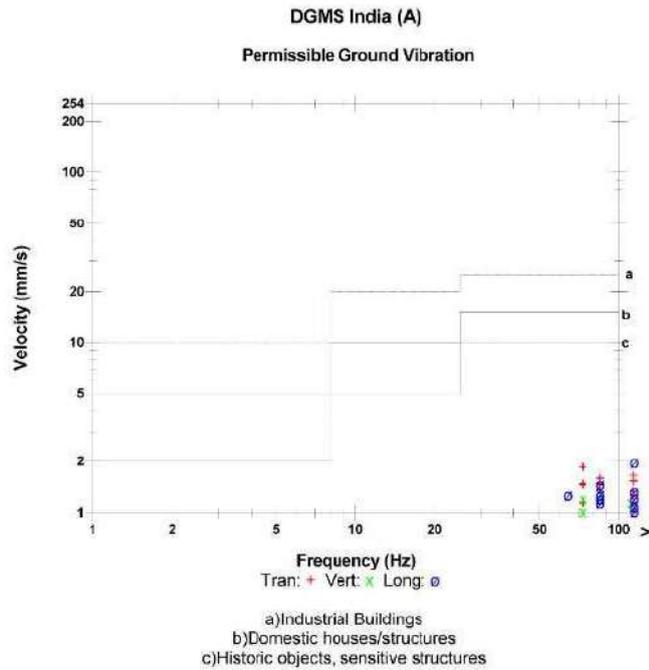
Post Event Notes

Microphone Linear Weighting
PSPL 100.0 dB(L) at 0.293 sec
ZC Freq N/A
Channel Test Check (Freq = 0.0 Hz Amp = 14 mv)

	Tran	Vert	Long	
PPV	1.84	1.27	1.97	mm/s
ZC Freq	73	85	N/A	Hz
Time (Rel. to Trig)	0.321	0.224	0.323	sec
Peak Acceleration	0.186	0.0994	0.192	g
Peak Displacement	0.00326	0.00205	0.00270	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.8	8.0	7.7	Hz
Overswing Ratio	3.6	3.5	3.7	

Peak Vector Sum 2.11 mm/s at 0.321 sec

N/A: Not Applicable





VMS_69 Location : EVENT



Event Report

Date/Time MicL at 10:54:58 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 3.0 sec at 1024 sps

Serial Number 4688 V 2.6 MiniMate
Battery Level 6.5 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F688IWBK.ZM0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 05:00:31 (V8.12)

Extended Notes

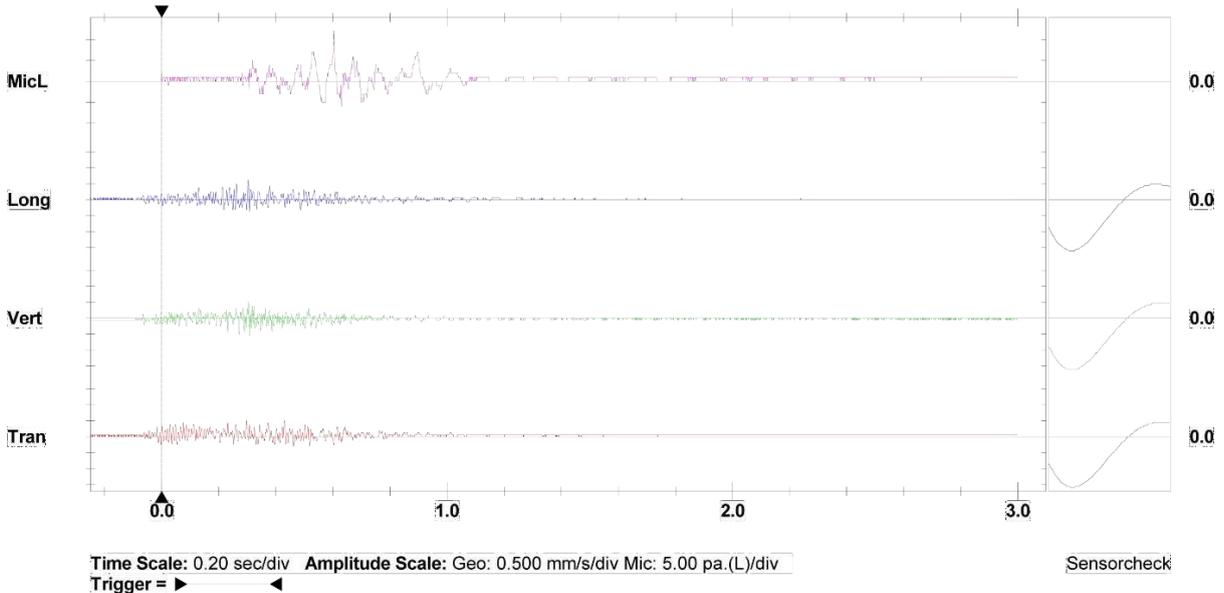
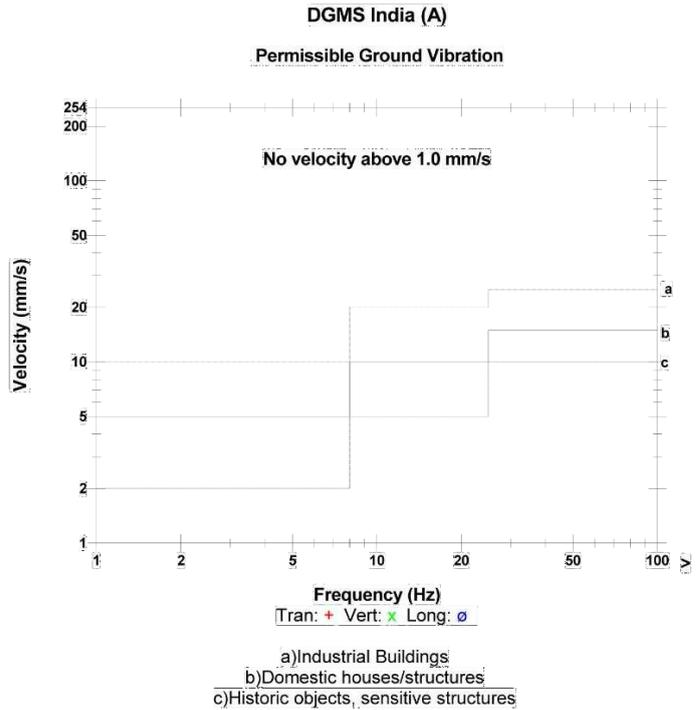
Post Event Notes

Microphone Linear Weighting
PSPL 112.6 dB(L) at 0.604 sec
ZC Freq 14 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 490 mv)

	Tran	Vert	Long	
PPV	0.508	0.572	0.635	mm/s
ZC Freq	85	N/A	85	Hz
Time (Rel. to Trig)	0.298	0.309	0.304	sec
Peak Acceleration	0.0265	0.0464	0.0331	g
Peak Displacement	0.00127	0.00096	0.00112	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.7	7.8	8.2	Hz
Overswing Ratio	3.4	3.6	3.3	

Peak Vector Sum 0.778 mm/s at 0.309 sec

N/A: Not Applicable





VMS_70 Location : EVENT



Event Report

Date/Time MicL at 10:54:50 March 17, 2021
Trigger Source Geo: 0.492 mm/s
Range Mic: 106 dB(L)
Record Time Geo: 127 mm/s
 5.0 sec at 1024 sps

Serial Number 4687 V 2.61 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F6871WBK.ZE0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 05:05:54 (V8.12)

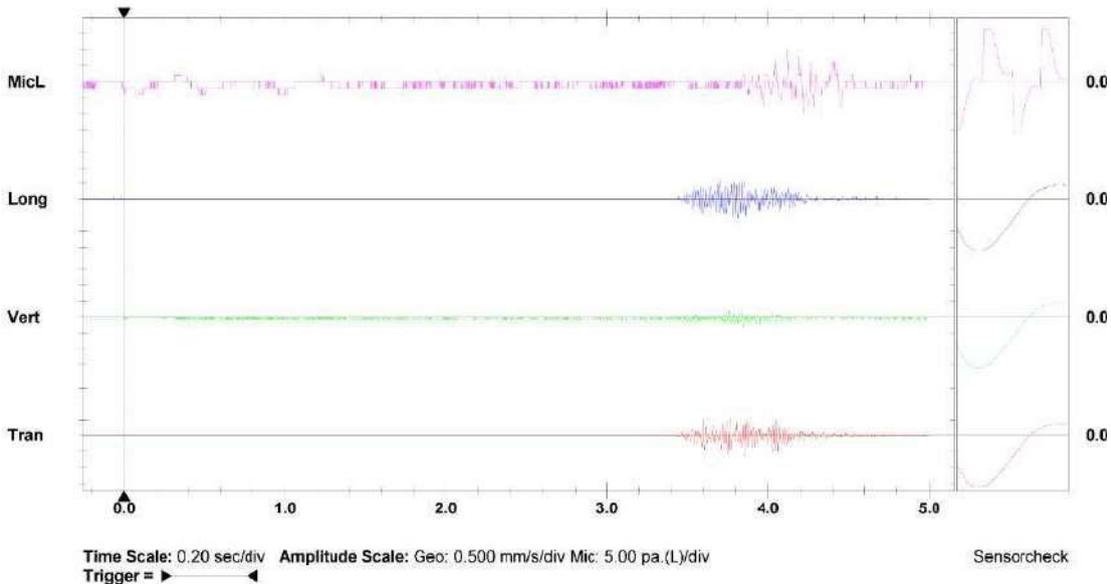
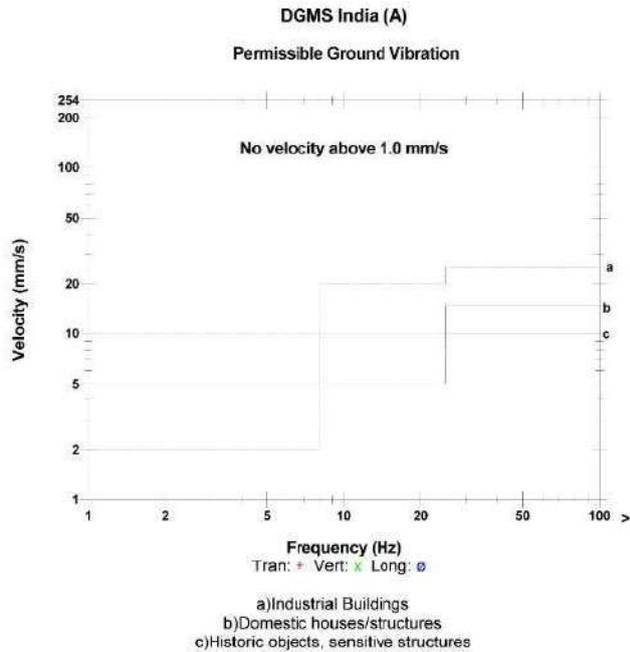
Extended Notes

Post Event Notes

Microphone Linear Weighting
PSPL 114.0 dB(L) at 4.122 sec
ZC Freq 30 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 505 mv)

	Tran	Vert	Long	
PPV	0.635	0.318	0.572	mm/s
ZC Freq	64	73	57	Hz
Time (Rel. to Trig)	3.755	3.843	3.705	sec
Peak Acceleration	0.0265	0.0199	0.0265	g
Peak Displacement	0.00198	0.00047	0.00149	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.6	8.0	7.8	Hz
Overswing Ratio	3.5	3.2	3.2	

Peak Vector Sum 0.683 mm/s at 3.856 sec



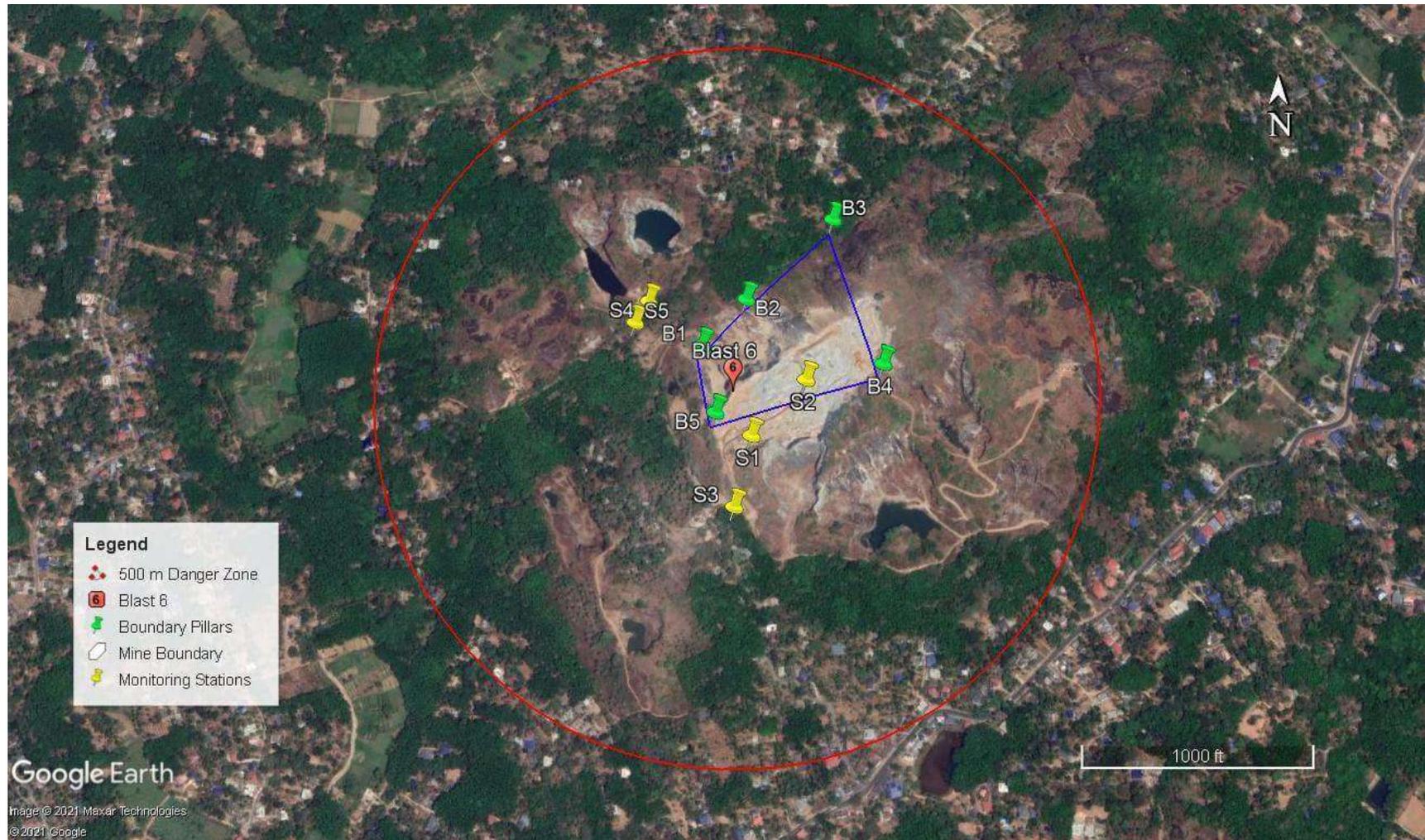


Figure 3.12 Imagery shows the location blast site 6 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry



Blast No 7: The seventh blast was conducted on 17th March, 2021 and the adopted blasting pattern and details are given in the Table 3.14 and 3.15. The Figure 3.13 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.14

Table 3.14 Co-ordinates of Blast & Instrument Locations

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise dB(A)	Type of structure/ Permissible limit
1	Blast Location (B7)			8°43'43.82"	76°50'15.93"	---		
2	VMS_1 Location	11772	75	8°43'41.81"	76°50'17.47"	11.09 Within permissible limit	70.9	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	125	8°43'44.17"	76°50'19.88"	2.51 Within permissible limit	68.2	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	157	8°43'38.74"	76°50'16.72"	2.24 Within permissible limit	6.9	Not belonging to the owner, maximum value is 5 mm/s
5	VMS_4 Location	4688	160	8°43'48.033"	76°50'12.81"	1.17 Within permissible limit	47.2	Belonging to the owner, maximum value is 15 mm/s
6	VMS_5 Location	4687	154	8°43'47.04"	76°50'12.20"	1.89 Within permissible limit	56.3	Not belonging to the owner, maximum value is 5 mm/s

Table 3.15 Details of Blast Parameters

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	50	0.625	1.736	31.25

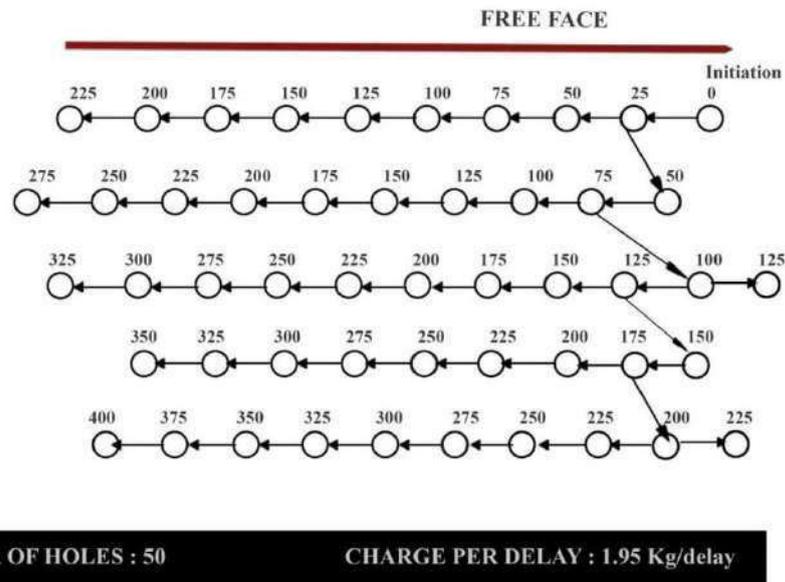


Figure 3.13 Schematic diagram of adopted blasting pattern for the blast 7

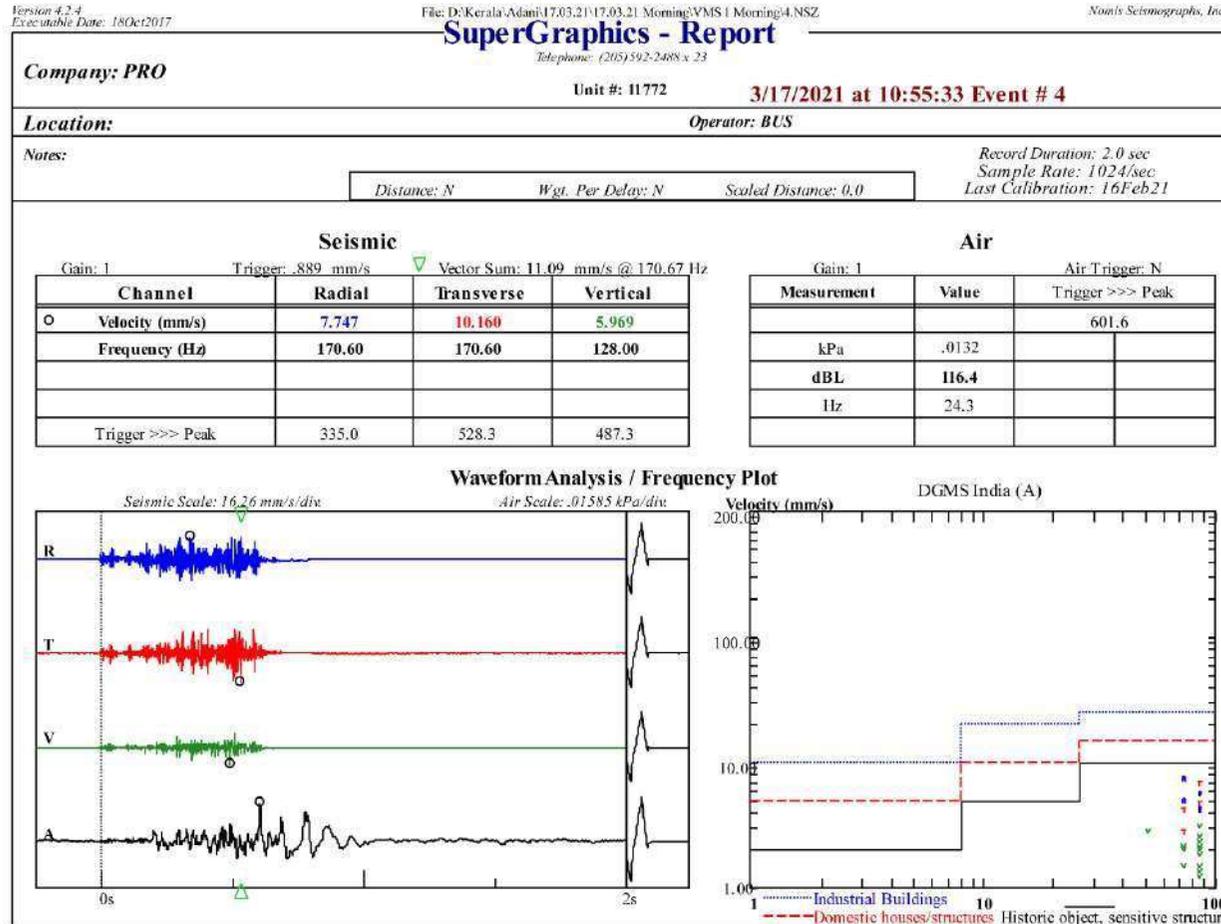
Post Blast Observations

During the post blast observations, the following conditions were identified:

- Backbreak was observed of about 0.5 m.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 15 m which is considered to be normal.
- A drop of about 0.50 to 0.75 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 15 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.14 & 3.15.**

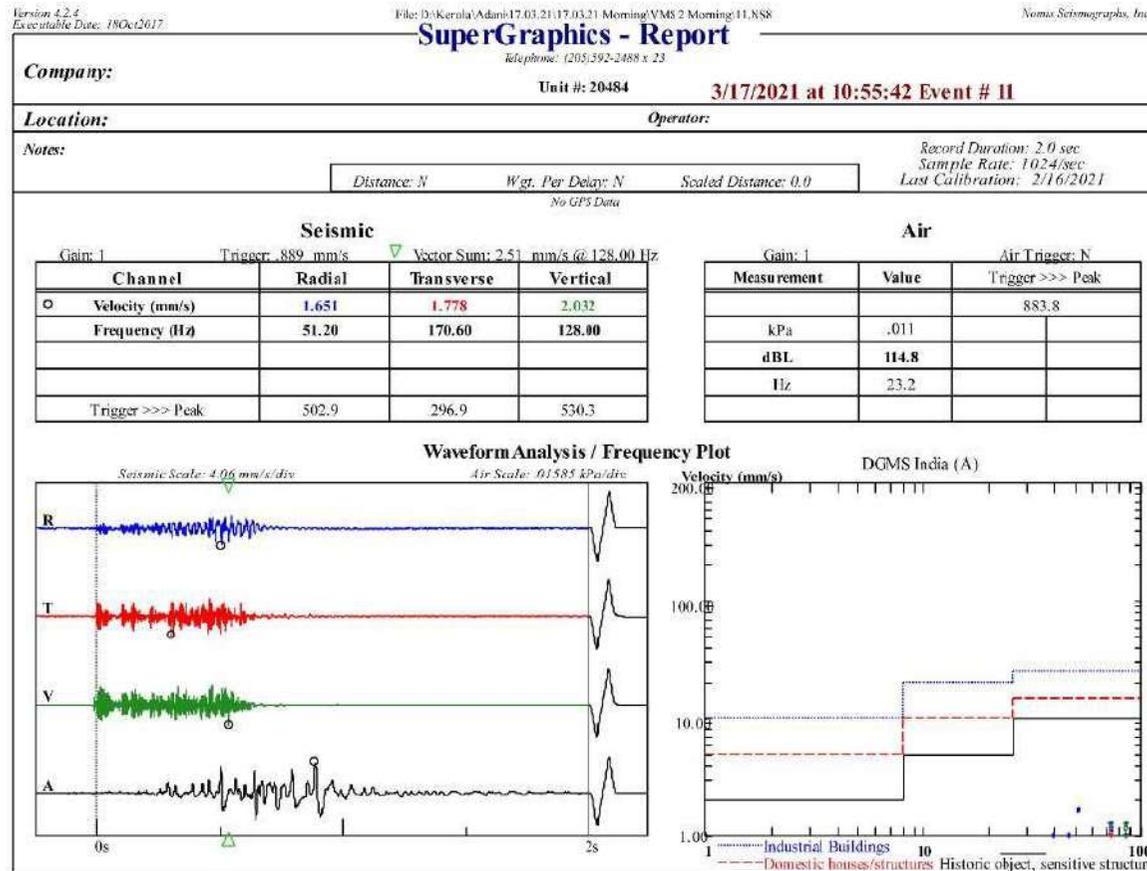


VMS_1 Location : EVENT REPORT





VMS_2 Location : EVENT REPORT





VMS_76 Location : EVENT



Event Report

Date/Time Tran at 10:54:10 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 5993 V 2.61 MiniMate
Battery Level 6.6 Volts
Calibration March 1, 2021 by UES New Delhi
File Name G993IWBK.YA0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 05:03:19 (V8.12)

Extended Notes

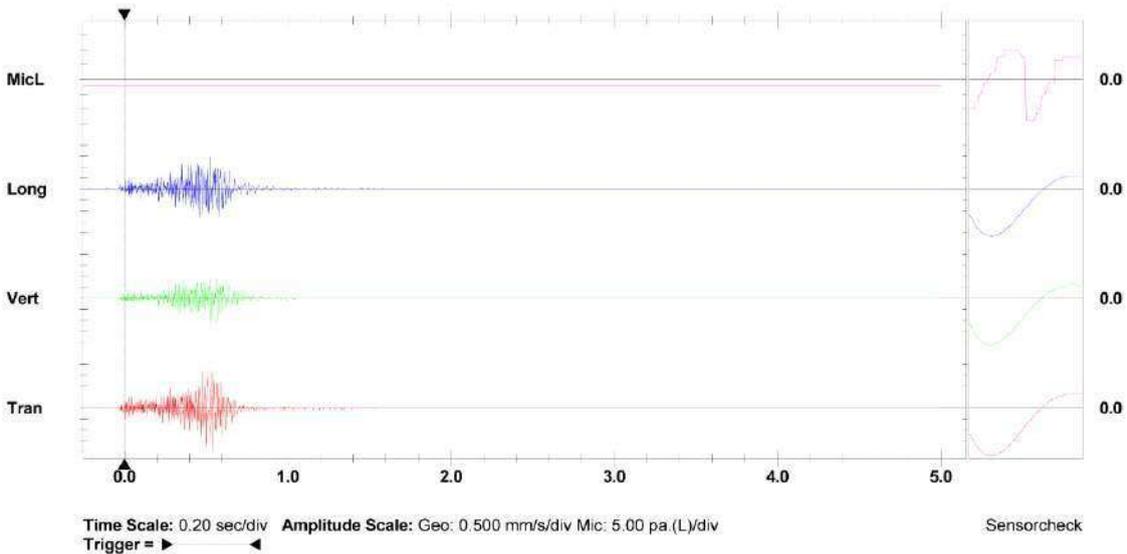
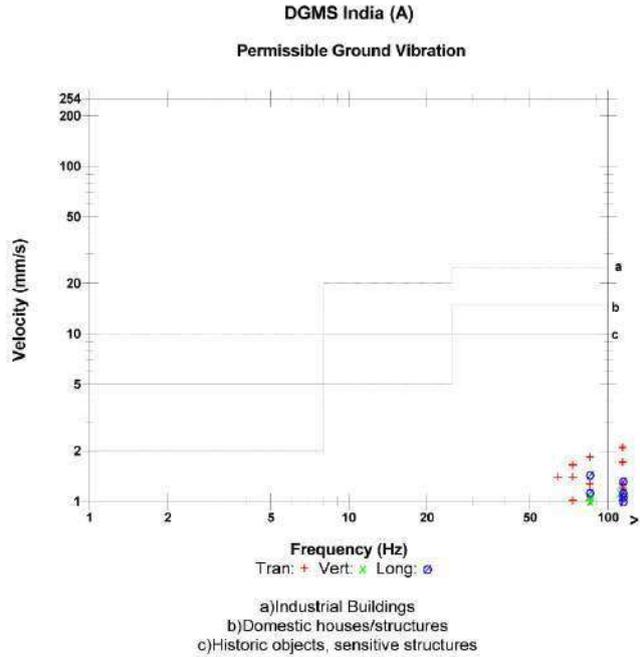
Post Event Notes

Microphone Linear Weighting
PSPL 100.0 dB(L) at 0.293 sec
ZC Freq N/A
Channel Test Check (Freq = 0.0 Hz Amp = 14 mv)

	Tran	Vert	Long	
PPV	2.10	1.14	1.46	mm/s
ZC Freq	>100	N/A	85	Hz
Time (Rel. to Trig)	0.544	0.524	0.526	sec
Peak Acceleration	0.152	0.0862	0.126	g
Peak Displacement	0.00375	0.00251	0.00295	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.8	8.0	7.7	Hz
Overswing Ratio	3.6	3.5	3.7	

Peak Vector Sum 2.24 mm/s at 0.544 sec

N/A: Not Applicable





VMS_77 Location : EVENT



Event Report

Date/Time Long at 10:55:33 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo : 127 mm/s
Record Time 2.0 sec at 1024 sps

Serial Number 4688 V 2.6 MiniMate
Battery Level 6.5 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F688IWBL.DLO

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 05:00:31 (V8.12)

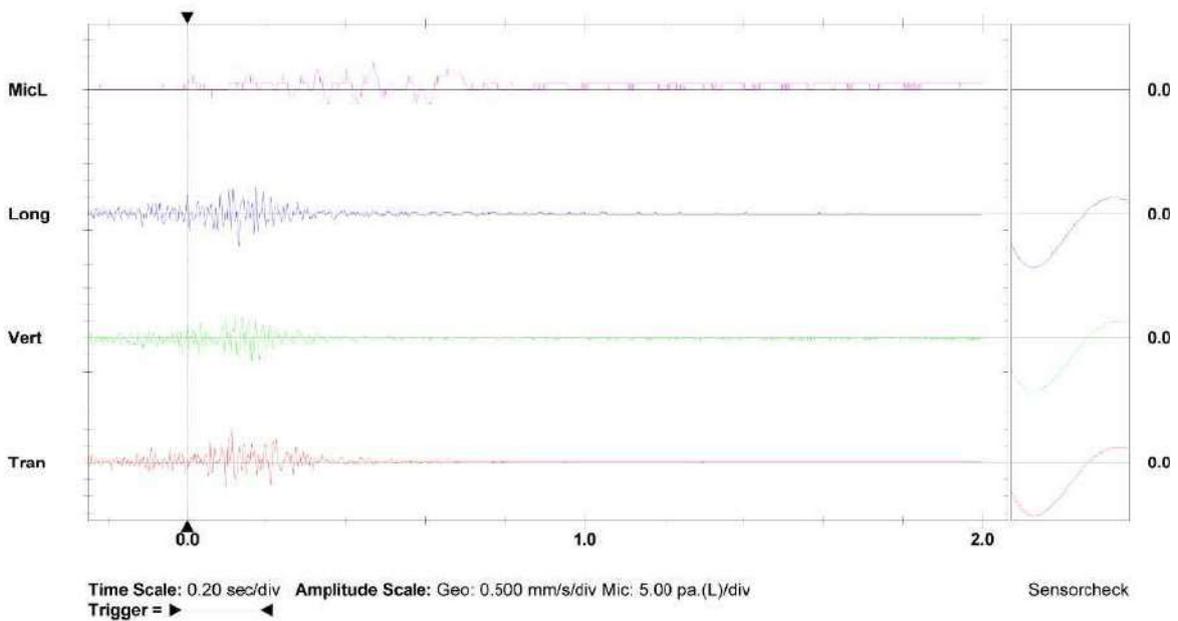
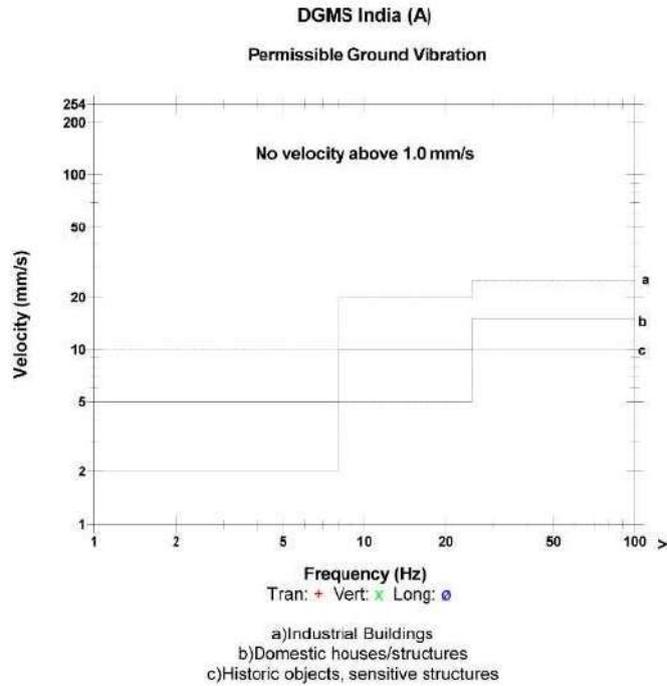
Extended Notes

Post Event Notes

Microphone Linear Weighting
PSPL 112.0 dB(L) at 0.468 sec
ZC Freq 12 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 490 mv)

	Tran	Vert	Long	
PPV	0.953	0.699	0.953	mm/s
ZC Freq	57	>100	73	Hz
Time (Rel. to Trig)	0.111	0.163	0.128	sec
Peak Acceleration	0.0398	0.0398	0.0464	g
Peak Displacement	0.00366	0.00220	0.00198	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.7	7.8	8.2	Hz
Overswing Ratio	3.4	3.6	3.3	

Peak Vector Sum 1.17 mm/s at 0.128 sec





VMS_78 Location : EVENT



Event Report

Date/Time Tran at 10:55:28 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 5.0 sec at 1024 sps.

Serial Number 4687 V 2.61 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F687IWBL.0G0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 05:05:54 (V8.12)

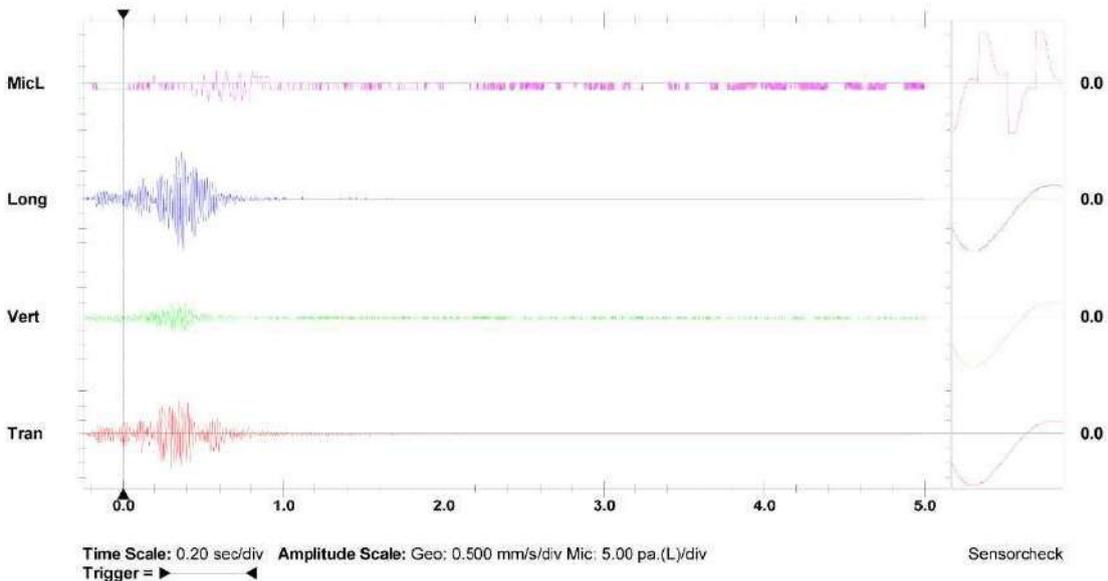
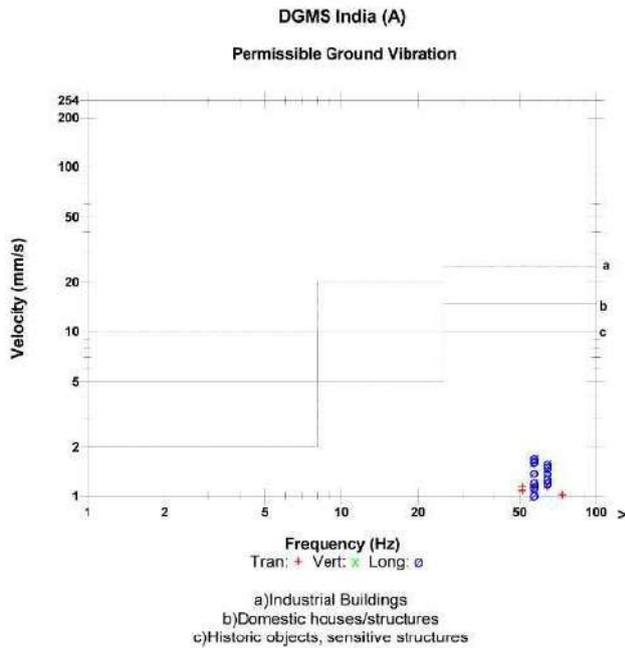
Extended Notes

Post Event Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) at 0.527 sec
ZC Freq 18 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 505 mv)

	Tran	Vert	Long	
PPV	1.14	0.572	1.71	mm/s
ZC Freq	64	64	57	Hz
Time (Rel. to Trig)	0.299	0.312	0.377	sec
Peak Acceleration	0.0530	0.0398	0.0663	g
Peak Displacement	0.00347	0.00146	0.00490	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.6	8.0	7.8	Hz
Overswing Ratio	3.5	3.2	3.2	

Peak Vector Sum 1.89 mm/s at 0.369 sec



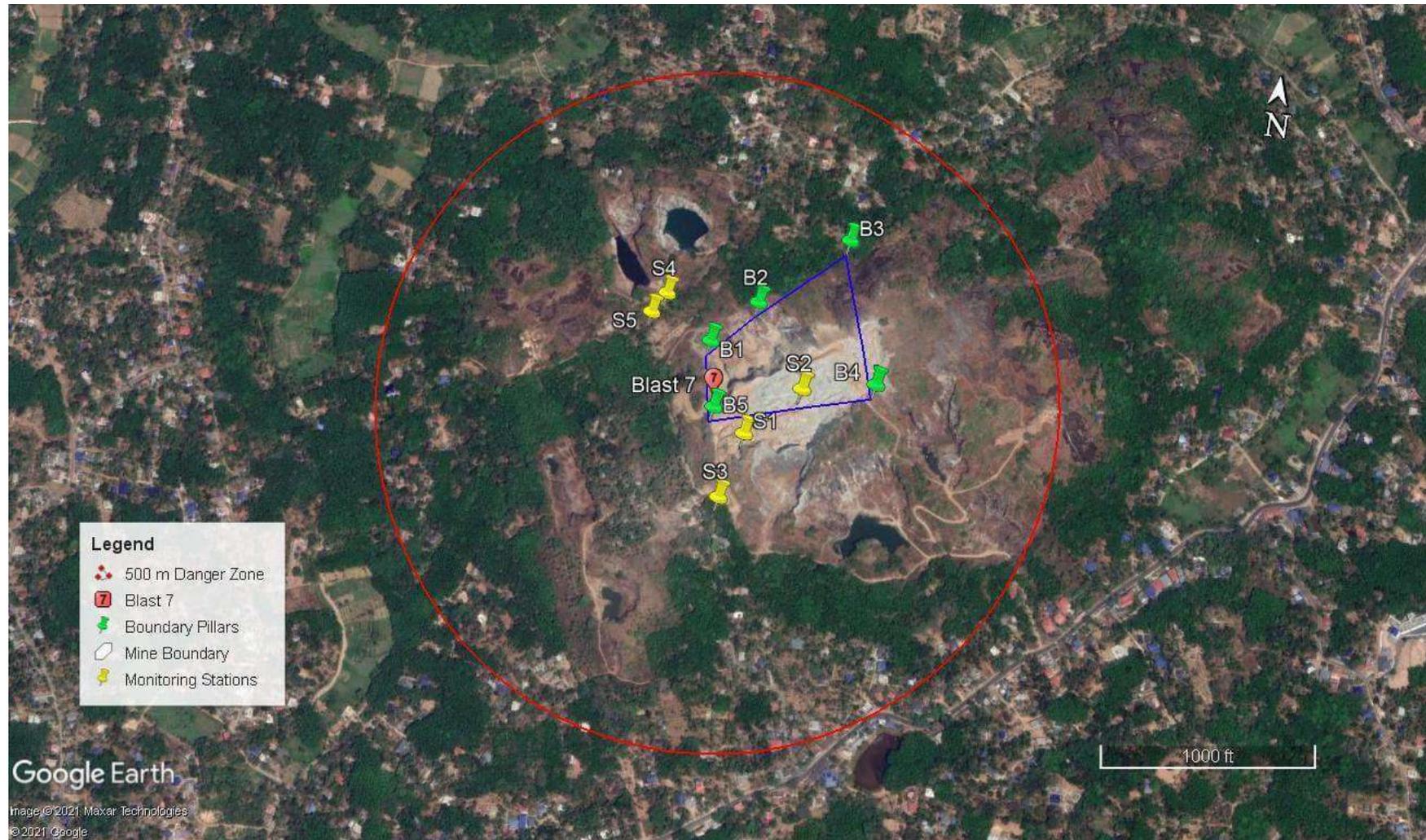


Figure 3.14 Imagery shows the location blast site 7 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry



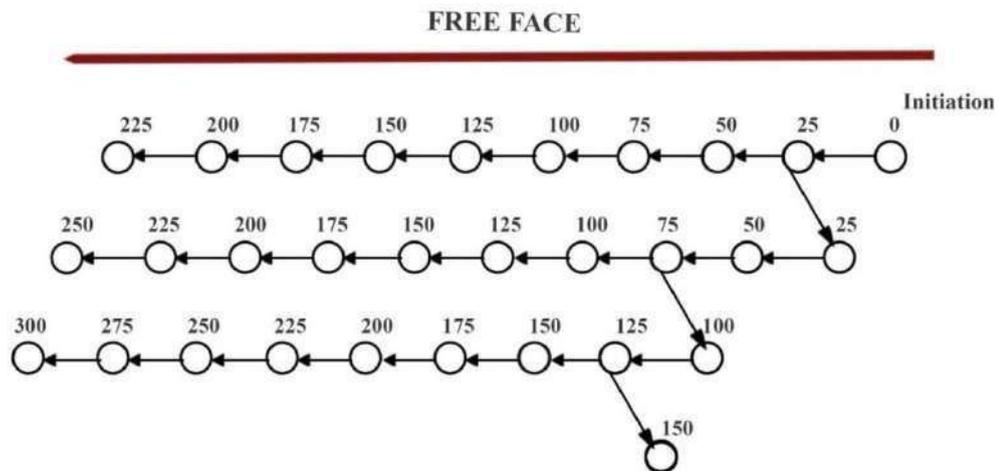
Blast No 8: The eighth blast was conducted on 17th March, 2021 and the adopted blasting pattern and details are given in the Table 3.16 and 3.17. The Figure 3.15 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.16

Table 3.16 Co-ordinates of Blast & Instrument Locations

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise dB(A)	Type of structure/ Permissible limit
1	Blast Location (B8)			8°43'45.29"	76°50'17.95"	---		
2	VMS_1 Location	11772	105	8°43'41.81"	76°50'17.47"	6.12 Within permissible limit	64.4	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	68	8°43'44.17"	76°50'19.88"	2.3 Within permissible limit	78.0	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	218	8°43'38.33"	76°50'16.16"	Not Triggered		Not belonging to the owner
5	VMS_4 Location	4688	182	8°43'48.033"	76°50'12.81"	1.40 Within permissible limit	62.4	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	282	8°43'53.22"	76°50'22.62"	1.68 Within permissible limit	6.9	Not belonging to the owner, maximum value is 5 mm/s

Table 3.17 Details of Blast Parameters

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.50	2.4	30	0.625	1.339	18.75



NUMBER OF HOLES : 30

CHARGE PER DELAY : 1.56 Kg/delay

Figure 3.15 Schematic diagram of adopted blasting pattern for the blast 8

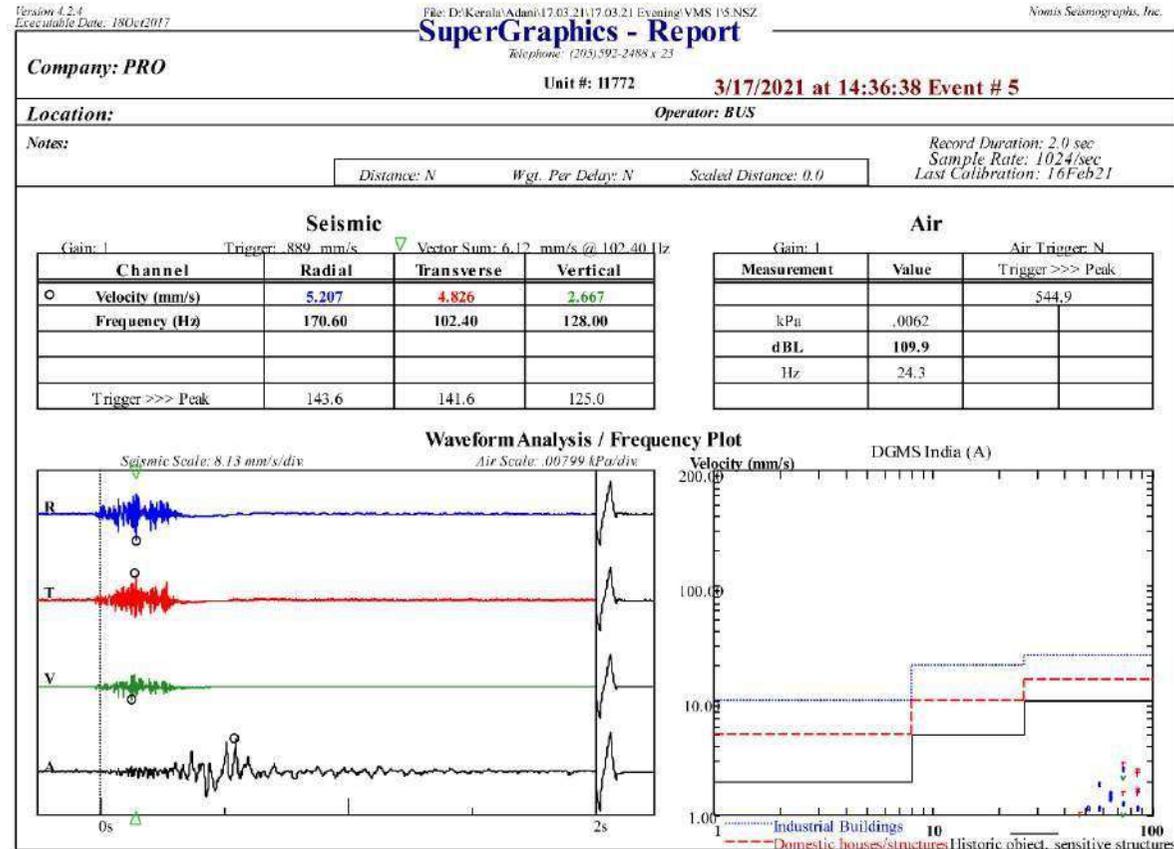
Post Blast Observations

During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 m which is considered to be normal.
- A drop of about 0.75 to 1.0 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.16 & 3.17.**

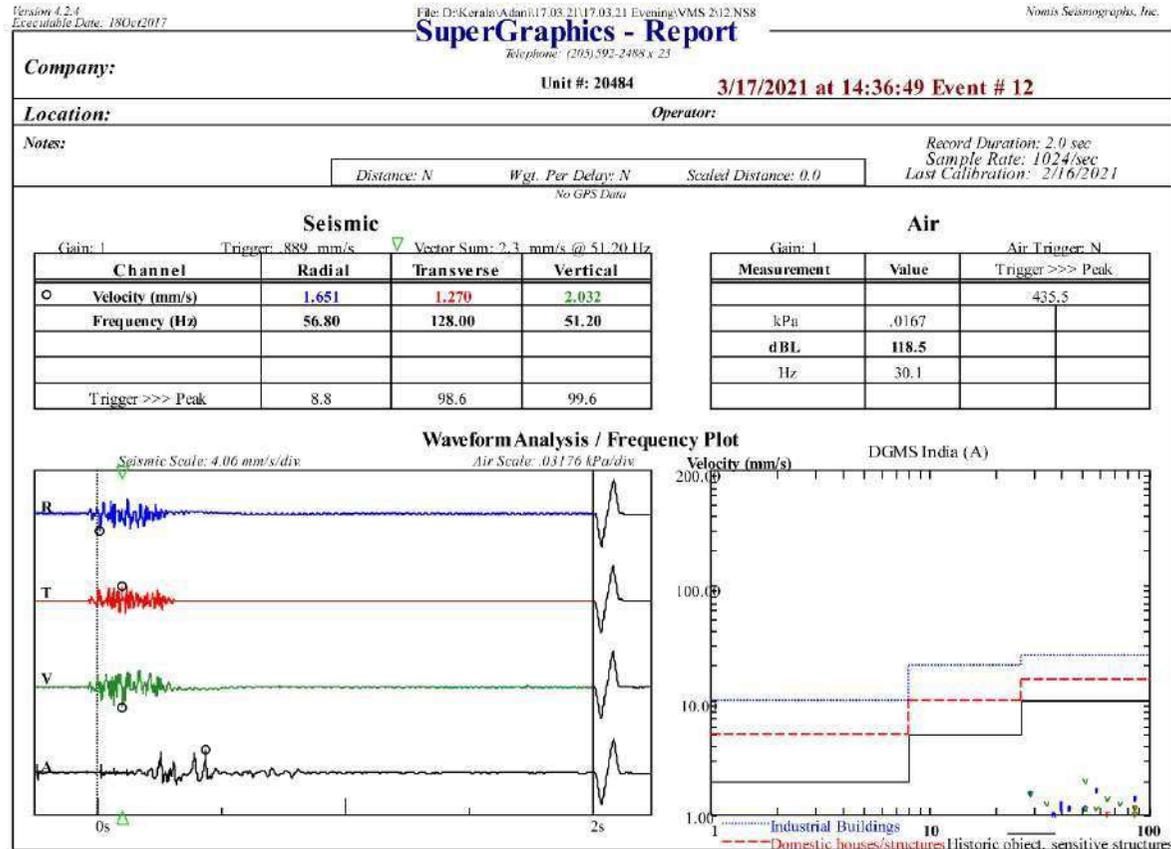


VMS_82 Location : EVENT





VMS_83 Location : EVENT





VMS_84 Location : EVENT



Event Report

Date/Time Long at 14:38:38 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo: 127 mm/s
Record Time 2.0 sec at 1024 sps

Serial Number 4688 V 2.6 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F688IWBV.920

Notes

Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 04:23:50 (V8.12)

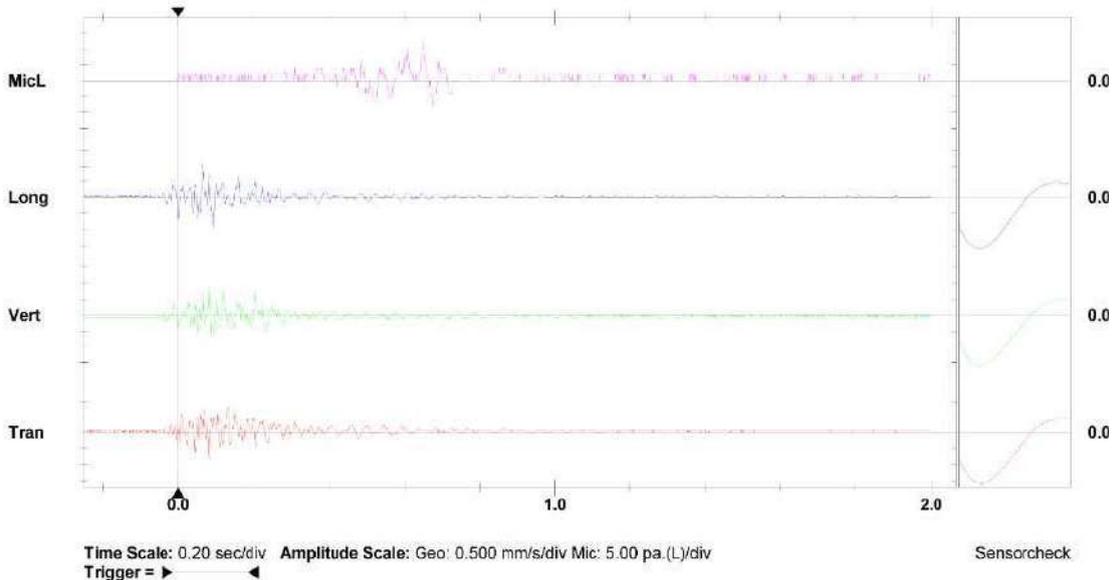
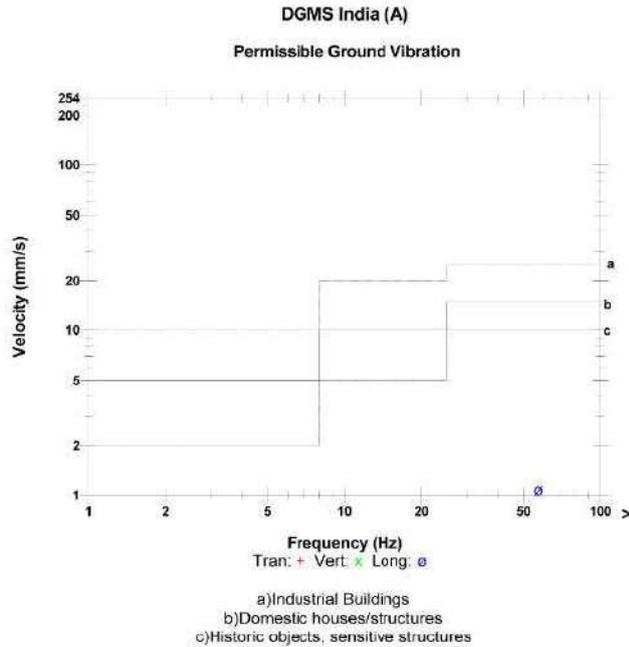
Extended Notes

Post Event Notes

Microphone Linear Weighting
PSPL 115.6 dB(L) at 0.651 sec
ZC Freq 18 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 491 mv)

	Tran	Vert	Long	
PPV	0.826	0.889	1.08	mm/s
ZC Freq	85	57	57	Hz
Time (Rel. to Trig)	0.082	0.083	0.064	sec
Peak Acceleration	0.0398	0.0398	0.0464	g
Peak Displacement	0.00239	0.00276	0.00282	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.7	7.8	8.2	Hz
Overswing Ratio	3.4	3.6	3.3	

Peak Vector Sum 1.40 mm/s at 0.083 sec





VMS_85 Location : EVENT



Event Report

Date/Time Vert at 14:37:06 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 4687 V 2.61 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F687IWBV.9J0

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 04:26:47 (V8.12)

Extended Notes

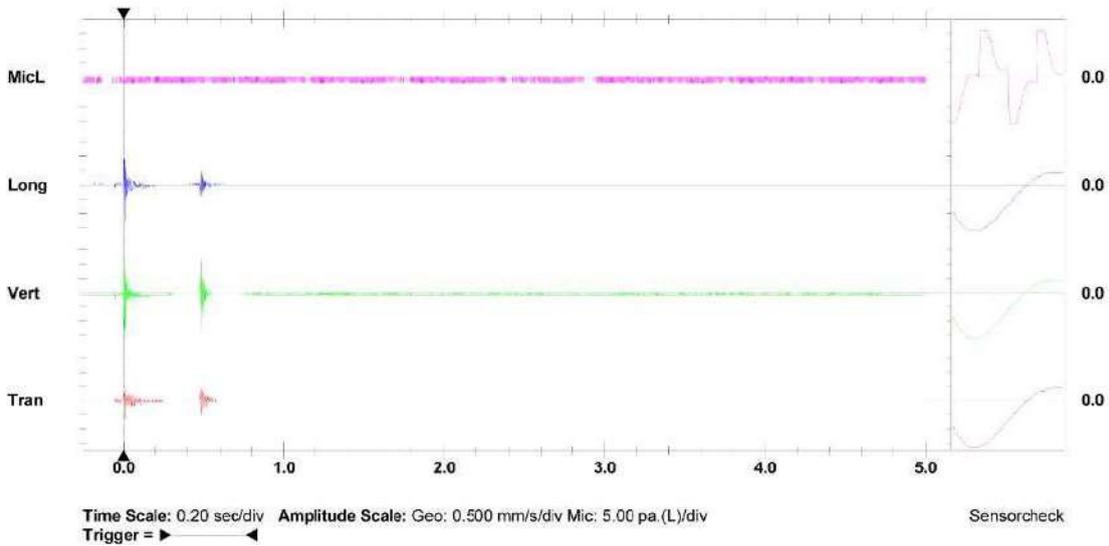
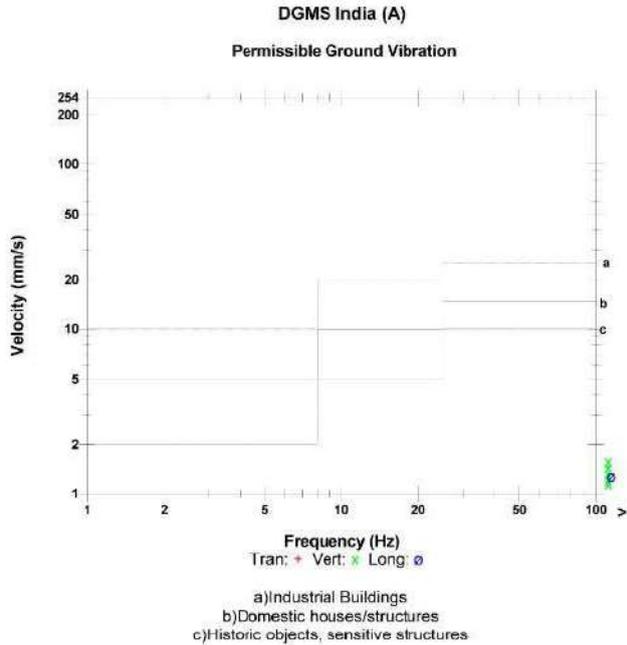
Post Event Notes

Microphone Linear Weighting
PSPL 100.0 dB(L) at 0.003 sec
ZC Freq N/A
Channel Test Passed (Freq = 20.0 Hz Amp = 505 mv)

	Tran	Vert	Long	
PPV	0.635	1.59	1.27	mm/s
ZC Freq	N/A	>100	N/A	Hz
Time (Rel. to Trig)	0.007	0.008	0.009	sec
Peak Acceleration	0.0729	0.212	0.133	g
Peak Displacement	0.00099	0.00136	0.00118	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.6	7.8	7.7	Hz
Overswing Ratio	3.5	3.2	3.6	

Peak Vector Sum 1.68 mm/s at 0.010 sec

N/A: Not Applicable



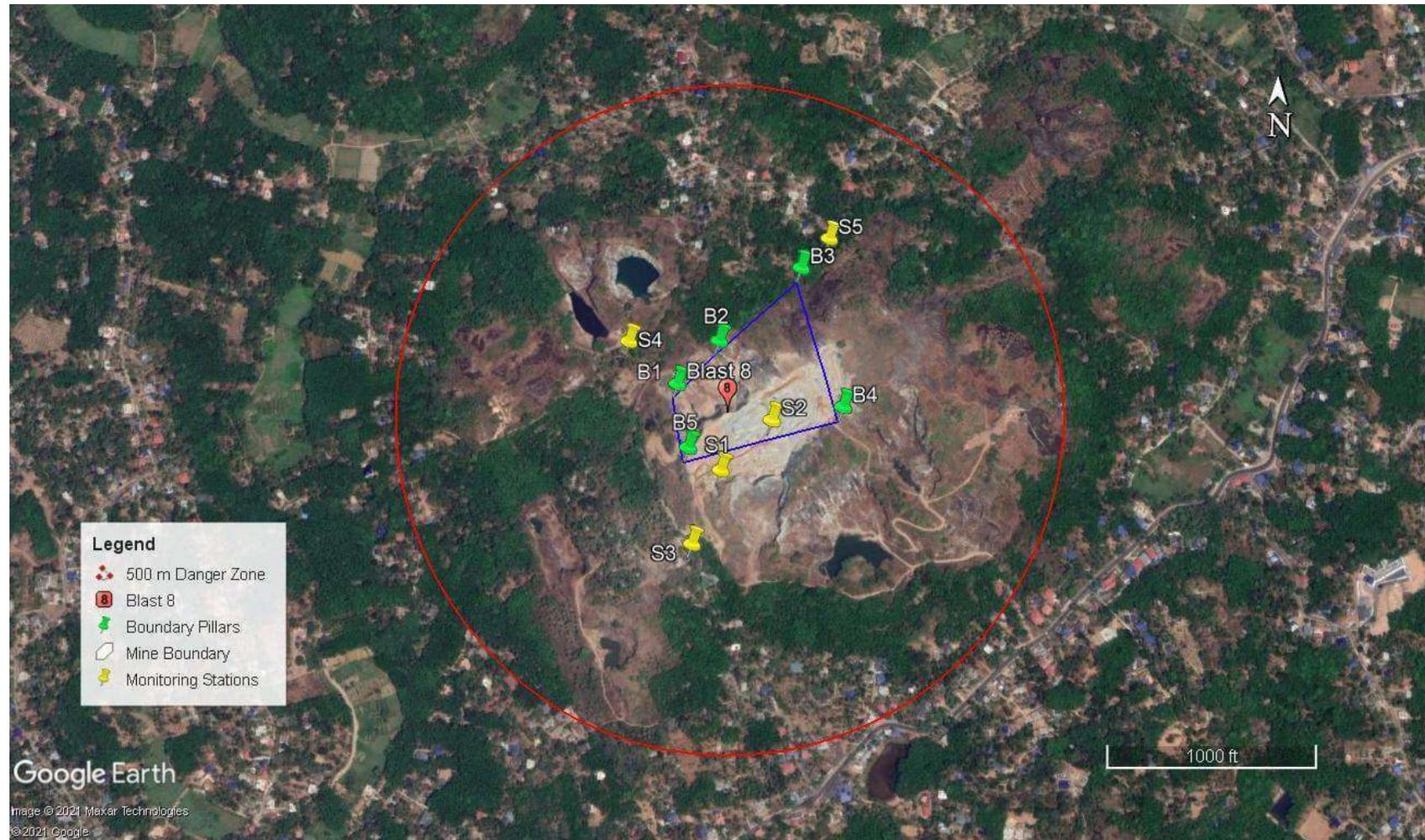


Figure 3.16 Imagery shows the location blast site 8 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry



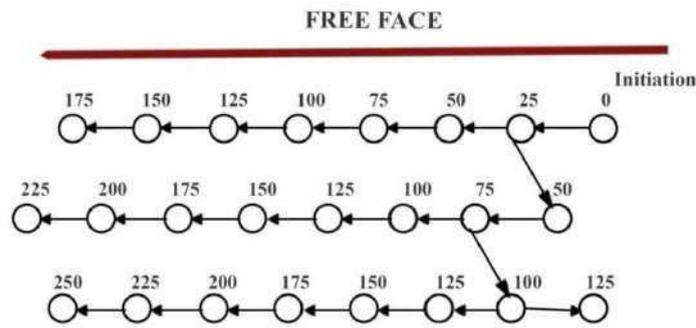
Blast No 9: The ninth blast was conducted on 17th March, 2021 and the adopted blasting pattern and details are given in the Table 3.18 and 3.19. The Figure 3.17 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.18

Table 3.18 Co-ordinates of Blast & Instrument Locations

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise dB(A)	Type of structure/ Permissible limit
1	Blast Location (B9)			8°43'47.24"	76°50'19.47"	---		
2	VMS_1 Location	11772	186	8°43'41.81"	76°50'17.47"	3.47 Within permissible limit	67.8	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	91	8°43'44.17"	76°50'19.88"	1.75 Within permissible limit	69.2	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	293	8°43'38.33"	76°50'16.16"	Not Triggered		Not belonging to the owner
5	VMS_4 Location	4688	205	8°43'48.033"	76°50'12.81"	0.524 Within permissible limit	63.7	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	209	8°43'53.22"	76°50'22.62"	1.00 Within permissible limit	56.3	Not belonging to the owner, maximum value is 5 mm/s

Table 3.19 Details of Blast Parameters

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	24	0.625	1.0714	15



NUMBER OF HOLES : 24

CHARGE PER DELAY :

Kg/delay

Figure 3.17 Schematic diagram of adopted blasting pattern for the blast 9

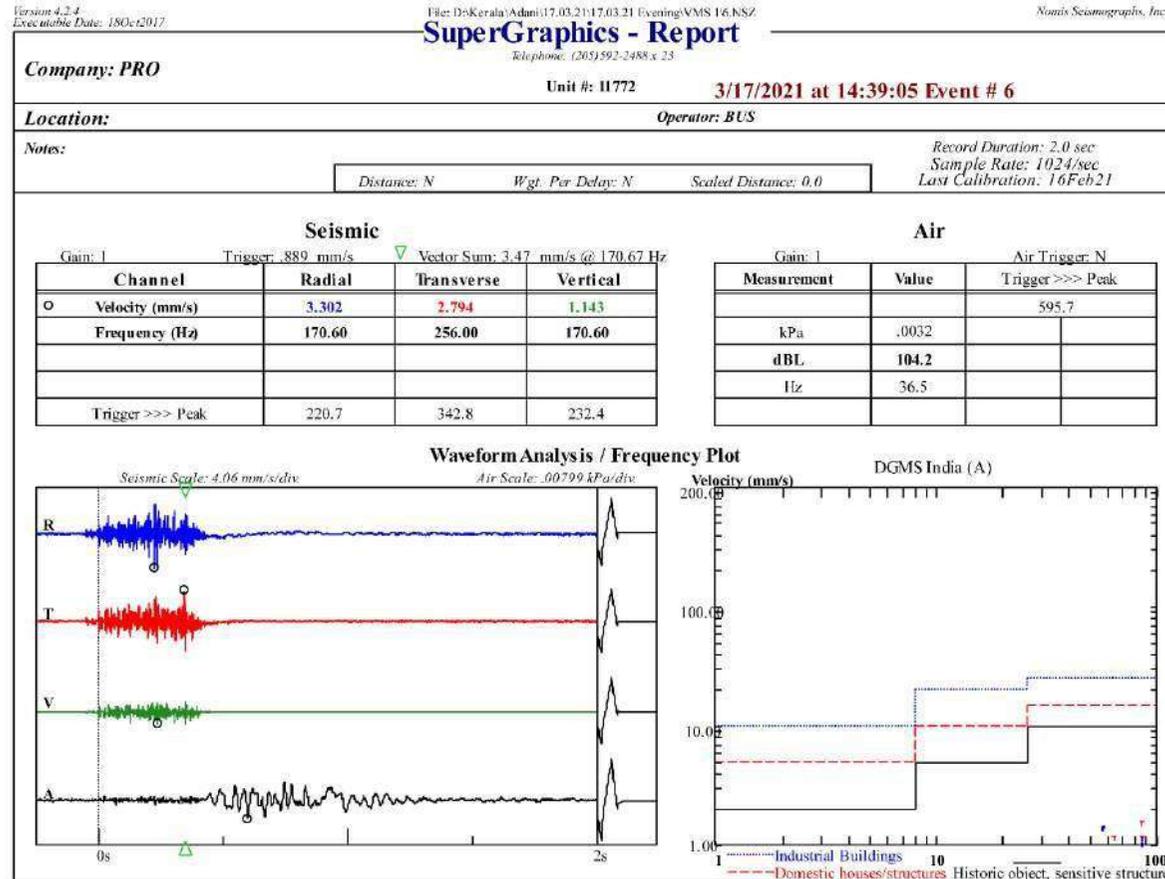
Post Blast Observations

During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 8 to 10 m which is considered to be normal.
- A drop of about 0.50 to 1.0 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.18 & 3.19.**

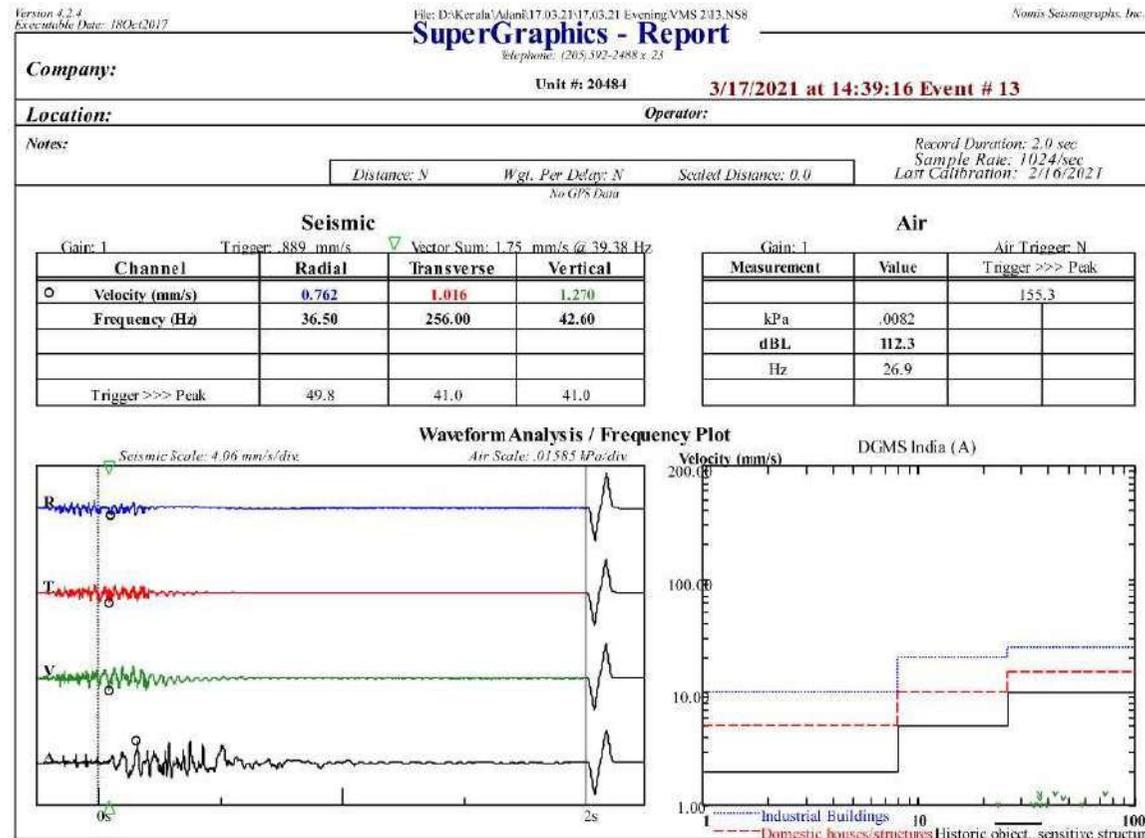


VMS_89 Location : EVENT





VMS_90 Location : EVENT





VMS_91 Location : EVENT



Event Report

Date/Time MicL at 14:39:04 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 2.0 sec at 1024 sps

Serial Number 4688 V 2.6 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F688IWBV.D40

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 04:23:50 (V8.12)

Extended Notes

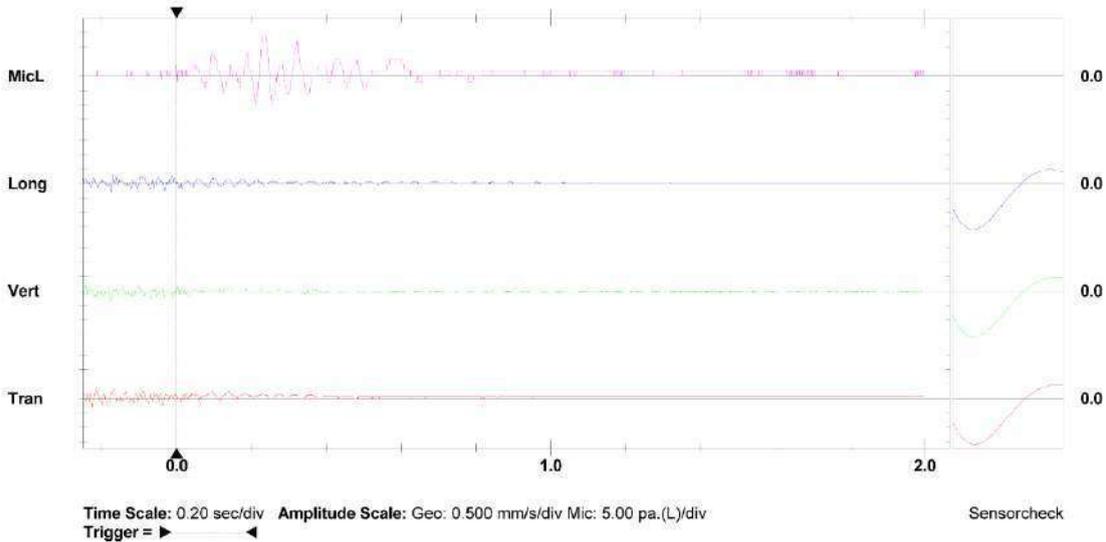
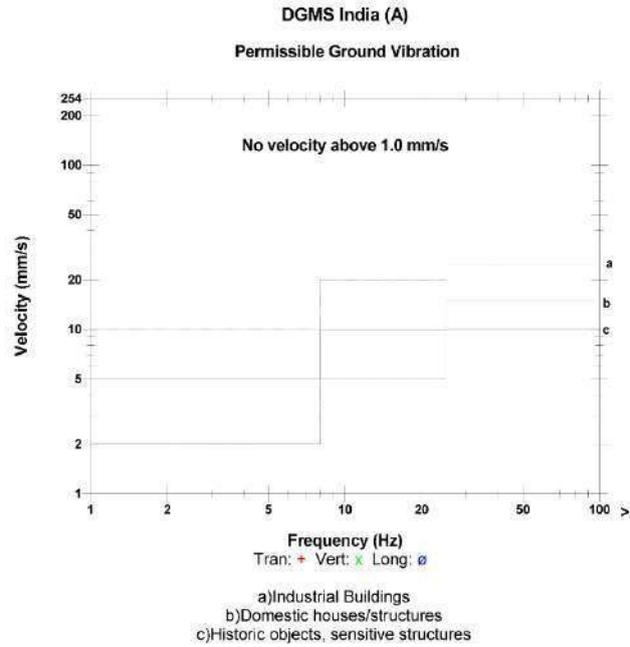
Post Event Notes

Microphone Linear Weighting
PSPL 116.9 dB(L) at 0.231 sec
ZC Freq 18 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 491 mv)

	Tran	Vert	Long	
PPV	0.318	0.318	0.318	mm/s
ZC Freq	85	64	N/A	Hz
Time (Rel. to Trig)	-0.225	-0.176	-0.175	sec
Peak Acceleration	0.0199	0.0133	0.0199	g
Peak Displacement	0.00127	0.00050	0.00090	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.7	7.8	8.2	Hz
Overswing Ratio	3.4	3.6	3.3	

Peak Vector Sum 0.524 mm/s at -0.175 sec

N/A: Not Applicable





VMS_92 Location : EVENT



Event Report

Date/Time Long at 14:39:00 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 4687 V 2.61 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F687\WBV.D00

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 04:26:47 (V8.12)

Extended Notes

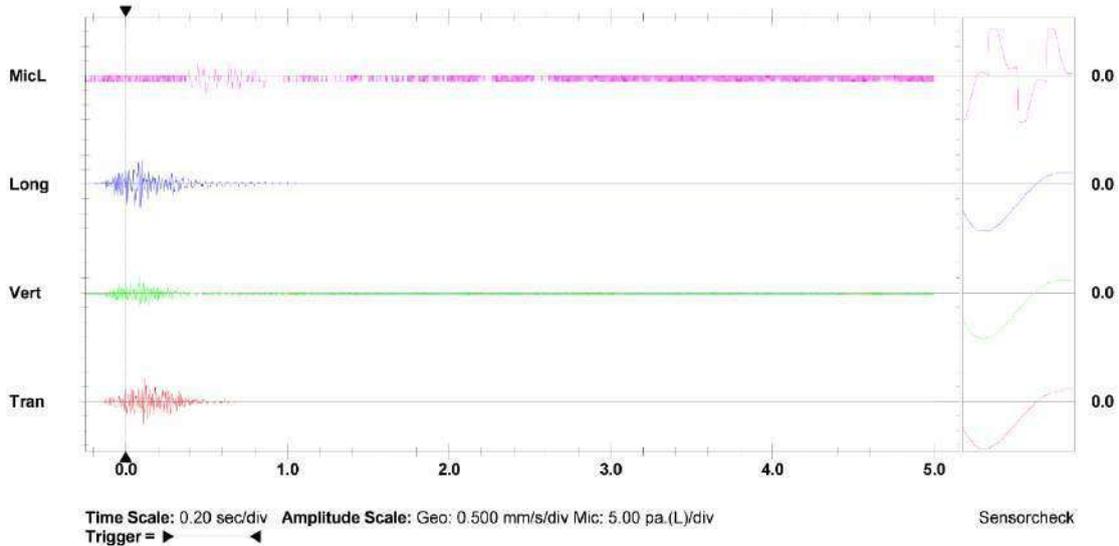
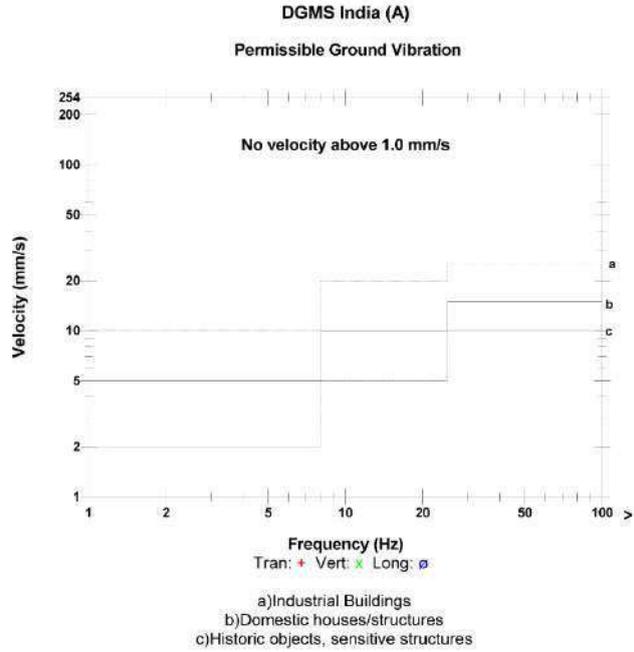
Post Event Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) at 0.492 sec
ZC Freq 18 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 505 mv)

	Tran	Vert	Long	
PPV	0.826	0.572	0.889	mm/s
ZC Freq	>100	N/A	>100	Hz
Time (Rel. to Trig)	0.112	0.090	0.101	sec
Peak Acceleration	0.0530	0.0464	0.0464	g
Peak Displacement	0.00121	0.00087	0.00152	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.6	7.8	7.7	Hz
Overswing Ratio	3.5	3.2	3.6	

Peak Vector Sum 1.00 mm/s at 0.101 sec

N/A: Not Applicable



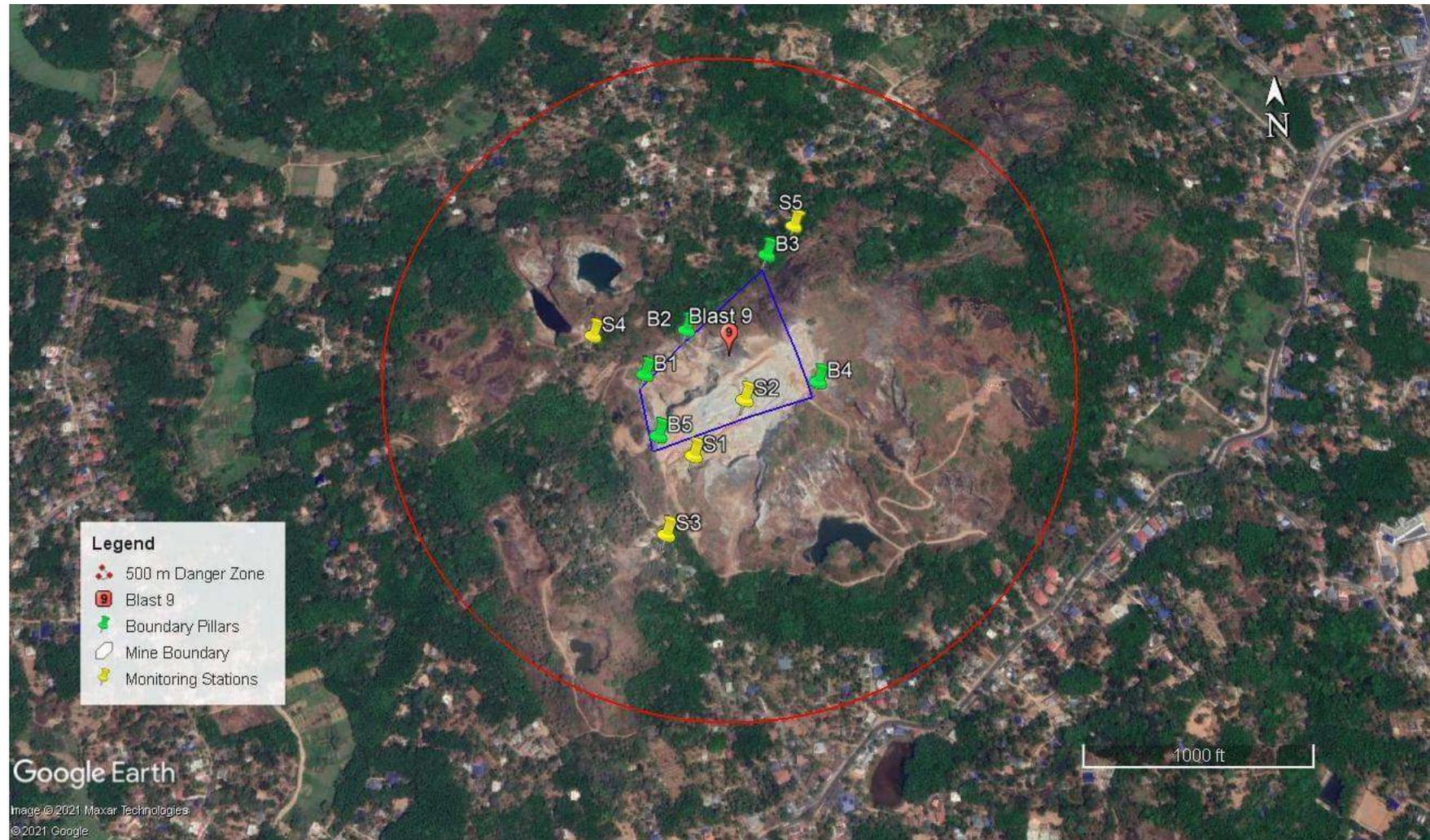


Figure 3.18 Imagery shows the location blast site 9 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry



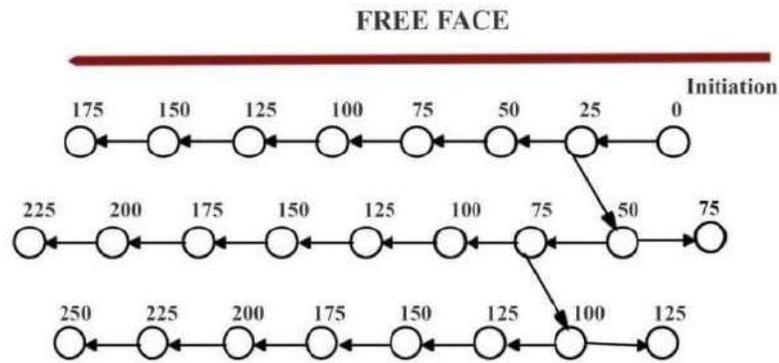
Blast No 10: The tenth blast was conducted on 17th March, 2021 and the adopted blasting pattern and details are given in the Table 3.20 and 3.21. The Figure 3.19 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.20

Table 3.20 Co-ordinates of Blast & Instrument Locations

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise dB(A)	Type of structure/ Permissible limit
1	Blast Location (B10)			8°43'45.74"	76°50'20.27"	---		
2	VMS_1 Location	11772	146	8°43'41.81"	76°50'17.47"	3.4 Within permissible limit	56.2	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	46	8°43'44.17"	76°50'19.88"	2.29 Within permissible limit	72.1	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	259	8°43'38.33"	76°50'16.16"	Not Triggered		Not belonging to the owner
5	VMS_4 Location	4688	245	8°43'48.03 3"	76°50'12.81"	0.206 Within permissible limit	59.1	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	243	8°43'53.22"	76°50'22.62"	0.318 Within permissible limit	56.3	Not belonging to the owner, maximum value is 5 mm/s

Table 3.21 Details of Blast Parameters

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	25	0.625	1.1161	15.625



NUMBER OF HOLES : 25

CHARGE PER DELAY :

Kg/delay

Figure 3.19 Schematic diagram of adopted blasting pattern for the blast 10

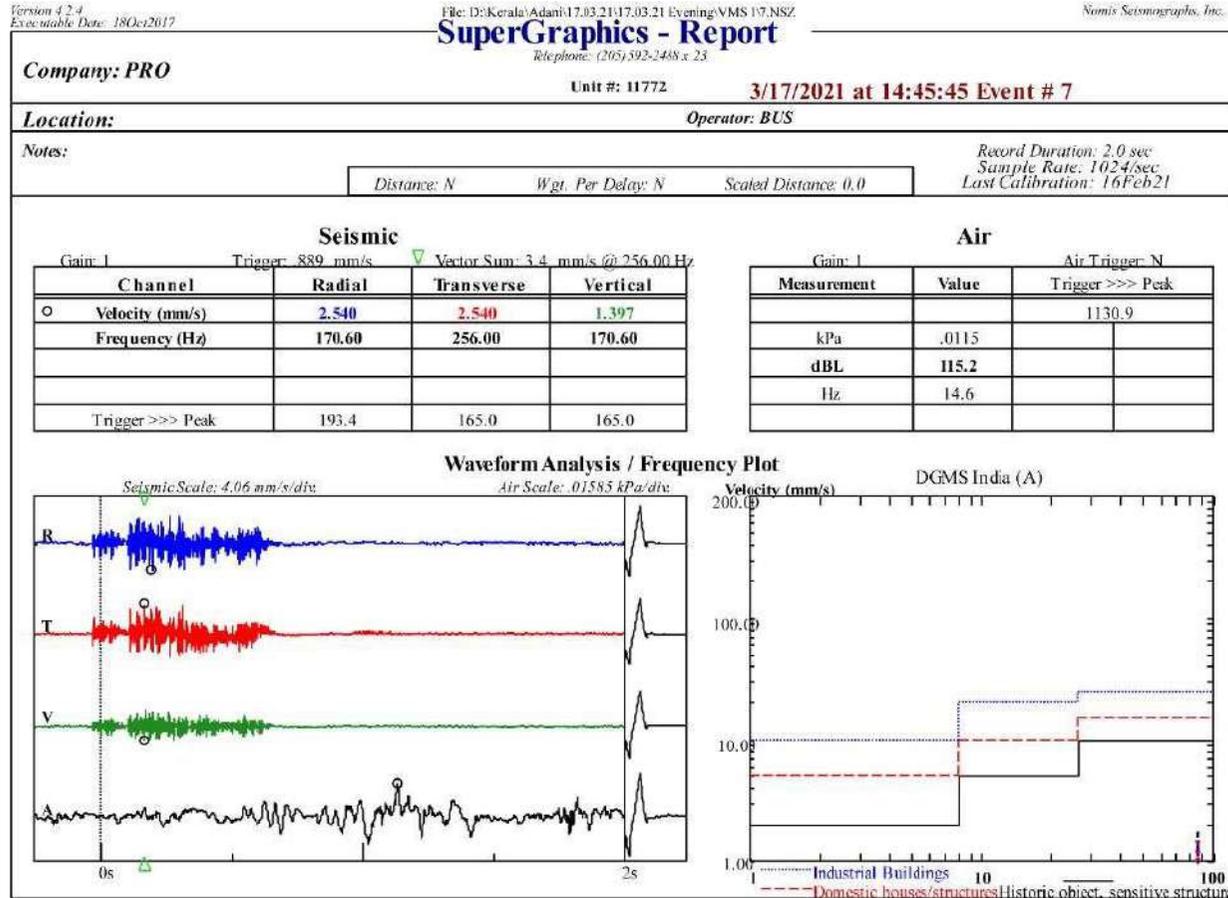
Post Blast Observations

During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 m which is considered to be normal.
- A drop of about 0.50 to 1.0 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 to 15 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.18 & 3.19.**

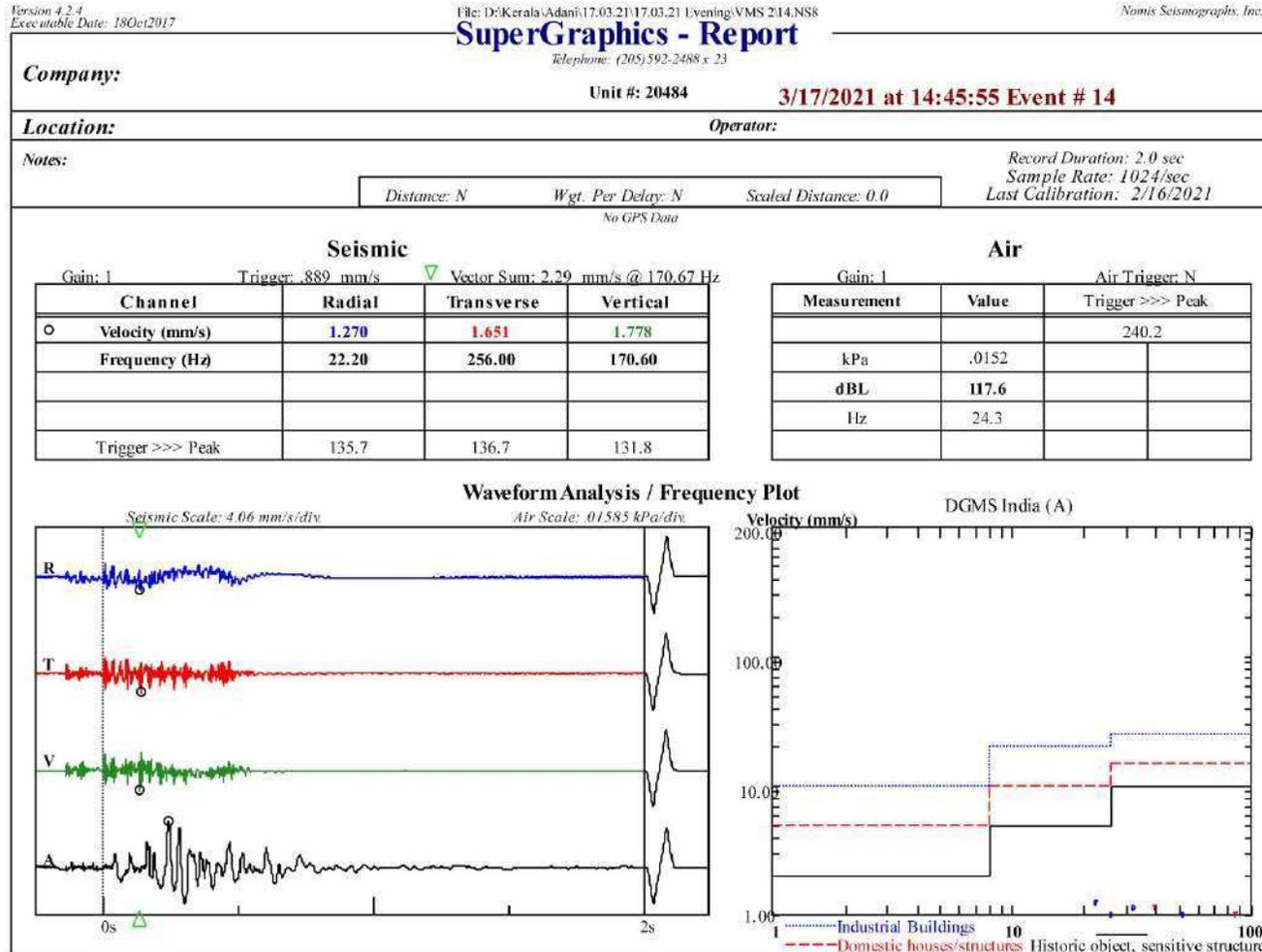


VMS_1 Location : EVENT REPORT





VMS_2 Location : EVENT REPORT





VMS_98 Location : EVENT



Event Report

Date/Time MicL at 14:45:43 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo :127 mm/s
Record Time 2.0 sec at 1024 sps

Serial Number 4688 V 2.6 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F688IWBV.070

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 04:23:50 (V8.12)

Extended Notes

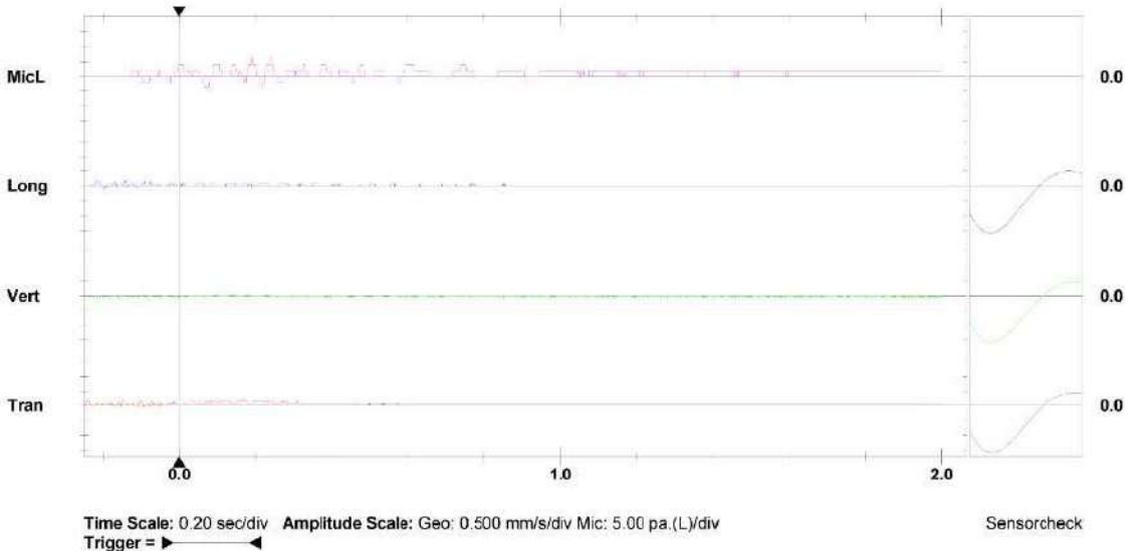
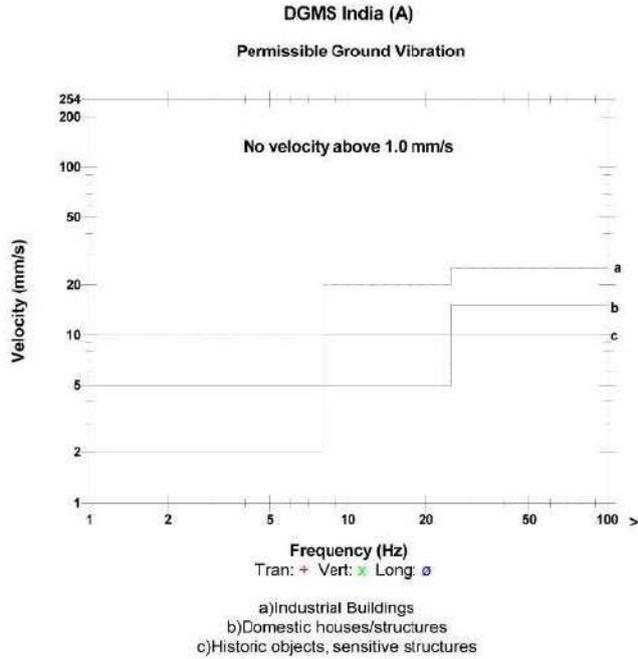
Post Event Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) at 0.191 sec
ZC Freq 20 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 491 mv)

	Tran	Vert	Long	
PPV	0.191	0.127	0.191	mm/s
ZC Freq	64	N/A	47	Hz
Time (Rel. to Trig)	-0.240	-0.242	-0.216	sec
Peak Acceleration	0.0133	0.00663	0.00663	g
Peak Displacement	0.00003	0.00003	0.00003	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.7	7.8	8.2	Hz
Overswing Ratio	3.4	3.6	3.3	

Peak Vector Sum 0.206 mm/s at -0.240 sec

N/A: Not Applicable





VMS_99 Location : EVENT



Event Report

Date/Time MicL at 14:45:38 March 17, 2021
Trigger Source Geo: 0.492 mm/s
 Mic: 106 dB(L)
Range Geo: 127 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 4887 V 2.61 MiniMate
Battery Level 6.4 Volts
Calibration April 21, 2017 by UES, New Delhi
File Name F687IWBV.020

Notes
 Location: KADAVILA STONE QUARRY
 Client: ADANI PORT PVT LTD
 User Name: ANNA UNIVERSITY
 Converted: February 26, 2011 04:26:47 (V8.12)

Extended Notes

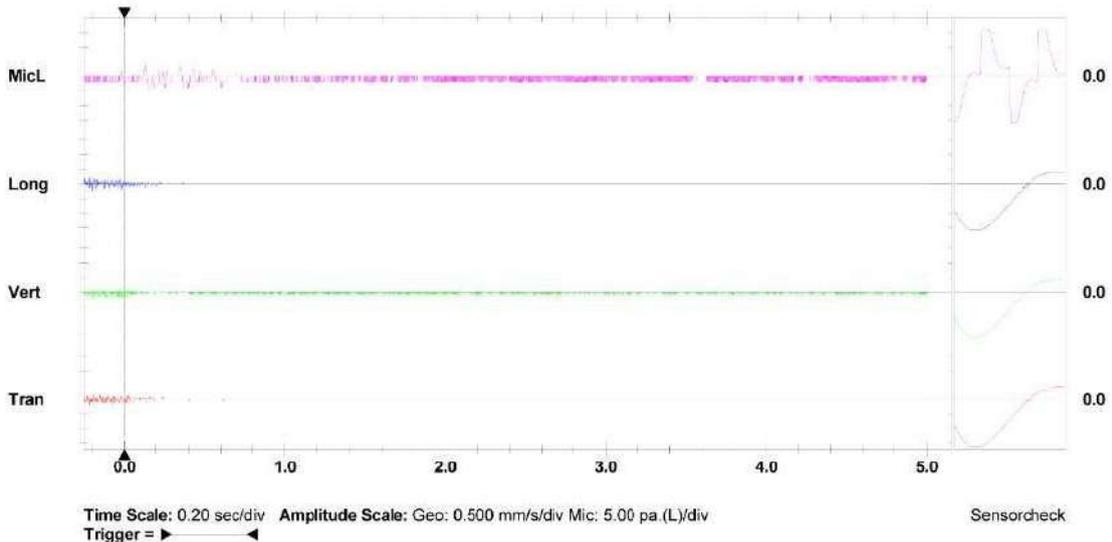
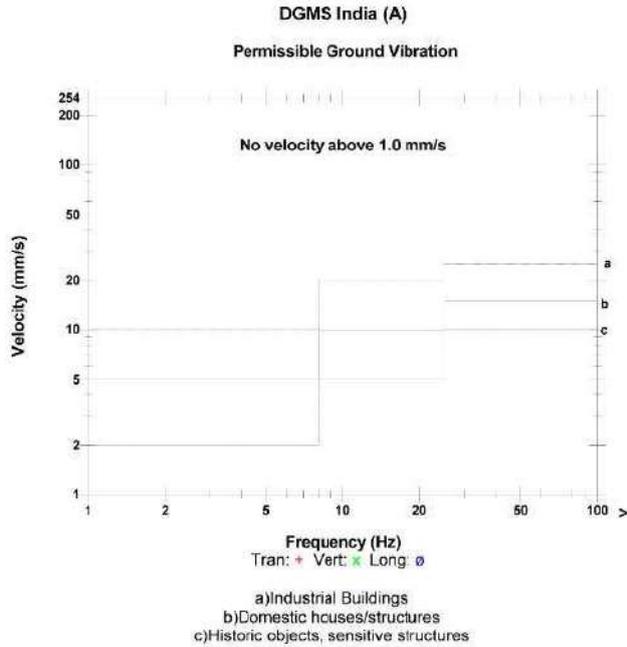
Post Event Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) at 0.149 sec
ZC Freq 18 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 505 mv)

	Tran	Vert	Long	
PPV	0.191	0.254	0.254	mm/s
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	-0.074	-0.005	-0.198	sec
Peak Acceleration	0.0133	0.0199	0.0199	g
Peak Displacement	0.00006	0.00016	0.00019	mm
Sensorcheck	Passed	Passed	Passed	
Frequency	7.6	7.8	7.7	Hz
Overswing Ratio	3.5	3.2	3.4	

Peak Vector Sum 0.318 mm/s at -0.198 sec

N/A: Not Applicable



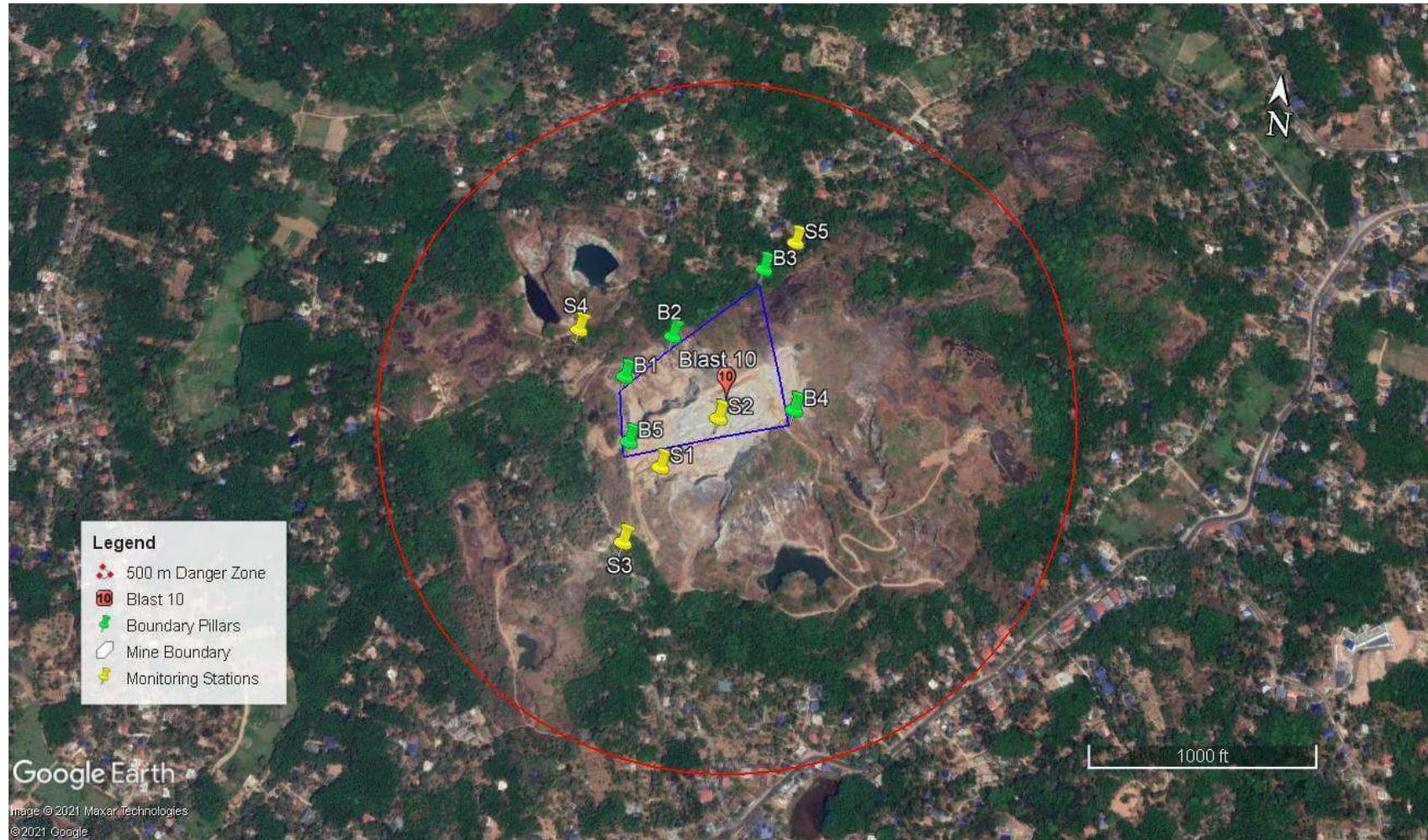


Figure 3.20 Imagery shows the location blast site 10 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry

3.2 Blast Vibration Monitoring

To minimise generation of blast induced ground vibrations and thereby their adverse effects on the residential buildings, and other structures, the blast vibration predictor equation for the quarry area has been developed by determining the field constants (which are site specific) by monitoring ground vibrations during all **10 trial blasts** in M/s. Kadavila-1 Stone Quarry. This monitoring was carried out by five numbers of seismographs of INSTANTEL (3 Nos.) and NOMIS (2 Nos.) make by locating them at different locations and distances from the blasting site.

Based on the parameters like the maximum explosive charge per delay, measured peak particle velocities (PPV), distances of each of the blasting sites to the monitoring stations of that particular blast, predictor equations for the site have been developed using regression analysis. This predictor equation was used to calculate the maximum (safe) explosive charge per delay by substituting the distance of the blasting site from the nearest residential structures.

Blast design for the trial blasts was based on the information collected from the site, the empirical relations normally used for blast design and the current practices prevailing in the quarry. Results of the trial blasts, rock type, height of the bench, existence of structures to be protected from blast vibrations like the residential structures of the village, etc. have been taken into account, in this report, while designing the future blasts for M/s. Kadavila-1 Stone Quarry.

3.2.1 Tolerable PPV Levels of the Residential Buildings and other structures of Nagaroor village (Kadavila village)

The guidelines by DGMS and others (given in **Section No. 1.3**) specify the tolerable PPV levels surface civil structures of various types can tolerate at different frequencies. Amongst them, DGMS recommends the least (most conservative and therefore safe) permissible peak particle velocities to which different types of structures should be subjected to, for ensuring their safety. Hence, these standards are considered for blast design in this report.

The **minimum and maximum blast vibration frequencies** recorded during the trial blasts ranged between **7.5 to 256 Hz** respectively. Keeping in view the minimum



frequency recorded during the trial blasts, the maximum PPV, structures of any type, can tolerate without damage fall within the frequency range of **8 to 25 Hz** recommended by DGMS in the **Table 1.2** and the same are given in the **Table 3.22**. Based on the DGMS recommendations, it is indicated in the **Table 3.22 (A)** that the tolerable PPVs measured at the foundation level of the structures are **10 mm/s for the domestic houses/structures made up of kutchha brick and cement** and **20 mm/s for the Industrial buildings (RCC & framed structures)** not belonging to the quarry management and **5 mm/s for other structures of historical importance like dam and bridges** if located within the vicinity of the quarry.

However, to avoid confusion for the people in the field, the maximum explosive charge per delay is calculated for this quarry to restrict the peak particle velocity to **5.0 mm/s only** (irrespective of the type of structure), which is more conservative and safer as shown in the **Table 3.22 (B)**. Further it will secure the safety of Domestic houses & structures/Residential buildings located in the Kadavila village whose safety is also very important.

Table 3.22 Permissible Maximum PPV for Residential buildings and other civil structures for blast induced ground vibration frequencies ranging between 8 to 25 Hz

Type of structure		Max. Permissible PPV, mm/s with Dominant excitation frequency in the range of 8-25 Hz
(A) Buildings / structures not belonging to the owner		
(i)	Domestic houses/structures (kutchha brick & cement), Residential & other Buildings of Vaniyamkulam village	10
(ii)	Industrial buildings (RCC & framed structures)	20
(iii)	Sensitive structures like Dam & Bridges in the Surrounding villages	5
(B) Maximum PPV considered for calculation of Max. Charge per Delay		
	For all types of structure of Nagaroor village	5



3.3 Development of Predictor Equation

The vibration data generated during the trial blasts was analysed and a regression curve for the same at **95%** degree of confidence level has been drawn and indicated in **Figure 3.21**. The **95%** degree of confidence level was chosen because this is the minimum level at which all the measured data points were lying below this line(level). Based on the regression analysis, the predictor equation for the area has been developed and given in Equation 3.

$$V = 1026 * (SD)^{(-1.01)} \quad \dots \quad (3)$$

where,

V	=	Peak particle velocity (PPV), mm/s
SD	=	Scaled distance, m/\sqrt{kg}
k and β	=	Rock constants, which are site specific and

SD is calculated by equation (2).

$$SD = \frac{D}{\sqrt{W}} \quad (m/\sqrt{kg})$$

where,

D	=	Distance between the blasting site and the vibration monitoring station, m
W	=	Maximum explosive charge per delay, kg.

Accordingly, the safe (maximum) explosive charge per delay to be used and the maximum number of drill holes to be charges with same delay number for various distances of the blasting site from the structures like residential buildings and other structures in the Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala to restrict the PPV to a maximum of 5.0 mm/s **with 95% confidence** are calculated using the predictor **equation (3)** developed for the site. **Table 3.23** gives the recommended maximum explosive charge per delay and the maximum number of drillholes to be charges with same delay number in M/s. Kadavila-1 Stone Quarry. Similarly, **Figure 3.21** depicts the maximum explosive charge recommended per delay.



Table 3.23 Maximum explosive charge recommended per delay for various distances of the blasting site to the structure to be protected like Residential buildings and other structures to restrict the blast vibrations (Peak Particle Velocity) to a maximum of 5 mm/s with 95% confidence level

Predictor Equation: $V = 1026 * (SD)^{-1.01}$		
Sl. No.	Shortest distance between the nearest structure to be protected to the blasting site, m	Maximum permissible explosive charge per delay, kg (rounded off to the nearest kg)
1	150	0.57
2	200	1.01
3	250	1.57
4	300	2.26
5	350	3.08
6	400	4.02
7	450	5.09
8	500	6.28
9	550	7.60
10	600	9.05

Scaled Distance

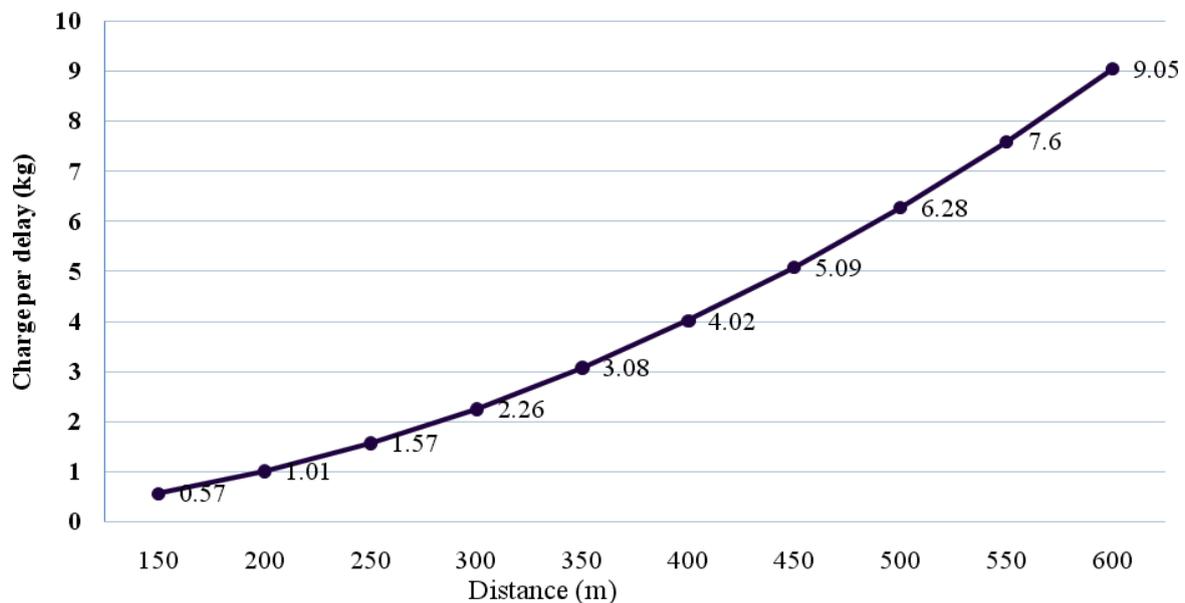


Figure 3.21 Relationship between maximum charge per delay and distance between the blasting site and the structure to be protected to restrict the blast induced ground vibrations (PPV) to a maximum of 5 mm/s

3.4 Results and Discussions

Ten trial blasts were carried out 16.03.2021 to 17.03.2021 and blast vibrations were monitored using five seismographs located at various distances. The minimum and maximum charge per delay varied from 1.07 to 2.17 kg. A maximum of 80 holes were drilled with jack hammer drilling equipment with a maximum number of holes per delay of six. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighbouring village. Out of the total 47 measurements made, vibrations were recorded by the instruments only at 36 stations. The vibrations recorded behind the blast free face were of highest magnitude. The magnitude of vibration recorded in the flank of direction of initiation was lower than those on the opposite side of the flank of blast initiation.

The maximum vibration recorded was 0.968 mm/s with associated dominant peak frequency range of 8.1 at a distance of 465 m from the site of blasting where the total explosive detonated in the blasting round was 18.75 kg and explosives weight per delay was 1.33 kg. Further, the maximum vibration of 0.397 mm/s was recorded at a distance of 359 m with associated dominant peak frequency range of 8 Hz from the blasting site where the total explosive detonated in the blasting round was 15 kg and the corresponding explosives weight per delay was 1.25 kg.

All the 10 blasts were carried out using NONEL shock tube detonators with an in-hole delay of 250 ms and surface delay of 25 ms. Fast attenuation of vibration was recorded at shorter distances whereas at far-off distances the attenuation was slow and was influenced by low frequency blast wave characteristics.

The recorded dominant frequencies of vibrations were in the range of 7.5 to 256 Hz. The FFT analyses of vibration data revealed that the concentration of vibration energy was in the range of 29.30 to 170.6 Hz. However, keeping in view the minimum frequency recorded during the trial blasts, the maximum PPV structures of any type, can tolerate without damage fall within the frequency range of 8 to 25 Hz. However, to avoid confusion for the people in the field, the maximum explosive charge per delay is calculated for this quarry to restrict the peak particle velocity to 5.0 mm/s only (irrespective of the type of structure), which is more conservative and safer as shown in the Table 3.22. Further it will secure the safety of Domestic



houses & structures/Residential buildings located in the Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala whose safety is also very important.

Similarly, the maximum level of air over-pressure monitored at a distance of 205 m in the neighbouring village as 63.7 dB(A). All the recorded data were well within the threshold level of air over pressure/noise as per DGMS standard {85 dB(A)} and hence it will not cause any damage to the windows etc. of the houses/structures of the concerned village. Further, there was no ejection of flyrocks beyond the distance of 15 m in any of these blasts.

The analyses of vibration data recorded from detonation of blasts with higher amount of explosives generated higher level of vibrations at near-by-distances in comparison to the blasts which were detonated at the same bench face with lesser amount of explosives although the blast design and explosives parameters were kept identical. The explosives detonated in a delay in both the blasts were similar in weight.

The propagation equation for prediction of blast vibration have been established and are given as Equations 3. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. For convenience, the permissible explosive weight per delay has been computed and is given in Table 3.23.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.0 Conclusions and Recommendations

The Anna University team have conducted scientific study to evaluate damage potential of the blast induced ground vibration and air overpressure induced by blasting operations at Kadavila-1 Stone Quarry located in the Nagaroor village. Altogether 10 experimental blast rounds were conducted in Kadavila-1 Stone Quarry. Comprehensive vibration monitoring was carried out during the blasting experiment. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighboring village which includes domestic houses and other prominent structures of the village such as the houses are not belonging to the owner of mine management.

It is observed that the blast induced ground vibration and air overpressure (noise) monitored at the locations such as houses (which are not belonging to the mine management) beyond a distance of 130 m from the blasting site remained **less than 3.00 mm/s and 63.7 dB(A) against recommended safe values of 5.0 mm/s and 85 dB(A)** respectively. Ground vibration beyond a distance of 300 m decayed to less than 1.0 mm/s in majority of the cases observed. Therefore, it may be concluded that observed blast induced ground vibration values are safe and well within the permissible limit as per recommendations of Directorate General of Mine Safety (DGMS).

Based on the scientific study, it is concluded that **the blast induced ground vibrations and noise levels generated by the controlled blasting carried out in Kadavila-1 Stone Quarry was within permissible level and therefore is not affecting the residential buildings and other structures. Further, it has been observed that no flying fragments or projectiles travelled beyond 10 m from the site of blast. Hence, controlled blasting can be carried out at Kadavila-1 Stone Quarry by following the blasting parameters as recommended in the Table No. 4.1.**



Here, it is recommended that the permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. Hence, the maximum charge per delay shall not exceed the value specified in **Table 3.22** corresponding to the distance between the blasting site and the residential building or any sensitive structure.

Further, it is recommended to continue the present method of fragmenting the oversized rocks using Rock breakers and wherever possible, to adopt muffling using old tyres / old conveyor belts in the blasting operation which will not only minimize the flyrock generation as well as condense the noise generation considerably.

However, it may be noted that the recommendations of this report are site specific and can be effectively implemented only in M/s. Kadavila-1 Stone Quarry and not to the quarries outside the study area.



Table 4.1 Summary of suggested Controlled Blast Design for M/s. Kadavila-1 Stone Quarry

Sl. No.	Parameter		Value
1.	Blast hole diameter		33 mm
2.	Burden		1.2 m
3.	Spacing		1.5 m
4.	Height of the bench		6.00 m
5.	Stemming length		Minimum 0.70 m
6.	Drilling patterns to be followed		Rectangular / Staggered
7.	Specific charge	For creating Initial (Box) Cut	0.16 to 0.17 kg/m ³
		For production blasting	0.15 to 0.16 kg/m ³
8.	Loading Density	Cap-sensitive Emulsion (or) Slurry Cartridges	0.26 kg/m
9.	Average explosive Quantity/hole	Cap-sensitive Emulsion (or) Slurry Cartridges	0.50 kg
10	Maximum explosive charge per drillhole during production blasting	Cap-sensitive Emulsion (or) Slurry Cartridges	125 g 0.625 to 0.688 kg
11	Detonators recommended		NONEL based detonators of 17/25 ms surface delay with an in-hole delay of 250 ms
12	Type of explosive recommended		Emulsion (or) slurry cartridge type (ø=25 mm)
13	Initiation system recommended		Inverse initiation
14	Method of connecting detonator		Series
15	Maximum charge per delay		As stated in Table 3.22 based on the distance of the blasting site from the structure and the type of structure to be protected

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DISCLAIMER

The scientific investigation presented in this report was carried out by Department of Mining Engineering, Anna University, Chennai. The findings were based on **10 Nos. of trial blasts** carried out with **33 mm diameter holes** to a maximum **depth of 2.4 m** using cap-sensitive **Emulsion explosive** cartridges of **25 mm diameter** along with **NONEL**. Blast design for Kadavila-1 Stone Quarry. given in this report is based on the scientific investigations including the results of the trial blasts.

The Department of Mining Engineering, Anna University, Chennai is not responsible for the results produced, if there is any change in the conditions like – increase in strength of the explosives used, using more explosive charge per delay than recommended in **Table – 3.23** of this report, adopting faulty initiation sequence, not following the recommendations of this report etc.

The **Department of Mining Engineering, Anna University, Chennai is no way responsible for proper implementation of the recommendations of this report, as the day-to-day activities in the mine are neither under its control nor possible for it to control.**

In view of the above, neither the authors of this report nor the Department of Mining Engineering, Anna University assume any liability with respect to any claims, damages or losses which may result from the implementation of the conclusions and recommendations / results of this report. This report is only for the guidance of quarry management and the Kadavila-1 Stone Quarry management has to decide on all other safety and operational aspects of the actual blasting operation for the Kadavila-1 Stone Quarry. It is also the responsibility of the management to take all statutory and other additional safety precautions and measures while carrying out the blasting as the same have not been stated in this report.




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ANNEXURE – I

DGMS Technical (S & T) Circular No. 7 of 1997

Sub: Damage of structures due to blast induced ground vibrations in the mining areas.

1. Introduction

In response to increase demand for coal and other minerals, a number of large mechanised opencast mines have come into operation. Some of these opencast workings are located near surface structure like residential buildings, schools, commercial shops, hutments with large number of inhabitants etc. Whenever blasting is done in these opencast mines, ground vibrations are generated outward from the blast area and cause damage to surrounding surface structures. The vibrations radiating from the blast holes while passing through surface structures, induce vibrations on the structures causing resonance. The components of ground motion can affect the structures through compression and tension and also through vertical and horizontal shearing effects. Blast induced ground vibrations create socioeconomic problems for the mine managements as well as the people residing in vicinity of these mines. As only 20-30 % of energy of commercial explosives used in the mines is utilized for fragmenting the rock, the rest of energy is transmitted through the earth in the form of ground vibrations resulting in damage to the surrounding structures.

2.0 Damager Criteria

The peak particle velocity has so far been considered as the best criteria for evaluating blast vibrations in terms of its potential to cause damage. The extensive studies on the problems have established that the frequency of the waves is also equally important factor to consider the effect of damage. The blasting damage is generally classified into following four categories:

Sl. No.	Category	Description of damage
i.	No appreciable damage	No formation of noticeable cracks.
ii.	Threshold damage	Formation of fine cracks, fall of plaster, opening & lengthening of old cracks, loosening of joints, dislodging of loose objects etc.
iii.	Minor damage	Superficial not affecting the strength of structure(s). Hair line cracks in masonry around openings near partition, broken windows. Fall of loose mortar etc.
iv.	Major damage	Formation of several large cracks, serious weakening of structures, shifting of foundation, fall of masonry, ruptures of opening vaults etc.



3.0 Natural Frequencies

Elements of building construction such as sprung floors, stud partition walls, ceiling and windows can all react as mass-spring systems; each with its own natural frequencies of about 4-24 Hz (low frequencies) Ground vibrations at these frequencies amplified by the structures increase the risk of damage. When the low frequency ground vibration coincides with the natural frequency of the structure resonance is originated. The resonance is a state in which the structure absorbs most energy progressively becoming deformed with time, until plastic deformation occurs. Therefore even the low peak particle velocity of ground vibrations at natural frequency of structure is more harmful to the structure. Natural frequencies of brick and concrete structure generally vary from 8-16 Hz.

4.0 Structural response

All structures develop cracks from natural causes like periodic changes in humidity, temperature and wind velocity. Changes in soil moisture cause foundation cracks. The width of old cracks change seasonally and number of cracks increase with the time. This damage is independent of damage caused by blasting.

The cracking location and the wall material have an influence on the particle velocity at which cracking begins. If the entire structure is not inspected thoroughly, there may be chances of biased opinion on the type of cracks. Thus it is important to place transducer properly for the correct assessment of damage.

In the mud houses, number of cracks develop before blasting and these cracks widened and extended with the passage of time. These cracks are further widened and get extended due to blast induced ground vibrations. Concrete structures vibrate for longer duration than brick and mud structures. Concrete walls have free top and show no cracks at vibration levels for which mud and brick walls can damage. Cracks develop in concrete walls with large vibration level. Cracks in brick-structures can be observed in junction of walls, roof and at window corners. Brick walls with clay mortar and cement-sand mortar behave in same fashion. Steel structures can sustain more vibration level.

The magnitude of vibrations on structures is much more than on the ground. Duration of vibration in structure is also longer than, that of ground vibration. Multi-storied buildings are more sensitive to blast vibration than the single-storied buildings.

To predict the extent of damage and to take preventive measures, it is necessary to measure ground vibrations due to blasting. Studies on structural response of ground

vibration in the structures of different constructions within the mining areas under Indian condition are limited and therefore such study should be carried out to ascertain the degree of damages for improvement and standardization of damage criteria under Indian conditions.

5.0 Measurement of blast induced vibrations

5.1 Instrumentation

The instrument selected for monitoring blast induced ground vibration shall be simple, light, compact, easily portable, battery operated, digital form output, triggering by geophone etc. Triaxial transducers for recording blast vibration shall have a liner frequency up to 500 Hz and capable of recording particle velocity up to 100 mm/s.

5.2 Methodology

The transducers shall be placed near the structure on the solid undisturbed ground and should be placed well in contact with the ground. For structural response, the transducers shall be placed horizontally over the wall, floors and ceiling. A minimum of 15 points of observations corresponding to a minimum of 10 blasts shall be made for better prediction with a high index of determination.

5.3 Predictor Equation

The least means square method of regression analysis shall be used to interpret the date. The square root scale distance shall be used for analysis and interpretation of data when blasting is done on surface and measurements are taken on the surface, or the blasting is done underground and measurements are taken underground. On the other hand, if blasting is done on the surface and the measurements taken underground the cube root scaled distance shall be used.

6.0 Guidelines on experimental blasting

6.1 Factors

Major factors affecting particle velocity of ground vibration are type and amount of explosive charge used, distance from the charge to the point of observation (surface structures), geological, structural and physical properties of the rock that transmits the vibrations, height of structures and blast geometry. Use of safe charge/delay, in hole delay with non- electric initiation systems. Proper burden, inclined holes in conformity with slope of bench, deck charge, air deck, sequential blasting, clearing off loose pieces of rocks from the blast site and proper stemming of holes bring reduction in blast induced ground vibrations. Controlled blasting methods in conjunction with effective muffling of holes will control ground vibrations and also arrest fly rock.

6.2 Plan

A plan showing structures belonging to the to the owner and not belonging to the owner in different prominent shades should be prepared. The plan shall incorporate details of construction of the structures in a tabular form. Plan should also show 50 m., 100m, 200 m and 300 m zones from the structures, the place of experimental study and the limit upto the which blasting is proposed to continue.

6.3 Study/ observations

In a particular mining area with built-up structures where deep hole blasting is to be introduced for the first time, experimental blasting shall be carried out by any research/ academic institute much before the structures fall within the blasting danger zone. The type of instruments, the methodology and predictor norm as recommended in para 5.0 shall be followed in measurement of blast induced vibrations. Based on the study, the safe charges for different zones shall be determined and recommendations made in the report. In a cluster of buildings of different types existing close to each other, the charge for the buildings/ structures requiring greater protection against damage shall be assessed and recommended.

6.4 Structural response

During the study the response of the structures assuming different natural frequencies should be calculated and plotted on a figure. Software with the different programmes are available now for the said plot and should be used for convenience.

6.5 Monitoring

In order to ensure effective control over the vibration and related damages there is a need for regular inhouse monitoring and the managements should train the blasting personnel during the experimental study and start observations on their own during the regular blasting operations.

7.0 Recommended permissible standards of blast induced ground vibrations:

7.1 Technical considerations

Permissible standards for different type of structures have been arrived at considering the importance of building and structures. The buildings of historical importance and multi- storied structures are likely to get damaged with low level of vibration and therefore permissible standards are to be lowest. Similarly buildings not belonging to the owner but with mud/brick in cement construction and others with good construction (RCC and framed structures) should also be protected but higher permissible standards than that of the level



fixed for first category has been allowed. The buildings belonging to the owner of the mine are constructed for a limited period generally equal to the life of the project. The management accept that these buildings constructed within the mining area are likely to suffer some damages during the extraction of minerals, but the damages should be repairable. Therefore, slightly higher permissible levels of vibrations have been allowed in such cases.

7.2 Permissible standards

Depending on the type of structures and the dominant excitation, the peak particle velocity (ppv) on the ground adjacent to the structure shall not exceed the values given below in the table.

Table: A1 Permissible Peak Particle Velocity (ppv) at the foundation level of structures in Mining Areas in mm/s

Type of structure		Dominant excitation frequency, Hz		
		<8 Hz	8-25 Hz	> 25 Hz
(A) Buildings / structures not belonging to the owner				
(i)	Domestic houses/structures (kutchha brick & cement)	5	10	15
(ii)	Industrial buildings (RCC & framed structures)	10	20	25
(iii)	Objects of historical importance & sensitive structures	2	5	10
(B) Buildings belonging to the owner with limited span of life				
(i)	Domestic houses/structures(kutchha brick & cement)	10	15	25
(ii)	Industrial buildings (RCC & framed structures)	15	25	50

In view of the complexities of the problems I hope you all would take adequate measures as recommended above to ensure that the blasts near surface structures are carried out with utmost care and precautions. The blast induced ground vibration should be within the permissible limits as specified above.



ANNEXURE – II PROCEDURE FOR DEALING WITH MISFIRES

Abstract of Regulation No. 167 of Metalliferrous Mines Regulations 1961 on Misfires:

- (1) When shots are fired electrically, no person shall re-enter or be permitted to re-enter the place of blasting until 5 minutes after firing of the shots and the source of electricity has been disconnected from the cable.
- (2) In the event of a misfire, the entrance or entrances to the place shall be barricaded or fenced so as to prevent inadvertent access; and no work other than that of locating or relieving the misfire shall be done therein until the misfire has been located and relieved. The place of the misfire shall be marked with a red flag.
- (3) In the event of a misfire, the tamping may be sludged out with compressed air or water under pressure. The hole shall thereafter be re-primed and fired.
- (5) Except where the misfire is due to faulty cable or a faulty connection, and the shot is fired as soon as practicable after the defect is remedied, or where a shot has been re-primed and fired under sub-regulation (3) another shot shall be fired in a relieving hole which shall be so placed and drilled in such a direction that at no point shall it be nearer than 30 centimetres from the misfired hole. The new hole shall be bored in the presence of a blaster, preferably the same person who fired the shot.
- (7) If a misfired hole is not dislodged by a relieving shot, the procedure laid down in sub-regulation (5) and (6) shall be repeated. A misfired hole which cannot be dealt with in the manner so prescribed shall be securely plugged with a wooden plug; and no person other than a blaster or a mining official or a person authorised for the purpose shall remove or attempt to remove such plug.
- (8) When a misfired shot is not found, or when a misfired shot is not relieved or re-blasted, the blaster shall, before leaving the mine, give information of the failure to such official as may relieve or take over charge from him. He shall also record, in a bound page book kept for the purpose, a report on every misfire, whether suspected, and whether relieved or not relieved. It shall be the responsibility of the relieving blaster or official also to sign the report and later to record in the said book the action taken for relieving the misfired shot hole.
- (9) The blaster of the next shifts shall locate and re-blast the misfired hole, but if after a thorough examination of the place where the misfire was reported to have occurred, the blaster or other competent person holding a Manager's or Foreman's certificate appointed for the purpose by the Manager, is satisfied that no misfire had actually occurred, they may permit drilling in the place.



ANNEXURE - III

DGMS Technical (S & T) Circular No. 1 of 1995

Sub: Danger due to lightning/storm during blasting operation in mines

Recently, three accidents took place due to premature blasting by lightning when persons were killed/injured/escaped while they were in the process of charging explosives/connecting detonators etc. These accidents occurred as mentioned below:

1. While 9 deep holes and a number of secondary holes were being charged to be connected in series and fired, a lightning discharge due to thunderstorm caused premature firing of the deep holes, killed three persons and inflicted serious bodily injuries to one.
2. While a Blaster was carrying 100 primed cartridge of explosives with electric detonators in a card-board box on his shoulder, the cartridges exploded suddenly resulting in instant death of the Blaster.
3. While a Blaster and his helpers were about to take shelter after charging of the holes, suddenly there was a lightning/thunder-storm resulting in premature blast of the holes. Persons escaped unhurt.

Accidents due to above causes continue to occur despite very clear safety precautions laid down while granting permission under Reg. 106(2) (b) of MMR 1961 and Reg. 98 of CMR 1957 and also Circulars issued by DGMS recommending additional precautions to prevent such accidents. These precautions in brief are given below:

1. Shots shall not be fired except during the hours of daylight or until adequate artificial light is provided; all holes charged on any one day shall be fired on the same day as far as practicable.
2. As far as practicable, shotfiring shall be carried out either between shifts or during the rest interval or at the end of work for the day.

During the approach and progress of an electric storm, the following precautions shall be taken:

- (a) Neither explosives nor detonators shall be handled;
- (b) If charging operations have been commenced, the work shall be discontinued until the storm has passed;
- (c) If the blast is to be fired electrically, all exposed wires shall be coiled up and, if possible, placed in the mouth of the holes or kept covered by something other than a metal plate,
- (d) All wires shall be removed from contact with the steel rails of a haulage track, so as to prevent the charge being exploded prematurely by a local strike of the lightning;
- (e) If the firing circuit has been set up before the thunderstorm came on, the persons at the site should withdraw at the earliest and the blast should be fired off immediately;
- (f) All persons shall be withdrawn from the danger zone.

ANNEXURE – IV

Procedure for Warning and Withdrawing of Persons from the Blasting Zone

1. The Quarry management should employ persons possessing statutory qualifications of Blaster's Certificate from Directorate General of Mines Safety (DGMS) to handle and use explosives. The Blaster will be in-charge of receipt, transport, use and return of unused explosives and accessories.
2. All blast site employees shall follow the instructions of the Blaster and they shall use and adhere to every precaution to ensure employee safety including, but not limited to, visual and audible warning signals, flags, etc.
3. The Blaster should possess the Exploder Key with him during the entire process of charging and firing and he should not hand over it to any other unauthorised person.
4. All shots will be fired by the Blaster himself.
5. The blaster shall keep an accurate, up-to-date record of explosives and blasting accessories used in each blast and shall keep an accurate running inventory of all explosives and blasting accessories in his custody.
6. The Quarry management will maintain an inventory of the explosives and accessories received, issued, used and returned in a bound paged notebook kept for the purpose. A competent person will be in-charge of these operations.
7. The storage and handling of explosives will be in accordance with the provisions of Explosive Rules.
8. No explosives or accessories shall be abandoned.
9. Smoking, firearms, sparks, open flame or heat producing devices (including cell phones and battery operated watches) will be prohibited where explosives are being stored, handled, transported or used.
10. Electric Detonators shall never be pulled, stretched, kinked, twisted, mashed or abused in any way which could cause the tube to break or otherwise malfunction.
11. Electric detonator connections and splices shall be competent and positive in accordance with the manufacturer's recommendations.
12. No blast will be fired if any person is present in the vicinity of the blasting area. If any person is present or any operations are being carried out, steps will be taken to withdraw such persons or suspend above operations completely.
13. The Quarry management will establish a code of blasting signals as noticed below and all blast site employees will be familiarized with them: It is obligatory on the part of every employer and other person in the blasting zone to adhere to the code and keep away from the blasting zone during the blasting operations.



- contain audible pre-blast and all clear signals
- contain an emergency method for guards, flagmen, or authorized employees to signal “do not fire”, and
- prohibit sounding of the all clear signal until the blaster has checked the blast site for misfires. The following table that would meet these requirements.

Signal	Meaning
WARNING SIGNAL	A one minute series of long hooter / siren / blasts 5 minutes prior to blast signal.
BLAST SIGNAL	A series of short hooter / siren / blasts one minute prior to the shot.
ALL CLEAR SIGNAL	A prolonged hooter / siren / blast following the inspection of blast area.

- Blasting flags (red flags) shall be displayed around the blasting zone before blasting to facilitate clearing of all persons from the blasting zone.
- Flagmen will be safely stationed on all sides of the blasting area so as to stop any inadvertent entry.
- In the event of any misfires, the blaster will determine the suitable method(s) to detect misfires and take preparatory steps (e.g., noting obvious indications of misfire, or other appropriate means). Misfires shall be handled in accordance with the requirements of Metalliferous Mines Regulations - 1961 (given in **Annexure-II**).
- All lines shall be carefully traced and a search made for unexploded charges before giving all clear signals.
- No drilling, or loading shall be permitted until all misfires have been cleared.
- The safety zone of 500 m is to be maintained at the time of blasting
- All blasting operations will be conducted between sun rise and sun set (during the daylight hours) and preferably during a specific period of time like 12.00 noon to 3.00 p.m.

*



ANNEXURE - V



The monitoring instrument (S5) is located at the distance of 282 m from the blasting site (B8)



The monitoring instrument (S5) is located at the distance of 282 m from the blasting site (B4)



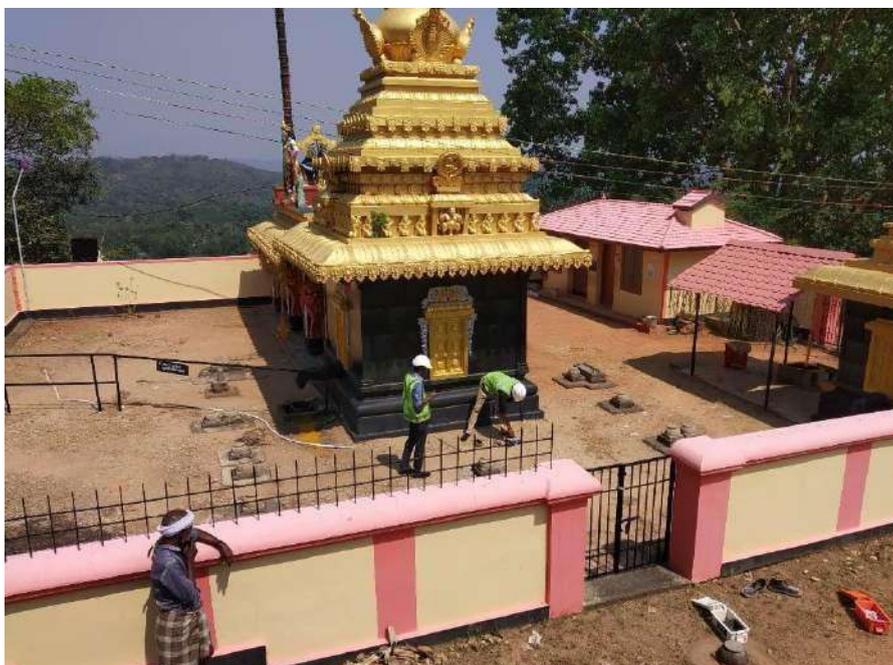
The monitoring instrument (S3) is located at the distance of 174 m from the blasting site (B6)



The vibration monitoring station (S1) is located at the distance of 297 m from the blasting site (B2)



The monitoring instrument (S3) is located at the distance of 465 m from the blasting site (B4)

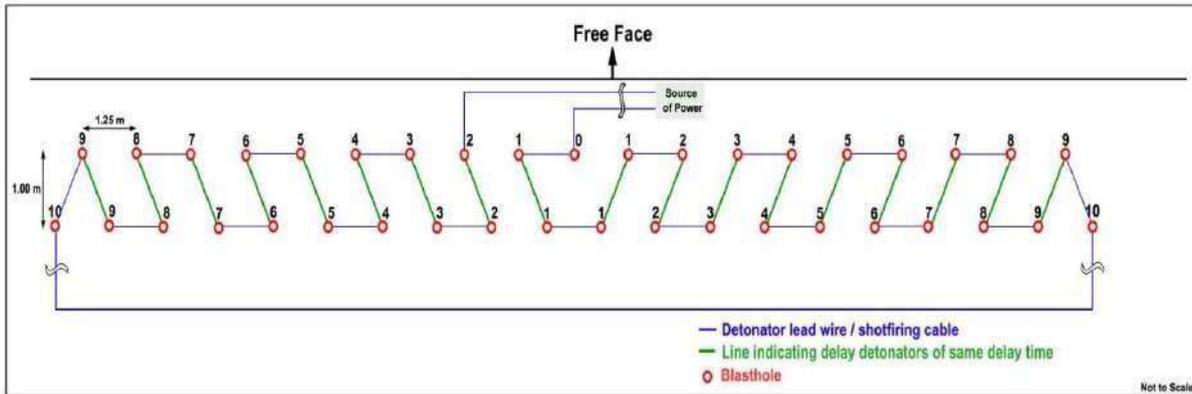


The vibration monitoring station inside the Temple near to Kadavila-1 Stone Quarry

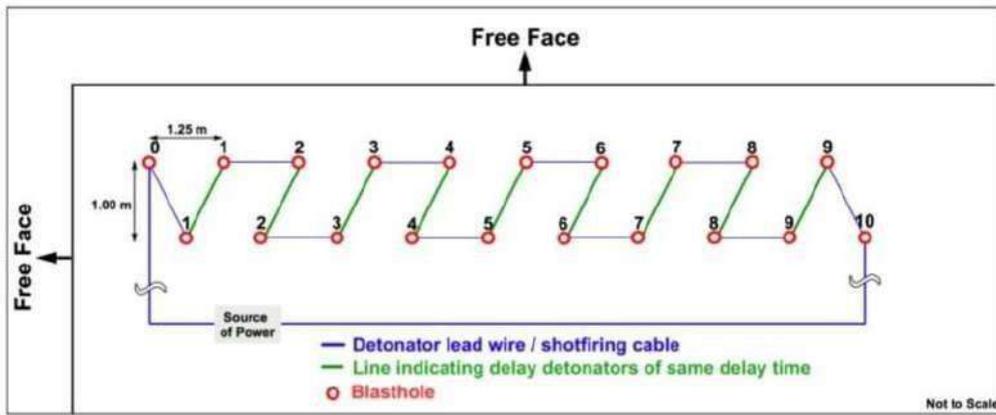


ANNEXURE - VI

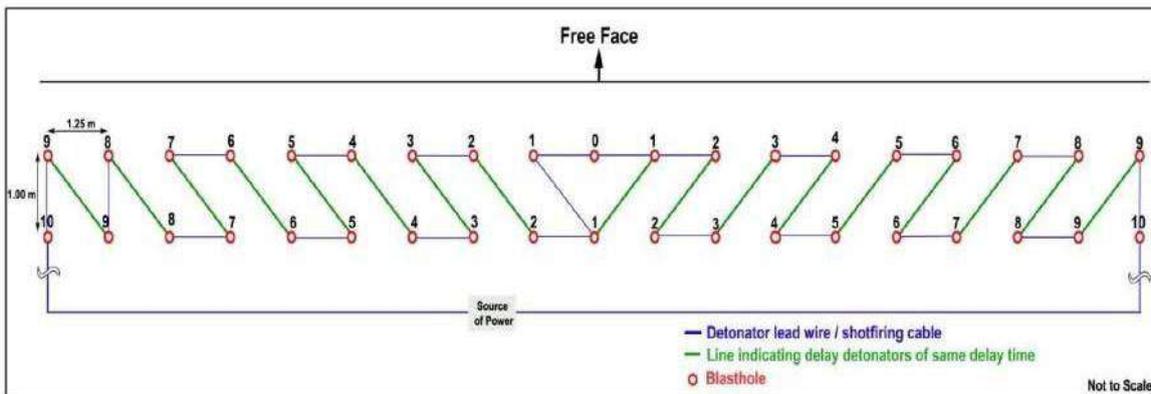
Suggested Blasthole Patterns & Initiation Sequences



Multi row Staggered blasthole pattern with “V” initiation sequence for benches with SINGLE free face



Multi row staggered blasthole pattern with “V” initiation sequence for benches with TWO free face



Multi row Square/rectangular blasthole pattern and initiation sequence for benches with ONE free face



GOVERNMENT OF KERALA

Abstract

Fisheries & Ports Department - Vizhinjam International Seaport project –Condoning the delay occurred for the completion of the Project and extension of the Scheduled Completion Date of the Project for a period of 5 years, Extension of the Concession Period by 5 years, Signing the Tripartite Agreement as Confirming Party, withholding an amount of Rs. 219 Crores as Commitment Fee Deposit from the Equity Support - Sanction Accorded- Orders Issued.

FISHERIES & PORTS (E) DEPARTMENT

G.O(Ms)No. 2/2024/F&PD

Dated, Thiruvananthapuram, 15-02-2024

- Read:
- 1 Letter F.No.3D(2)/1/2014-PPP(Vol-III) of PPP Cell, DEA dated 03-02-2015 from the Department of Economic Affairs, Ministry of Finance, Government of India.
 - 2 Concession Agreement executed between Government of Kerala and Adani Vizhinjam Port Private Limited on 17-08-2015
 - 3 Letter F. No. 2/2/2018-ISD dated 27-07-2022 from the Deputy Secretary to Govt, Ministry of Economic Affairs, Ministry of Finance.
 - 4 E-mail dated 03-11-2022 from the Deputy Director, Infrastructure Support and Development Division (ISDD) Department of Economic Affairs, Ministry of Finance.
 - 5 Letter No. SS GK 7/2023/AG dated 25-04-2023 from the Advocate General of Kerala, Ernakulam.
 - 6 Minutes of the High Level Meeting convened by Chief Secretary on 08-01-2024.
 - 7 Letter Nos. AVPPL/GoK/2023-24/2503 dated 28-10-2023 from the M.D. & C.E.O. Adani Vizhinjam Port Private Limited & AVPPL/GoK/2023-24/2793 dated 08-01-2024 from the M.D. & C.E.O AVPPL.
 - 8 Letter No. SS GK 7/2023/AG dated 09-02-2024 from the Advocate General of Kerala, Ernakulam.

ORDER

As per the letter read as 1st paper above, In-Principle approval for Viability Gap Funding (VGF) for the development of Vizhinjam International Deepwater Multipurpose Seaport was accorded by the Department of Economic Affairs, Ministry of Finance in 2015. Following this, Government of Kerala completed the bid process and the Letter of Award was issued to the selected bidder, M/s.Adani Ports and Special Economic Zone Ltd (APSEZ) on 13th July 2015. Accordingly, the Concession Agreement(CA) for the

Project was executed between Government of Kerala and the Concessionaire, M/s. Adani Vizhinjam Port Private Limited (AVPPL) on 17th August 2015. As per the CA, the Scheduled Completion Date (SCD) is 03-12-2019, i.e. 1460 days from the Appointed Date.

2. The Concessionaire has not been able to complete the Project even after the cure period of 270 days from the original SCD. The Concessionaire at different points of time had raised 16 numbers of Force Majeure Events which were rejected by Vizhinjam International Seaport Ltd (VISL), the SPV constituted for the purpose of implementing the Seaport project. Due to the non-completion of the project, VISL had issued notice for levying the liquidated damages from the Concessionaire on account of the Concessionaire Default. It was also intimated to the Concessionaire that since further time is required for resolving the disputes raised by the Concessionaire, it is premature and irregular on their part in invoking arbitration without completing the steps under Article 45.2 of the Concession Agreement. In spite of this, the Concessionaire moved with arbitration proceedings.

3. The claims of the Concessionaire before the Arbitration Tribunal are extension of Scheduled Completion Date from 03rd Dec 2019 to 03rd Dec 2024 (5yrs), extension of Concession Period from 40 to 45 yrs (i.e. by 5 yrs) & an amount of Rs.3854 Cr which includes Equity Support of Rs.1227 Cr. The VISL has furnished their counterclaims including non-extension of the Scheduled Completion Date, non extension of the Concession Period and an amount of Rs.911 Cr which includes damages for delay in completion of port. The Arbitration proceedings are ongoing now.

4. As per the letter read as 3rd paper above, the Department of Economic Affairs, Ministry of Finance has conveyed GOI's final approval of Viability Gap Funding(VGF) support for the development of Vizhinjam International Multipurpose Seaport Project. In continuation to this, vide the e-mail read as 4th paper above, the Deputy Director, Infrastructure Support and Development Division (ISDD), Department of Economic Affairs, Ministry of Finance has forwarded the premium sharing agreement and the Tripartite agreement that needs to be signed by the concerned parties and requested to forward the Tripartite agreement duly signed by the Concessionaire, LFI and DEA and confirmed by PSA (Government of Kerala) for further necessary action.

5. As per the letter read as 5th paper above, the Advocate General opined that due to the provision in 3.2 (h) in the Tripartite Agreement, Govt of Kerala cannot confirm the Agreement as Arbitration proceedings are pending in the Arbitral Tribunal and the Concessionaire is in default of the CA.

6. As per the letter read as 7th paper above dated 28-10-2023, the M.D. & C.E.O. AVPPL expressed their willingness to withdraw the Arbitration.

7. Based on this, a High Level Committee Meeting convened by Chief Secretary on 08-01-2024 decided that the construction delay of 5 years can be condoned and Scheduled Completion Date can be extended till 3rd December 2024. But the Concession Period and the Revenue sharing should remain the same as per the Concession Agreement. The High Level Committee negotiated with AVPPL officials and asked them to submit their contentions for the delay in implementing the project in writing.

8. The M.D. & C.E.O AVPPL vide letter read as 7th paper above dated 08-01-2024 furnished their contentions in writing and reported that the challenges faced by them included Cyclones, Adverse weather conditions, Floods, Covid-19 pandemic, Public Agitations, and other numerous Force Majeure Situations and also put forth certain suggestions.

9. Based on the suggestions putforth by AVPPL, the opinion of Advocate General was sought for and vide letter read as 8th paper above, the Advocate General opined that the proposal can be approved. There is no legal impediment in arriving at settlement of disputes and that in the long run the settlement as proposed could be in the best interest of the State.

10. Having examined all matters in the interest of the State and taking into account the opinion of the Advocate General, Government are pleased to issue the following orders:

- 1) The delay occurred in completing the Vizhinjam International Seaport project by AVPPL is condoned and the Scheduled Completion date is extended for a period of 5 years (i.e from 03-12-2019 to 03-12- 2024)
- 2) The Concession Period is extended for 5 years (i.e from 2055 to 2060), subject to the following conditions:
 - (i) AVPPL shall withdraw all the arbitration claims filed before the arbitral tribunal;
 - (ii) the Revenue sharing should remain the same i.e. the 15th Anniversary (from 2034) as per the Concession Agreement;
 - (iii) The capacity augmentation shall be achieved by 2028 itself;
- 3) In addition to the above, following financial arrangements shall be made with AVPPL:
 - i) An amount of Rs. Two Hundred and Nineteen Crores is withheld as Commitment Fee Deposit from the Equity Support to be given by Government of Kerala to AVPPL.
 - ii) From the amount so withheld, an amount of Rs. 175.2 Crores (43.8 x 4) shall be released to AVPPL once the 2nd and 3rd phases of the project are completed in 2028.
 - iii) An amount of Rs. 43.8 Crores shall be retained by GoK.
- 4) Chief Secretary is entrusted to ensure that AVPPL shall comply with the above conditions and also to sign the Tripartite Agreement as Conforming Party once AVPPL takes action to withdraw the arbitration proceedings.

(By Order of the Governor)

K.S. SRINIVAS
Principal Secretary to Government

To

The Advocate General, Kerala (with c/l)

The Managing Director, Vizhinjam International Seaport Ltd.,
Thiruvananthapuram

The Managing Director & Chief Executive Officer, Adani Vizhinjam Ports Private
Ltd.

The Principal Accountant General (Audit), Kerala, Thiruvananthapuram.

The Accountant General (A&E), Kerala, Thiruvananthapuram.

General Administration (SC) Department (vide Decision No. 2053 dated
14-02-2024 & Decision No. OA. No. 2065 Dated 15-02-2024)

Finance Department (file No. 2266720/PU-B3/136/2022/Fin dated 13-04-2023

Law Department (file No. 62/convey 1/2022/Law dated 13-12-2022 &
No.15/LS/2024/Law dated 15-02-2024.)

The Information Officer, Web & New Media, Information and Public Relations
Department (for uploading in the Government web site.)

SF/OC.

Forwarded/By Order



Section Officer.

Copy to :- The Private Secretary to Chief Minister
The Private secretary to Minister (Ports, Co-operation)
PA to Principal Secretary, Ports.

3732

©
കേരള സർക്കാർ
Government of Kerala
2017



Regn. No. KERBIL/2012/45073
dated 5-9-2012 with RNI
Reg. No. KL/TV(N)/634/2015-17

കേരള ഗസറ്റ്
KERALA GAZETTE

അസാധാരണം
EXTRAORDINARY ANNEXURE-R15

ആധികാരികമായി പ്രസിദ്ധപ്പെടുത്തുന്നത്
PUBLISHED BY AUTHORITY

വാല്യം 6 Vol. VI	} തിരുവനന്തപുരം, വെള്ളി Thiruvananthapuram, Friday	2017 ജൂൺ 23 23rd June 2017	} നമ്പർ No. } 1290
		1192 മിഥുനം 9 9th Mithunam 1192	
		1939 ആഷാഢം 2 2nd Ashadha 1939	

GOVERNMENT OF KERALA

Industries (A) Department

NOTIFICATION

G. O. (P) No. 25/2017/ID.

Dated, Thiruvananthapuram, 22nd June, 2017
8th Mithunam, 1192.

S. R. O. No. 346/2017.—In exercise of powers conferred by sub-section (1) of section 15 of the Mines and Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957), the Government of Kerala hereby make the following Rules further to amend the Kerala Minor Mineral Concession Rules, 2015 issued by notification under G. O. (P) No. 16/2015/ID dated 7th February, 2015 and published as S.R.O. No. 72/2015 in the Kerala Gazette Extraordinary No. 288 dated 7th February, 2015, namely:—

PRINTED AND PUBLISHED BY THE SUPERINTENDENT OF GOVERNMENT PRESSES AT THE
GOVERNMENT CENTRAL PRESS, THIRUVANANTHAPURAM, 2017.

33/2190/2017/S-5.

RULES

1. *Short title and commencement.*—(1) These Rules may be called the Kerala Minor Mineral Concession (Amendment) Rules, 2017.

(2) They shall come into force at once.

2. *Amendment of the Rules.*—In the Kerala Minor Mineral Concession Rules, 2015,—

in rule 2, in sub-rule (1),—

(i) after clause (ix), the following clause shall be inserted, namely:—

“(ix)(a) “Minor Mineral” means building stones, gravel, ordinary clay, ordinary sand other than sand used for prescribed purposes, ordinary earth and such other minerals declared as minor minerals by the Government of India”;

(ii) for clause (xv), the following clause shall be substituted, namely:—

“(xv) “Quarrying Permit” means a short term permit granted under these rules for a period not exceeding one year at a time to extract minerals specified in item numbers 1, 2, 3 and 5 of Schedule I”;

(iii) for clause (xvi), the following clause shall be substituted, namely:—

“(xvi) “Quarrying Lease” means a mining lease granted under these rules for extraction of minerals specified in item numbers 4, 5, 6, 7, 8 and 9 of Schedule I, for a period as specified in Rule 39”;

(2) in rule 3, in sub-rule (1), for the words “other than dimension stone,” the words “other than the minerals specified in item numbers 4, 6, 7, 8 and 9 of Schedule I” shall be substituted;

(3) in rule 7, the following proviso shall be inserted, namely:—

“Provided that in cases where extraction of minerals are from Revenue Puramboke lands or from lands possessed by other Government Departments or Local Self Governments, the person who extracts minerals

from such lands shall pay compensation or value of minerals, as the case may be, to the department concerned for the quantity of such extraction, as fixed by such departments from time to time."

(4) in rule 9,—

(i) in sub-rule (1), for the existing proviso, the following proviso shall be substituted, namely:—

"Provided that the approved mining plan shall not be insisted, for the grant and renewal of quarrying permits for ordinary earth, ordinary clay, and laterite (building stone), in cases where the depth of mining does not exceed 2 metres.";

(ii) in sub-rule (2), after the words "No Objection Certificate etc." the words "as the case may be" shall be inserted.

(5) in rule 10,—

(i) in clause (a), in the second proviso, the words, symbols and figures "The Regional Controller of Mines, Yeshwantpur, Bengaluru-560 022" shall be omitted.

(ii) for clause (f), the following clause shall be substituted, namely:—

"(f) the permit holder shall not carry on or allow to be carried on any quarrying operations at or to any points within a distance of 100 metres from any railway line except with the previous written permission of the Railway Administration concerned and any bridge on National Highway or 50 metres from any reservoir, tanks, canals, rivers, bridges, other public works, residential buildings, the boundary walls of places of worship, burial grounds, burning ghats or village roads or one kilometre from the boundaries of National Park or Wildlife Sanctuaries except with the previous permission of the authorities concerned or the Government or the competent authority.";

Provided that the Railway Administration or the State Government or any other authority in this behalf may in granting such permission impose other such conditions as may be found proper and necessary:

(6) in rule 13, for the words and figures "3 years", the words "five years" shall be substituted;

(7) in rule 14,—

(i) in sub-rule (2), for the existing provisos the following proviso shall be substituted, namely:—

“Provided that in cases where transportation of ordinary earth is required, the owner of the land shall obtain mineral transit passes for the quantity to be transported under the Kerala Minerals (Prevention of Illegal Mining, Storage and Transportation) Rules, 2015 after making payment of royalty, on an application submitted in this regard. Such application shall be accompanied by (1) valid building permit for construction of building obtained from the Local Self Government authorities concerned, (2) land development permit obtained from the Local Self Government authorities concerned in cases where the levelling of the land and extraction of ordinary earth is involved and (3) possession and enjoyment certificate of the land issued by the Village Officer concerned:

Provided further that in cases where levelling of land and extraction of ordinary earth is involved, the building permit shall be accompanied by an approved building plan obtained from the Local Self Government authorities concerned which shall contain the area of land to be developed for the construction of the building and the quantity of ordinary earth to be extracted for such construction.”;

(8) (ii) after sub-rule (2) the following sub-rules shall be inserted, namely:—

“(3) A person who applies for mineral transit passes for transportation of ordinary earth under this rule shall also submit along with the application a sworn affidavit in stamped paper to the effect that he will carry out the proposed construction as per the building plan and building permit and shall complete at least the construction of basement of the building within one year from the date of issuance of mineral transit passes and intimate the same to the competent authority.

(4) In the event of extraction of ordinary earth outside the permitted area, the permission granted for extraction and transportation shall be liable for cancellation and the offender shall be liable to pay an amount equal to five times the royalty of the ordinary earth extracted outside the area of permission as penalty.

(5) In the event of failure to complete at least the construction of basement of building within one year from the date of issuance of mineral transit passes the act of extraction of ordinary earth shall be treated as illegal and the offender shall be liable to pay an amount equal to five times the royalty of the ordinary earth extracted from the area, in addition to the amount already paid.”;

(9) in rule 18, in item (ii), before the words “all those group of rocks” the words “Granite (building stone) which includes” shall be inserted.

(10) in rule 32, after sub-rule (2), the following sub-rule shall be inserted, namely:—

“(3) In cases where extraction of minerals is from Revenue Puramboke lands or from lands possessed by other Government Departments or Local Self Governments, the person who extracts minerals from such lands shall be liable to pay compensation or value of minerals, as the case may be, to the department concerned for the quantity of such extraction, as fixed by such departments from time to time.”.

(11) in rule 37, in sub-rule (1), after the existing proviso, the following proviso shall be inserted, namely:—

“Provided further that in the case of silica sand, the restrictions in minimum area for grant and renewal of quarrying lease shall not be applicable.”;

(12) in rule 40, in sub-rule (1),—

(i) for clause (i), the following clause shall be substituted, namely:—

“(i) the lessee shall not carry on or allow to be carried on any quarrying operations at or to any points within a distance of 100 metres from any railway line except with the previous written

permission of the railway administration concerned and any bridge on National Highway or 50 metres from any reservoir, tanks, canals, rivers, bridges, public roads, other public works, residential buildings, the boundary walls of places of worship, burial grounds, burning ghats or one kilometre from the boundaries of National Park or Wildlife Sanctuaries except with the previous permission of the authorities concerned or the Government or competent authority:

Provided that the railway administration or the State Government or any other authority in this behalf may in granting such permission impose such other conditions as may be found proper and necessary.”;

(ii) item (ii) of clause (m) shall be omitted.

(13) after rule 45, the following rule shall be inserted, namely:—

“45A. *Amalgamation of quarrying leases.*—The State Government or the competent authority may, in the interest of quarry development, with reasons to be recorded in writing, permit amalgamation of two or more adjoining leases held by a lessee:

Provided that the period of amalgamated leases shall be co-terminus with the lease of which period will expire first:

Provided further that the leaseholds to be amalgamated shall be contiguous:

Provided also that along with the application for amalgamation of leases, copy of the survey map of the combined area for amalgamation attested by an officer not below the rank of a Tahsildar of the Department of Land Revenue or Assistant Director of the Department of Survey and Land Records shall be submitted:

Provided also that amalgamation of leases shall be subject to submission of approved mining plan for the entire leasehold and Environmental Clearance.”;

(14) after rule 65, the following rule shall be inserted, namely:—

“65A. The holder of a quarrying permit/a quarrying lease issued under these rules after the date of commencement of the Kerala District Mineral Foundation Rules, 2017, shall pay to the District Mineral Foundation of the district in which the mining operations are carried on, an amount equivalent to such percentage of the royalty/consolidated royalty paid, as may be prescribed in the Kerala District Mineral Foundation Rules, 2017 in addition to the royalty/consolidated royalty instead of quarry safety fund specified in rules 63, 64 and 65 of these rules.

Note:—Rules 63, 64 and 65 shall cease to operate from the date of commencement of the Kerala District Mineral Foundation Rules, 2017.”;

(15) in rule 66,—

(i) for sub-rule (1) the following sub-rule shall be substituted, namely:—

(1) “Where quarrying operations for minor minerals have been undertaken before 7th day of February, 2015 without an approved mining plan, the holder of such lease shall not be permitted to operate such quarry unless he submits a mining plan for the remaining period of lease to the competent authority in this behalf.”;

(ii) sub-rules (2) and (3) shall be omitted;

(16) in rule 89, after sub-rule (3), the following sub-rule shall be inserted, namely:—

“(4) In cases where the lessees who opted for registration of metal crusher units under sub-rule (1) for a financial year do not desire to opt for such registration in the succeeding year they shall pay royalty at the rates specified in Schedule I for removal and transport of balance quantity of granite aggregates stocked in the crusher units during the period of registration.”;

(17) for rule 95, the following rule shall be substituted, namely:—

“95. *Cancellation of registration.*—If a lessee operates any type of machine that is not included in the registration certificate or fails to comply with any of the conditions of registration, the competent authority shall, by an order in writing, rescind the registration granted to the metal crusher unit.”;

(18) for rule 104, the following rule shall be substituted, namely:—

“104. *Power to grant special permission to extract and remove minor minerals in special circumstances.*—In certain cases where extraction and removal of minor minerals is inevitable and in which the Government is of the opinion that the extraction is not for the purpose of winning the minerals and for reasons to be recorded in writing, the Government may by an order grant permission with conditions as they deem fit.”;

(19) in rule 108,—

(i) in sub-rule (2), in the first proviso, the words and symbols “limited to twice the royalty amount,” and “In such a case while calculating the amount of royalty and price payable, the amount already paid by the permit holder/lessee for obtaining permission shall be deducted” shall be omitted;

(ii) after the 2nd proviso, the following note shall be inserted, namely:—

“*Note:*—In this rule the price of the mineral shall be limited to two times the royalty.”;

(iii) after sub-rule (3), the following sub-rule shall be inserted, namely:—

“(4) whenever any person raises without any lawful authority any mineral from any land for the purpose of winning minerals and for that purpose brings on the land any tool, equipment, vehicle or any other thing, such mineral, tool, equipment, vehicle or any other thing shall be seized by an officer or authority specially empowered in this behalf by the Government.”;

(20) in the SCHEDULES,—

(i) in SCHEDULE I, for the entry against item number 5 in column (2), the following entry shall be substituted, namely:—

“Granite (building stone) and Laterite (building stone)”

(ii) after item number 5, and the entry against it in columns (2) and (3) the following items and entries shall respectively be inserted, namely:—

6. Laterite (used for industrial purposes)	95 (Ninety-five) per tonne
7. China clay/Kaolin including ball clay, white shale and white clay	
(i) Crude	(i) 50 (Fifty) per tonne
(ii) Processed/washed	(ii) 750 (Seven hundred and fifty) per tonne
8. Silica sand	250 (Two hundred and fifty) per tonne
9. Quartz	50 (Fifty) per tonne

(iii) for Schedule III, the following shall be substituted, namely:—

“SCHEDULE III
CONSOLIDATED ROYALTY
(See rule 89)”

Sl. No.	Description of Crusher	Annual Consolidated royalty per machine (in Rupees)
(1)	(2)	(3)
Secondary Jaw Crusher (in terms of area of feed opening)		
1	Up to 929.03 sq.cm.	2,00,000
2	Greater than 929.03 sq.cm. but less than or equal to 1548.38 sq.cm.	4,00,000
3	Greater than 1548.38 sq.cm.	6,00,000

(1)	(2)	(3)
Cone Crusher (in terms of 'Horse Power' of motor used)		
4	Up to 300	16,00,000
5	Greater than 300	26,00,000
Sand Making Units (in terms of 'Horse Power' of motor used) (for those who use sand making machine only)		
6	Up to 300	16,00,000
7	Greater than 300	26,00,000 .";

Exemption from payment of consolidated royalty is applicable to Vertical Shaft Impactor, Horizontal Shaft Impactor, Auto Sand Units which are fed by granite aggregates produced in the secondary jaw crushers or cone crushers for which the consolidated royalty has been paid and are located in the premises of those crusher units;

(iv) in Schedule IV,

(i) under the heading "A. Granite (Building stone)" for the entry against serial number 5 in column (3), the figures "7000" shall be substituted;

(ii) under the heading "B. laterite (Building Stone)" for the entry against serial number 5, in column (3), the figures "7000" shall be substituted;

(21) in Form D, the words "The Regional Controller of Mines, Yeshwantpur, Bengaluru-560 022" shall be omitted.

(22) in Form H, for condition No. 7, the following condition shall be substituted, namely:—

The lessee shall not carry on or allow to be carried on any quarrying operations at or to any points within a distance of 100 metres from any railway line except with the previous written permission of the railway administration concerned and any bridge on National Highway or 50 metres from any reservoir, tanks,

canals, rivers, bridges, public roads, other public works, residential buildings, the boundary walls of places of worship, burial grounds, burning ghats or one kilometre from the boundaries of National Park or Wildlife Sanctuaries except with the previous permission of the authorities concerned or the Government or competent authority:

Provided that the railway administration or the State Government or any other authority in this behalf may in granting such permission impose such other conditions as may be found proper and necessary.

By order of the Governor,

PAUL ANTONY,
Additional Chief Secretary to Government.

Explanatory Note

(This does not form part of the notification, but is intended to indicate its general purport.)

The Kerala Minor Mineral Concession Rules, 2015 were framed by the Government of Kerala to regulate extraction of minor minerals in the State. As per S.O. 423 (E) of Ministry of Mines dated 10th February, 2015, thirty-one minerals have been included in the category of minor minerals. Among these minerals mining leases were being granted to laterite used for industrial purpose, china clay, silica sand and quartz as per the provisions contained in the Mineral Concession Rules, 1960. As these minerals are now declared as minor minerals, these minerals are to be included in the Kerala Minor Mineral Concession Rules, 2015. When the minerals are extracted from the Government owned lands, the Government have to get compensation for the minerals extracted other than the mere payment of royalty and hence new provisions have been introduced in rules 7 and 32. The Regional Controller of Mines, Bengaluru is not the authority to deal with mining of minor minerals and hence there is no need to send Form 'D' of the rules to the said authority. In the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 for major minerals the distance criteria adopted for the mining activities were retained as stipulated earlier in the Mineral Concession Rules, 1960. Hence a different criterion cannot be adopted in

the case of minor minerals. In such circumstances, in order to make it in tune with the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016, it is decided to incorporate the same distance criterion in Rules 10 and 40 as well as Form H. As per S.O. 141(E) dated 15-1-2016, environmental clearance has been exempted for digging of foundation for buildings which do not require prior environmental clearance and hence amendment is necessitated in rule 14. In Writ Petition (C) No. 29710/2014 and 23251/2016, the Honourable High Court of Kerala has observed that there is possibility of misuse of rule 14 in the guise of building permit issued by Local Self Government authorities and directed the Government to find ways to avoid such misuse. Hence an amendment to this extent is necessitated. Since mining plan has been introduced in the rules, it is impractical for the lessees who have obtained two or more leases adjacent to one another to leave, a buffer zone of 7.5 meter between two lease areas and hence a new rule, 'Amalgamation of quarrying leases' has to be introduced in the rules for practicing scientific mining. Since quarry safety related activities mentioned in rule 65 have been included as one of the permissible activities in Kerala District Mineral Foundation Rules, rules 63, 64 and 65 have to be amended. As per rule 66 mining plan is to be submitted by the existing lessees within a period of one year from 7th February, 2015. As per existing sub-rules (2) and (3) of rule 66, there is provision for extension of time for one year for those who cannot submit mining plan within such period. Now two years have been passed by and there is no need to give time extension. In order to rectify this, an amendment is necessitated. In order to clarify the price of the mineral to be realized while compounding offences, amendment is to be made in rule 108. Provision for seizure of tools, minerals and equipment as existed in the earlier rules is reintroduced by amending rule 108. Since there are different sizes of jaws as stipulated in Schedule III available, it is difficult to fix royalty for a jaw crusher which is not mentioned in Schedule III. Since the area of a feed opening of a jaw crusher is the basic criteria for determining the quantum of production of granite building stone aggregates, this can be included in Schedule III instead of sizes of jaws for easy determination of royalty for a different size of jaw crusher and hence this notification.

The notification is intended to achieve the above objects.

~~3744~~
ANNEXURE R-16

Building Stone Quarry Project

**Survey No. 555/2 at Nagaroor Village,
Chirayinkeezhu Taluk, Thiruvananthapuram District**

Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019

**Half Yearly Compliance Report (HYCR)
for the Period October 2022 to March 2023**

Project Proponent

The logo for Adani, featuring the word "adani" in a lowercase, sans-serif font. The letters are colored in a gradient from blue on the left to purple on the right.

Adani Vizhinjam Port Private Ltd. (AVPPL)

May 2023

Ports and Logistics

Ref: AVPPL/MoEF/2023-24/2436

Date: 24th May 2023

To,
Ministry of Environment Forest and Climate Change (MoEF&CC),
Regional Office (Southern Zone), Kendriya Sadan,
IVth Floor, E&F Wings, 17th Main Road, IInd Block,
Koramangala, Bangalore-560034
rosz.bng-mefcc@gov.in

Subject: Submission of **Half Yearly Compliance Report (HYCR)** to Conditions of Environmental Clearance (EC) for the Period October 2022 to March 2023 - Reg.

Reference: EC for Building Stone Quarry in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala; by M/s. Adani Vizhinjam Port Pvt. Ltd. vide **No. 1200/EC2/2018/SEIAA dated 01.03.2019**

Dear Sir/Madam,

This has reference to the Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA issued on 1st March 2019 (vide reference cited) by the State Environmental Impact Assessment Authority (SEIAA), Kerala for the building stone quarry project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala; of M/s. Adani Vizhinjam Port Private Limited (AVPPL).

The Half Yearly EC Compliance Report (HYCR) of the conditions stipulated in the cited reference for the period from **October 2022 to March 2023** is enclosed herewith for record and reference. You are requested to kindly acknowledge the receipt of the same.

Thanking You.

Yours Sincerely,



Rajesh Jha
MD & CEO – Authorized Signatory



Enclosed: As mentioned above

Copy to: State Environment Impact Assessment Authority (SEIAA), K.S.R.T.C Bus Terminal Complex, 4th Floor, Thampanoor, Thiruvananthapuram, Kerala

Adani Vizhinjam Port Pvt Ltd
3rd Floor, Aspinwall House,
Kuravankonam
Thiruvananthapuram,
Kerala-695003

Tel +91 471 2772 100
Fax +91 471 2325 600
project.vizhinjam@adani.com
www.adani.com
CIN: U61200GJ2015PTC083954

Registered Office:
Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad-382421

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
Specific Conditions		
1	The mining should be conducted with Non-Electric Detonator (NONEL) Method thereby minimizing air blast, fly rock and ground vibration.	<p>Complied</p> <p>Mining is being conducted using Non-Electric Detonator (NONEL) method of controlled blasting only; to minimize the air blast, fly rock and ground vibration. To date no incident of fly rock has been recorded.</p> <p>Adani Vizhinjam Port Pvt. Ltd. (AVPPL) had engaged Anna University, Department of Mining Engineering, Chennai to conduct a scientific study on Blast Induced Ground Vibration for the Quarry. Altogether 10 experimental blast rounds were conducted, and comprehensive vibration monitoring was carried out during the blasting experiment. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighboring villages, which includes domestic houses and other prominent structures of the village.</p> <p>Based on the scientific study, it is concluded that the blast induced ground vibrations and noise levels generated by the controlled blasting carried out in the quarry are safe and well within the permissible limit as per recommendations of Directorate General of Mine Safety (DGMS) and therefore is not affecting the residential buildings and other structures. Further, it had been observed that no flying fragments or projectiles travelled beyond 10 m from the site of blast. Hence, it was inferred through the study report that controlled blasting can be carried out at the Quarry. The Anna University Study Report was submitted along with the HYCR for the period April 2021 to September 2021.</p>
2	Extract a maximum of 7 lakh tons of building stone within a period of two years. Further permission for mining may be considered based on the requirement then and environmental assessment.	<p>Will be Complied</p> <p>In view of the additional requirement of building stone for completion of phase 1 of the Vizhinjam project, State Environmental Impact Assessment Authority (SEIAA), Kerala decided to issue EC for the extraction of a further 10.79 Lakh Tons granite rock for the period from 2021-22 to 2023-24 subject original EC conditions vide their order</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
		<p>No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021). The Modified Approved Mining Plan was submitted along with the HYCR for the period April 2021 to September 2021). Therefore, permission is accorded for a total of 17.79 (7 + 10.79) Lakh Tons of building stones to be extracted from the quarry.</p> <p>During the compliance period (October 2022 to March 2023), a total of 2.002 Lakh Tons of building stones have been extracted and a total cumulative quantity of 15.113 Lakh Tons of building stones have been extracted from inception of mining on 02.07.2019 till 31.03.2023.</p>
3	The proponent shall file an affidavit that he will expend Rs. 15 lakhs as a part of CER in consultation with Local Self Government.	<p>Complied AVPPL have submitted to SEIAA an affidavit dated 08.11.2019 duly signed by the MD and CEO vide letter AVPPL/SEIAA/2019-20/945 dated 15.11.2019 that Rs. 15 Lakhs will be spent as a part of Corporate Environment Responsibility (CER) in consultation with the Local Self Government. A copy of the affidavit was submitted along with the HYCR for the period October 2019 to March 2020.</p> <p>As of March 31, 2023, AVPPL has spent Rs. 35.89 Lakhs towards CER Activities. Despite having exhausted the agreed-upon funds for CER activities, AVPPL remains committed to environmental responsibility and has exceeded the required expenditure of Rs. 15 Lakhs as stated in the affidavit.</p>
4	The proponent should follow the closure plans (progressive closure and final closure) as per KMMC Rules.	<p>Will be Complied AVPPL will follow the closure plans (progressive closure and final closures) as per Kerala Minor Minerals Concession (KMMC) Rules and Mine Closure Plan in the Modified Approved Mining Plan (The Modified Approved Mining Plan was submitted along with the HYCR for the period April 2021 to September 2021).</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
		The closure procedure (progressive closure and final closures) shall be documented prior to and during the closure of the mine.
General Conditions		
1	A separate environmental management and monitoring cell with qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	Complied A separate Environmental Management and Monitoring Cell (EMMC) with qualified personnel has been set up by AVPPL. The cell is under the control of the Head of Department (HoD), Environment who reports directly to the Chief Executive Officer (CEO), AVPPL. The details of the constitution of EMMC were submitted along with HYCR for the period April 2019 to September 2019. EMMC meeting is being conducted frequently to monitor the environmental issues at the quarry.
2	Suitable avenue trees should be planted along either side of the tarred road and open parking areas, if any, including of approach road and internal roads.	Being Complied There is already an existing plantation along the tar road. AVPPL have planted avenue trees at suitable locations, such as buffer zones for greenbelt development and the saplings planted are growing well and have started to bear fruits; as seen in the image below.

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
		 <p style="text-align: center;">Avenue Plantation</p>
3	Sprinklers shall be installed and used in the project site to contain dust emissions.	<p>Being Complied</p> <p>Regular water sprinkling through water tankers is being carried out on haul roads and other dust prone areas such as loading and unloading of minerals.</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
		 <p style="text-align: center;">Water Sprinkling through Tankers</p>
4	Eco-restoration including the mine closure plan shall be done at the own cost of the project proponent	<p>Will be Complied</p> <p>Eco-restoration including Mine Closure Plan is provided in the Modified Approved Mining Plan (Submitted along with the HYCR for the period April 2021 to September 2021). The same shall be implemented during the closure at the cost of AVPPL.</p>
5	In view of the deep pits left after the excavation, stacking at maximum top level should be carried out.	<p>Not Applicable</p> <p>The Stacking of materials is not being carried out, as all the produced materials are used for Breakwater Construction at Vizhinjam Port. They are being transported directly to the Port site and not stacked at the quarry site.</p> <p>As per the mine closure plan the pit will be utilized for storing water as a rainwater harvesting method and will also be induced to sustain the groundwater table. As for the post mining land use, an area of 0.9540 Ha will be used for water pond for storage of water.</p>
6	Corporate Environment Responsibility agreed upon by the proponent should be implemented.	<p>Being Complied</p> <p>AVPPL is coordinating with the Local Self Government regarding approval of the proposed CER plan with expense heads under specific activities in line with MoEF&CC Office Memorandum (OM) F.No.22-65/2017-IA.III dated 01.05.2018.</p>

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S. No.	Conditions	Compliance Status as on March 31, 2023
		<p>AVPPL had prepared a budget plan and had submitted the same to the Nagaroor Gram Panchayat seeking their confirmation and go ahead for the proposed CER (Proposed plan was submitted along with HYCR for the period October 2019 to March 2020). Correspondence to the President of the Nagaroor Gram Panchayat was submitted along with HYCR for the period April 2019 to September 2019.</p> <p>Considering the necessities of the community and discussions with the local panchayat, AVPPL has implemented CER activities in the surrounding areas of the quarry site (Details have been submitted along with earlier compliance reports). As per affidavit dated 08.11.2019 duly signed by the MD and CEO vide letter AVPPL/SEIAA/2019-20/945 dated 15.11.2019, that Rs. 15 Lakhs will be spent as a part of CER, AVPPL have surpassed the required expenditure of Rs. 15 Lakhs and spent Rs. 35.89 Lakhs towards CER activities. Despite having exhausted the agreed upon funds for CER activities, AVPPL are committed towards Environmental responsibility.</p>
7	The project proponent shall comply the conditions stipulated by the statutory authorities concerned.	Being Complied AVPPL is complying with all applicable conditions stipulated by respective competent statutory authorities.
8	Tarring /multiple options on the access roads shall be undertaken so as to reduce dust pollution during movement of vehicle.	Complied AVPPL has developed a tar road of around 0.9 km from the quarry project site gate to Kadavilla Junction (which is connected to SH46 and onto NH66) for movement of vehicles; thereby reducing the dust pollution.

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S. No.	Conditions	Compliance Status as on March 31, 2023
		 <p style="text-align: center;">Tar Road at Project Site</p>
9	Overburden materials should be managed within the site and used for reclamation of mine pit as per mine closure plan / specific conditions	<p>Being Complied</p> <p>As such, the quarry had been mined earlier by another party and since this is already an open mine, there was no topsoil or overburden available in the quarry; all the produced materials are being used for Breakwater Construction at Vizhinjam Port.</p> <p>However, due to certain geological disturbances in the formation, some overburden has been found in between the rock formation after attaining 6 m on the western slope between p3 and p4 pillars. AVPPL have shifted the topsoil and overburden on the western slope to an area of land in the lower portions of the quarry along with 150 m gabion wall protection. The overburden materials will be managed in this area within the site as per mine closure plan.</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
		 <p style="text-align: center;">Gabion Wall</p>
10	Height of benches should not exceed 5 m, and width should not be less than 5 m, if there is no mention in the mining plan/specific condition.	Being Complied As per the Modified Approved Mining Plan, the bench height and width need to be maintained at a maximum of 6.0 m. Also, a 45° pit slope will be maintained; which is currently being adhered to.
11	Ground level should be fixed in individual cases separately	Being Complied For every bench, ground level is fixed in MSL as individual cases separately. Surface plan with MSL levels is provided in the Modified Approved Mining Plan (Submitted along with the HYCR for the period April 2021 to September 2021).
12	No mining operations should be carried out at places having a slope greater than 45.	Being Complied No mining operations are being carried out at places having a slope greater than a 45 degrees angle.
13	Acoustic enclosures should have been provided to reduce sound amplifications in addition to the provisions of green belt and hollow brick envelop for crushers so that the noise level is kept within prescribed standards given by CPCB/KSPCB. This condition is applicable only in such cases if a crusher is adjacent to the quarry	Not Applicable There is no crusher adjacent to the quarry and the same is not proposed.
14	The workers on the site should	Being Complied

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S. No.	Conditions	Compliance Status as on March 31, 2023
	be provided with the required protective equipment such as ear muffs, helmet, etc.	<p>All employees are provided with relevant Personal Protective Equipment (PPEs) like Helmets, Shoes, Fluorescent Reflective Jackets, etc.</p>  <p style="text-align: center;">Employees with PPEs</p>
15	Garland drains with clarifiers to be provided in the lower slopes around the core area to channelize storm water.	<p>Being Complied Mining operations are being carried out at the top level during the compliance period. However, garland drainage/garland canals of 60 m have been developed in the lower slopes to channelize storm water.</p>

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		 <p style="text-align: center;">Garland Drain</p> <p>A siltation pond has been created by constructing a check dam, which is up to 10m X 1.5m in size, at the bottom of the quarry area to prevent the run-off of water and flow of sediments. The collected water is being utilized for watering the mine area, roads, greenbelt development, etc.</p>  <p style="text-align: center;">Check Dam</p>

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S. No.	Conditions	Compliance Status as on March 31, 2023
16	The transportation of minerals should be done in covered trucks to contain dust emissions. The proponent should plant trees at least 5 'times of: the loss: that has been occurred while clearing the land for the project. SEAC should assess the number of trees in each project site before the issuance of EC so as to ensure the promptness in, planting.	<p>Being Complied</p> <p>The transportation of minerals in trucks is being undertaken covered with tarpaulin cover. Since this is an existing quarry which was already mined earlier, the quarry is in open condition. There was no clearing of land for the project and no trees have been cut down as there are no trees inside the lease area.</p>  <p style="text-align: center;">Truck with Tarpaulin Cover</p>
17	Explosives should be stored in magazines in isolated place specified and approved by Explosives Department	<p>Being Complied</p> <p>AVPPL constructed 500 Kgs portable explosives magazine at an area called Chappath; which is 65 km away from the quarry location. AVPPL are transporting the explosives and detonators from Chappath to Kadavilla quarry through two authorized explosives vans for which following licenses were obtained from PESO:</p> <ul style="list-style-type: none"> • Explosives magazine license E/SE/KL/22/331(E121778) dated 13.09.2021 • Explosives van-1 (KL01CP2414) license E/SE/KL/25/99(E135886) dated 22.09.2021 • Explosives van-2 (KL01CP2472) license E/SE/KL/25/99(E135883) dated 22.09.2021 <p>Copies of the above mentioned licenses were submitted along with the HYCR for the period April 2021 to September 2021. Operations at Explosives Storage at Chappath began in October 2021.</p>
18	A minimum buffer distance of 100m from the boundary of the quarry to the nearest dwelling	<p>Complied</p> <p>As per the Government of Kerala (GoK) State Gazette Notification G.O. (P) No. 25/2017/ID</p>

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S. No.	Conditions	Compliance Status as on March 31, 2023
	unit or other structures, not being any facility for mining shall be provided.	<p>dated 22.06.2017, permit holder shall not carry on or allow to be carried on any quarrying operations at or to any points within 50 m from any residential buildings or from the nearest dwelling unit or other structures.</p> <p>Also, as per the Consent to Operate (CTO) obtained from KSPCB, quarrying activities are restricted to a distance more than 50 m from the nearby residential buildings.</p> <p>Further, DMG had communicated to SEIAA vide its letter No. 9363/M3/2018 dated 23.03.2019 (A copy of the letter was submitted along with the HYCR for the period October 2019 to March 2020) that as per Rule 40 1(i) of the KMMC Rules, the lessee is permitted to carry out mining at 50 m from the residential houses.</p> <p>As per the map prepared by the village officer, the nearest house is ~60 m from the boundary of the quarry.</p>
19	50 m buffer distance should be maintained from forest boundaries.	<p>Not Applicable There are no forests in the vicinity of the project site.</p>
20	Consent from Kerala State Pollution Control Board under Water and Air Act(s) should be obtained before initiating mining activity.	<p>Complied CTO has been obtained from Kerala State Pollution Control Board (KSPCB) vide Consent No. PCB/TVM-DO/ICO/QRY/103/2019 dated 05.03.2019 valid up to 27.02.2021. A copy of the same was submitted along with HYCR for the period April 2019 to September 2019.</p> <p>Further, The CTO was renewed vide Consent No. PCB/TVM-DO/CHZ/ICO(R)/QRY/128/2020 dated 18.12.2020 valid up to 28.02.2024. Copy of the renewed CTO is was submitted along with HYCR for the period October 2020 to March 2021.</p>
21	All other statutory clearances should be obtained, as applicable, by project proponents from the respective competent authorities including that for blasting and storage of	<p>Complied AVPPL have obtained all applicable statutory clearances from the respective competent authorities. The following clearances have been obtained:</p> <ul style="list-style-type: none"> • No Objection Certificate (NoC) from

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
	explosives.	<p>Trivandrum District Collector vide Letter No. B7-40269/2017 dated 30.04.2018 for Govt. land.</p> <ul style="list-style-type: none"> • Letter of Intent from DMG vide Letter No. 9363/M3/2018 dated 04.09.2018 • CTO has been obtained from KSPCB vide Consent No. PCB/TVM-DO/ICO/QRY/103/2019 dated 05.03.2019 valid up to 27.02.2021. Further, The CTO was renewed vide Consent No. PCB/TVM-DO/CHZ/ICO(R)/QRY/128/2020 dated 18.12.2020 valid up to 28.02.2024. • Purchase and Use of Explosives Approval from Petroleum & Explosives Safety Organization (PESO), Ernakulam vide Letter No. E/Misc/Expl dated 27.03.2019 • Dangerous and Offensive Trade (D&O) License from Nagaroor Gram Panchayat vide License Number A2.1836\2019 dated 01.04.2019 • NoC for Use of Explosives from District Collector, Thiruvananthapuram vide File No. DCTVM/2436/2019-A17 dated 09.05.2019 • Approved Mining Plan by District Geologist, Trivandrum vide Letter No. 1716/DOT/ML/18 dated 20.05.2019 • Lease Order from DMG vide Letter No. 9363/M3/2018 dated 20.05.2019 • Lease Execution from Additional Director of Mining and Geology vide Letter No. 79/2019-20/9363/M3/2018/DMG dated 20.05.2019 • Quarrying Lease Registration Agreement in Form H at Chirayinkeezhu Register Office dated 22.05.2019 • Explosives magazine license E/SE/KL/22/331(E121778) dated 13.09.2021. • Explosives van-1 (KL01CP2414) license E/SE/KL/25/99(E135886) dated 22.09.2021. • Explosives van-2 (KL01CP2472) license E/SE/KL/25/99(E135883) dated 22.09.2021. • Modified Approved Mining Plan by District Geologist, Trivandrum vide Letter No. 2436/DOT/ML/2020 dated 16.11.2020 <p>Copies of the above mentioned approvals were submitted along with HYCR for the period April</p>

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		2019 to September 2019. Copy of the renewed CTO was submitted along with HYCR for the period October 2020 to March 2021. Copies of the explosives vans and magazine licenses and Modified Approved Mining Plan was submitted along with the HYCR for the period April 2021 to September 2021.
22	In the case of any change(s) in the scope of the project, extent quantity, process of mining technology involved or in any way affecting the environmental parameters/impacts as assessed, based on which only the E.C is issued, the project would require a fresh appraisal by this Authority, for which the proponent shall apply and get the approval of this Authority	<p>Complied</p> <p>In view of the additional requirement of building stone for completion of phase 1 of the Vizhinjam project, SEIAA decided to issue EC for the extraction of a further 10.79 Lakh Tons granite rock for the period from 2021-22 to 2023-24 subject original EC conditions vide their order No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021). Therefore, permission is accorded for a total of 17.79 (7.00 + 10.79) Lakh Tons of building stones to be extracted from the quarry.</p> <p>During the compliance period (October 2022 to March 2023), a total of 2.002 Lakh Tons of building stones have been extracted and a total cumulative quantity of 15.113 Lakh Tons of building stones have been extracted from inception of mining on 02.07.2019 till 31.03.2023.</p>
23	The Authority reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.	<p>Being Complied</p> <p>Based on the SEIAA order No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021), as an additional precautionary safeguard measure, Authority decided to constitute a monitoring team to monitor the functioning of the quarry.</p> <p>The team will inspect the quarry at least once every 3 months and prepare an inspection report. The team will also suggest corrective measures for irregularities if any. The project proponent will provide logistic support for field inspection. The first visit was completed and AVPPL have complied with all observations and</p>

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S. No.	Conditions	Compliance Status as on March 31, 2023
		<p>recommendations of the monitoring committee.</p> <p>Thereafter, in line with email from SEIAA dated 03.11.2022 (Annexure 1), a second site visit and field inspection of the monitoring team consisting of Dr. R. Ajayakumar Varma, Chairman, SEAC and Er. M. Dileep Kumar was held on 12.11.2022.</p> <p>The field Inspection report was discussed in the 135th SEAC Meeting between 07.12.2022 to 17.12.2022, wherein the committee decided to recommend additional points for compliance. The observations and recommendations of the monitoring committee were received from SEIAA vide letter No. 1200/EC2/2018/SEIAA dated 30.12.2022 (Annexure 2). In this regard, AVPPL have complied with all the observations and recommendations of the monitoring committee and details of the same are given in Annexure 3.</p>
24	The stipulations by Statutory Authorities under different Acts and Notifications should be complied with, including the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.	Noted
25	The project proponent should advertise in at least two local newspapers widely circulated in the region, one of which (both the advertisement and the newspaper) shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Environment	<p>Complied</p> <p>EC for the project was issued on 01.03.2019. Advertisements, that the project has been accorded EC were published within Ten days in two widely circulated local newspapers: The Hindu (English) on 09.03.2019 and Mathrubhumi (Malayalam – vernacular language) on 10.03.2019. Also, copy of the EC is available with the SEIAA office and it is also available on the website of the Authority at www.seiaakerala.in. Screenshot of the website showing the details of the EC was submitted along with HYCR for the</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
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	Impact Assessment Authority (SEIAA) office and may also be seen on the website of the Authority at www.seiaakerala.org . The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same signed in all pages should be forwarded to the office of this Authority as confirmation.	<p>period October 2019 to March 2020. Extracts of these newspaper clippings with the advertisements were submitted along with HYCR for the period April 2019 to September 2019.</p> <p>Copy of the advertisements signed on all pages were submitted to SEIAA vide Letter No. AVPPL/SEIAA/2019-20/731 dated 01.04.2019 was submitted along with HYCR for the period April 2019 to September 2019.</p> <p>The copy of EC is uploaded to the company website: https://www.adaniports.com/ports-downloads?port=Vizhinjam-Port Screenshot of the same was submitted along with HYCR for the period April 2019 to September 2019.</p>
26	The Environmental Clearance shall be put on the website of the company by the proponent.	<p>Complied</p> <p>The copy of EC is uploaded to the company website: https://www.adaniports.com/ports-downloads?port=Vizhinjam-Port. Screenshot of the same was submitted along with HYCR for the period April 2019 to September 2019.</p>
27	Proponent shall submit half yearly reports in soft copy and SEIAA will upload it on the website.	<p>Being Complied</p> <p>HYCRs on the status of compliance of the stipulated clearance conditions are being submitted to all the concerned agencies. As per the Notification of Ministry of Environment and Forests & Climate Change (MoEF&CC) dated 26.11.2018, wherein submission of HYCRs by email/soft copy is declared acceptable, soft copy of HYCR for the period April 2022 to September 2022 has been submitted vide email dated 30.11.2022 (a copy of the email is enclosed as Annexure 4).</p>
28	The details of Environmental Clearance should be prominently displayed in a metallic board of 3 ft x 3 ft with green background and yellow letters of Times New Roman font of size of not less than 40. Sign board with extent of lease area and boundaries shall be	<p>Complied</p> <p>The details of EC have been displayed at the site next to the entrance of the quarry, visible to the public.</p>

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S. No.	Conditions	Compliance Status as on March 31, 2023
	depicted at the entrance of the quarry, visible to the public	 <p>EC Details Displayed on Board at Site</p>
29	The proponent should provide notarized affidavit (indicating the number and date of Environmental Clearance proceedings) that all the conditions stipulated in the EC shall be scrupulously followed.	<p>Complied</p> <p>AVPPL has submitted Notarized Affidavit dated 03.04.2019 to SEIAA stating that all the conditions stipulated in the EC shall be scrupulously followed. Copy of the affidavit and the cover letter vide No. AVPPL/SEIAA/2019-20/731 dated 01.04.2019 have been submitted along with HYCR for the period April 2019 to September 2019.</p>
30	No change in mining technology and scope of working should be made without prior approval of the SEIAA, No further expansion or modifications in the mine shall be carried out without prior approval of the SEIAA, as applicable	<p>Noted for Compliance</p>
31	The Project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any	<p>Not Applicable</p> <p>There are no natural water courses and/or water resources of first order streams in and around the mine lease area.</p>

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S. No.	Conditions	Compliance Status as on March 31, 2023
	mining operations. Necessary safeguard measures to protect the first order streams, if any, originating from the mine lease shall be taken.	
32	The top soil, if any, shall temporarily be stored at earmarked site(s) only for the topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The maximum height of the dumps shall not exceed 8m and width 20m and overall slope of the dumps shall be maintained to. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining.	<p>Being Complied</p> <p>As such, the quarry had been mined earlier by another party and since this is already an open mine, there was no topsoil or overburden available in the quarry; all the produced materials are being used for Breakwater Construction at Vizhinjam Port.</p> <p>However, due to certain geological disturbances in the formation, some overburden has been found in between the rock formation after attaining 6 m on the western slope between p3 and p4 pillars. AVPPL have shifted the topsoil and overburden on the western slope to an area of land in the lower portions of the quarry along with 150 m gabion wall protection. The overburden materials will be managed in this area within the site as per mine closure plan.</p> <p>It will be ensured that the maximum height of the dumps shall not exceed dimensions specified and overall slope of the dumps shall be maintained to 37.5 degrees. The overburden dumps will be vegetated with suitable native species and monitoring and management of the area shall be done until the vegetation becomes self-sustaining.</p>
33	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river and other water bodies: 'The water so-collected should be utilized for watering the mine area, roads, green belt development.etc. The drains shall be regularly desilted	<p>Will be Complied</p> <p>The quarry has been mined earlier by other parties and is an already open mine and hence there is no topsoil or overburden available in the quarry. Also, there are no mineral dumps since all the produced materials are used for Breakwater Construction at Vizhinjam Port. Therefore, catch drains for prevention of run-off is not required at the project site.</p> <p>A siltation pond has been created by constructing a check dam (up to 10m X 1.5m size) at the</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023																											
S. No.	Conditions	Compliance Status as on March 31, 2023																									
	particularly after monsoon and maintained properly.	bottom of the quarry area to prevent run-off of water and flow of sediments. The water collected is being utilized for watering the mine area, roads, greenbelt development, etc. The drains will be regularly desilted particularly after monsoon and maintained properly.																									
34	Effective safeguard measures such as- regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels. 'of PM 10, and PM 2.5, such as haul Road, loading and unloading points and transfer points— it shall 'be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard	<p>Being Complied</p> <p>Regular water sprinkling through water tankers on haul road and other dust prone areas such as loading and unloading of minerals is being carried out.</p> <p>Environment Monitoring at the site has been carried out by NABL accredited laboratory; M/s. Standards Environmental & Analytical Laboratories. Summary of the Ambient Air Quality Monitoring (AAQM) during the compliance period at 5 monitoring locations is mentioned below.</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Max</th> <th>Min</th> <th>Perm. Limit</th> </tr> </thead> <tbody> <tr> <td>PM₁₀</td> <td>µg/m³</td> <td>58.7</td> <td>50.9</td> <td>100</td> </tr> <tr> <td>PM_{2.5}</td> <td>µg/m³</td> <td>34.6</td> <td>28.3</td> <td>60</td> </tr> <tr> <td>SO₂</td> <td>µg/m³</td> <td>BDL</td> <td>-</td> <td>80</td> </tr> <tr> <td>NO₂</td> <td>µg/m³</td> <td>BDL</td> <td>-</td> <td>80</td> </tr> </tbody> </table> <p>The Ambient Air Quality Monitoring Report is enclosed as Annexure 5. All the monitored parameters were found within the prescribed limits.</p>	Parameter	Unit	Max	Min	Perm. Limit	PM ₁₀	µg/m ³	58.7	50.9	100	PM _{2.5}	µg/m ³	34.6	28.3	60	SO ₂	µg/m ³	BDL	-	80	NO ₂	µg/m ³	BDL	-	80
Parameter	Unit	Max	Min	Perm. Limit																							
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NO ₂	µg/m ³	BDL	-	80																							
35	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained	<p>Being Complied</p> <p>AVPPL have developed a tar road of around 0.9 km from Kadavilla Junction to the quarry project site gate for movement of vehicles: thereby reducing the dust pollution.</p> <p>Also, regular water sprinkling through water tankers on haul road and other dust prone areas such as loading and unloading of minerals is being carried out.</p>																									
36	Measures should be taken for control of noise levels below 85 dBA in the work environment.	<p>Being Complied</p> <p>The following measures are being taken for the control of noise levels:</p> <ul style="list-style-type: none"> • Drilling: Good captive silencers are being used 																									

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023																				
S. No.	Conditions	Compliance Status as on March 31, 2023																		
		<p>in drilling equipment.</p> <ul style="list-style-type: none"> Blasting: AVPPL uses the NONEL method - bottom initiation to reduce the noise of blasting. Machinery & Tippers: It is ensured that equipment is fitted with effective silencers, mufflers, acoustic linings, or shields, as necessary. It is ensured that vehicles transporting the materials follow the speed limit to maintain the noise level. Vehicles are serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them. <p>Ambient Noise is being monitored by NABL accredited laboratory; Standards Environmental & Analytical Laboratories as per Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3 (1) and 4(1)) at 5 locations.</p> <p>Summary of the Ambient Noise Monitoring during the compliance period at 5 monitoring locations is mentioned below:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr style="background-color: #d9d9d9;"> <th style="width: 60%;">Location</th> <th style="width: 20%;">L_{eq} Day time</th> <th style="width: 20%;">L_{eq} Night time</th> </tr> </thead> <tbody> <tr> <td>Quarry Area (Project Site)</td> <td style="text-align: center;">58.3</td> <td style="text-align: center;">42.3</td> </tr> <tr> <td>Near Operators Rest Room (North Side)</td> <td style="text-align: center;">53.9</td> <td style="text-align: center;">41.8</td> </tr> <tr> <td>Vanchiyoor UP School (West Side)</td> <td style="text-align: center;">52.6</td> <td style="text-align: center;">41.6</td> </tr> <tr> <td>St. Joseph of Cluny Public School (South Side)</td> <td style="text-align: center;">50.6</td> <td style="text-align: center;">41.3</td> </tr> <tr> <td>Viswanadhapuram Shiva Temple (East Side)</td> <td style="text-align: center;">50.4</td> <td style="text-align: center;">40.6</td> </tr> </tbody> </table> <p>The results obtained were compared with Noise Pollution (Regulation & Control) Rule, 2000 (Rule 3(1) and 4(1)) and it is observed that the noise readings were within limits at all monitoring locations. The Noise Monitoring report is enclosed as Annexure 6.</p>	Location	L _{eq} Day time	L _{eq} Night time	Quarry Area (Project Site)	58.3	42.3	Near Operators Rest Room (North Side)	53.9	41.8	Vanchiyoor UP School (West Side)	52.6	41.6	St. Joseph of Cluny Public School (South Side)	50.6	41.3	Viswanadhapuram Shiva Temple (East Side)	50.4	40.6
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St. Joseph of Cluny Public School (South Side)	50.6	41.3																		
Viswanadhapuram Shiva Temple (East Side)	50.4	40.6																		
37	The funds earmarked for environmental protection measures and CER activate	<p>Being Complied</p> <p>AVPPL has entered into a Concession Agreement with GoK for the construction and operation of</p>																		

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
	should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the State Environment Impact Assessment Authority (SEIAA) office.	<p>Vizhinjam Port whereby it is mandated under Article 32 (copy submitted along with HYCR for the period April 2019 to September 2019) that an Escrow Account must be opened by AVPPL. All deposits must be made into this account and all payments have to be routed through this account for the construction of the port. This account is directly under the monitoring of both the Central and State governments through the Senior Lenders.</p> <p>Therefore, it is requested that the provision of opening of separate account be absolved as there will be a direct contradiction to the Concession Agreement. As the owner of the quarry, AVPPL guarantees that the amount of Rs. 15.00 Lakhs earmarked for CER and funds earmarked for environmental protection measures will be kept as a balance in the current Escrow Account. Furthermore, as provided above the account will be monitored by the government.</p> <p>Expenditure statement for CER and environmental protection measures is enclosed as Annexure 7.</p>
38	The Regional Office of MOEF & CC located at Bangalore shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (S) of the Regional Office by furnishing the requisite data/information/monitoring reports.	<p>Will be Complied</p> <p>All necessary support will be extended to the Regional Office of MoEF&CC located at Bangalore for the monitoring of the compliance of the stipulated conditions Office by furnishing the requisite data/information/monitoring reports.</p>
39	Any appeal against this Environmental Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Noted

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
40	Concealing the factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Noted
41	The SEIAA may revoke or suspend the order, for non-implementation of any of the specific or this implementation of any of the above conditions is not satisfactory. The SEIAA reserves the right to alter/modify the above conditions or stipulate any further condition in the interest of environment protection	Being Complied Refer Point No. 23 above.
42	The above conditions shall prevail notwithstanding anything to the contrary, in consistent, or simplified, contained in any other permit, license or consent given by any other authority for the same project.	Noted
43	The Environmental Clearance will be subject to the final order of the courts in any pending litigation related to the land or project, in any court of law.	Noted
44	The mining operation shall be restricted to above ground water table and it should not intersect ground water table	Complied Based on observations made in and around the quarry area, it was found that the general ground level in the area is 32 m above MSL and the general groundwater table is 8 m below the general ground level i.e., 24 m above MSL. During monsoons the ground water table will rise by 2-3 m. The lease area is situated on an isolated hillock where the topmost working level is about 106 m above MSL, and the lowest working level is 70 m above MSL. The total depth will be 36 m.

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023		
S. No.	Conditions	Compliance Status as on March 31, 2023
		Therefore, mining operations will be restricted to workings at a higher level at the quarry and will not touch the ground water table.
45	All vehicles used for transportation and within the mines shall have 'PUC' certificate from authorized pollution taking centre. Washing of all vehicles shall be inside the lease area	<p>Complied</p> <p>It is ensured that all vehicles used for transportation are having valid Pollution Under Control (PuC) certificate from authorized centers.</p>  <p style="text-align: center;">PuC Certificate</p>
46	Project proponent should obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and ground water for the project	<p>Not Applicable</p> <p>AVPPL is not withdrawing the surface water or ground water from the project area for any purposes.</p>
47	Regular monitoring of flow rates and water quality upstream and downstream of the springs and perennial nallahs flowing in and around the mine lease area shall be carried out and reported in the six monthly reports to SEIAA	<p>Not Applicable</p> <p>There are no springs and perennial nallahs flowing upstream and downstream of the mine lease area as there are no water courses and/or water resources of first order streams in and around the mine lease area.</p>
48	Occupational health surveillance program of the workers should be under taken periodically to observe any contractions due to exposure to	<p>Being Complied.</p> <p>The medical health test checkup of the employees, workers, and laborers as per Director General of Mines (DGM) prescribed statutory format are being taken up periodically by the</p>

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period October 2022 to March 2023

S. No.	Conditions	Compliance Status as on March 31, 2023
	dust and take corrective measures, if needed	<p>contractor involved in the mining operations to observe any contractions due to exposure to dust and take corrective measures.</p> <div data-bbox="724 656 1410 1496" style="border: 1px solid black; padding: 10px;"> <p align="center">FORM 'O' [Refer rules 29 - F (2) and 29 - L]</p> <p align="center">REPORT OF MEDICAL EXAMINATION UNDER RULE 29 - B (To be issued in triplicate)</p> <p>Certificate No. _____</p> <p>Certified that Shri <u>George Xavier Selvaraj</u> employed as <u>Blaster</u> in <u>Aveli - Kollavla</u> mine. For D.No. has examined for an initial/periodical medical examination. He appears to be <u>46</u> years of age. The findings of the examining authority are given in the attached sheet. It is considered that Shri <u>George Xavier Selvaraj</u></p> <p>a) Is medically fit for employment in mines. b) Is suffering from _____ and is medically unfit for i. Any employment in mines; or ii. Any employment below ground; or iii. Any employment or work _____</p> <p>c) Is suffering from _____ and should get this disability cured / controlled and should be again examined within a period of _____ months. He will appear for re-examination with the result of test of _____ and the opinion of _____ he may be permitted / not permitted to carry on his duties during this period.</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>Signature of the examining authority</p> <p><u>Shri</u></p> <p>_____</p> <p>Signature in block letters</p> </div> </div> <p>Place: <u>DRC Nagavari</u> Date: <u>29/03/23</u></p>  </div>

Medical Examination Report (Form O)

Enclosures:

Annexure Number	Details of Annexure
Annexure 1:	Email from SEIAA for SEAC Site Inspection
Annexure 2:	Letter from SEIAA based on Field Visit Report
Annexure 3:	Compliance of Recommendations by SEIAA Appointed Monitoring Committee
Annexure 4:	Email Submission of HYCR for the period April 2022 to September 2022
Annexure 5:	Ambient Air Quality Monitoring Report
Annexure 6:	Noise Monitoring Report
Annexure 7:	CER and EMP Expenditure Statement

**Annexure 1: Email from SEIAA for
SEAC Site Inspection**

3771

From: [Jesse Benjamin Fullonton](mailto:Jesse.Benjamin.Fullonton)
To: [Jesse Benjamin Fullonton](mailto:Jesse.Benjamin.Fullonton)
Subject: FW: SEIAA - Site inspection Intimation-File No.1200/EC2/2018/SEIAA
Date: Monday, May 29, 2023 1:24:38 PM
Importance: High

From: seiaa kerala [<mailto:seacseiaakerala@gmail.com>]
Sent: Thursday, November 3, 2022 8:20 PM
To: kadavilaland1@gmail.com; Hebin Chenthamarakshan <Hebin.C@adani.com>; Dr. R. Ajayakumar Varma <akvarmaseac@gmail.com>; M Dilipkumar <dileppcb@ymail.com>
Subject: SEIAA - Site inspection Intimation-File No.1200/EC2/2018/SEIAA

CAUTION: This mail has originated from outside Adani. Please exercise caution with links and attachments.

Sir,

As per the decision of SEAC meeting, Dr.R.Ajayakumar Varma, Chairman, SEAC (Contact No.**9447048526**) & Er.M.Dileep Kumar (Contact No.**9895623767**) will visit your project site on 12.11.2022 . Hence you are requested to be present with your RQP/Consultant during the site visit and make necessary arrangements for the same.

You can contact the members for further details

Mr.Rajesh JHA, CEO, M/s Adani Vizhinjam Port Ltd- 9099005722

Mr.Hebin, M/s Adani Vizhinjam Port Ltd- 9099056757

Regards,

Administrator, SEIAA

**Annexure 2: Letter from SEIAA based
on Field Visit Report**

**State Environment Impact Assessment Authority
(SEIAA) Kerala**

KSRTC Bus Terminal, 4th floor, Thampanoor, Thiruvananthapuram - 695 001

Ph: +91471-2334262 (Off) +91471-2334265 (Fax)

e-mail: seacseiaakerala@gmail.com

web: www.seiaakerala.org

No. 1200/EC2/2018/SEIAA

Date: 30.12.2022

From

The Administrator
State Environment Impact Assessment Authority
Thiruvananthapuram

To

Mr. Rajesh Kumar Jha,
Chief Executive Officer,
M/s Adani Vizhinjam Port Private Limited,
2nd Floor, Vipanchika Tower, Thycaud,
Thiruvananthapuram - 695014

Sir,

Sub:-SEIAA – Monitoring functioning of quarry of M/s Adani Vizhinjam Port Pvt. Ltd-
Field inspection report - reg.

Ref :- Minutes of the 135th SEAC meeting held on 07th to 09th & 14th & 17th
December, 2022

Attention is invited to the reference cited. The Committee in its 135th SEAC meeting, discussed the Field Inspection Report and decided to recommend the following points for compliance by the Proponent with immediate effect.

1. Install adequate sprinkling arrangements in the project area as no sprinklers are found installed in the project site to contain dust emissions except a small mobile water tanker. Sprinklers should be provided at the loading areas, vehicle parking areas and haulage roads
2. Improve the stormwater channelization by providing improved garland drain and silt traps.
3. Provide adequate sanitation arrangements to the workers at the site.
4. As per the approved mining plan, deep hole blasting (depth of the hole 6.5 m, dia 115 mm and 20 to 25 kg explosives per hole) was permitted. Considering the requirement of stringent norm of distance criteria, the Proponent stated that, now 33 mm dia holes of depth 2.4 m used for controlled blasting. The maximum explosive used per hole is



625 gm. This has to be complied with.

5. Deep hole blasting should be strictly avoided as dwelling units and built structures are located in the vicinity of the mine.
6. Green belt development in the buffer zone and the nurturing of plants should be done with more vigour.
7. Garland drain should be developed all around the mine and provided with intermittent silt traps to minimize the discharge of turbid water to the siltation pond and further to the natural drain.
8. Temporary shelters for the mine workers should be provided to safeguard themselves during the blasting events.
9. The Audit report received from the Mining & Geology Department should be shared with the SEIAA.

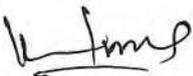
Hence you are requested to submit the compliance of the above mentioned points

Yours faithfully,

Sd/-

Harikumar.A.S
Administrator,SEIAA

Approved for issue


Asst. Section officer



**Annexure 3: Compliance of
Recommendations by SEIAA Appointed
Monitoring Committee**

S. No.	Condition	Compliance
1.	Install adequate sprinkling arrangements in the project area as no sprinklers are found installed in the project site to contain dust emissions except a small mobile water tanker. Sprinklers should be provided at the loading areas, vehicle parking areas and haulage roads.	<p>Being Complied</p> <p>Mobile Water Sprinklers are modified with good sprinkling capacities and are available to sprinkle water till the loading faces, Parking areas, Haulage roads, etc., and separate pipe is provided from the mobile tanker to spray all over the areas where the tanker is unable to reach.</p>  <p>Tanker with Pipeline for Sprinkling</p>
2.	Improve the storm water channelization by providing improved garland drain and silt traps.	<p>Complied</p> <p>The area between the gabion wall and garland drainage is concreted for the proper channelization of storm water.</p>
3.	Provide adequate sanitation arrangements to the workers at the site.	<p>Complied</p> <p>e-Toilet has been installed for the sanitation requirements of workers at the site.</p>  <p>Bio-Toilet at Site</p>

S. No.	Condition	Compliance
4.	As per the approved mining plan, deep hole blasting (depth of the hole 6.5 m, dia 115 mm and 20 to 25 kg explosives per hole) was permitted. Considering the requirement of stringent norm of distance criteria, the Proponent stated that, now 33 mm dia holes of depth 2.4 m used for controlled blasting. The maximum explosive used per hole is 625 gm. This has to be complied with.	Complied 33 mm dia holes of depth 2.4 m used for controlled blasting. The maximum explosive used per hole is 625 gm. This criterion is followed.
5.	Deep hole blasting should be strictly avoided as dwelling units and built structures are located in the vicinity of the mine.	Complied Deep hole blasting is not being undertaken.
6.	Greenbelt development in the buffer zone and the nurturing of plants should be done with more vigour.	Complied Greenbelt is developed and maintained in the buffer zone.

S. No.	Condition	Compliance
		 <p data-bbox="906 1328 1246 1357" style="text-align: center;">Greenbelt Development</p>
7.	<p>Garland drain should be developed all around the mine and provided with intermittent silt traps to minimize the discharge of turbid water to the siltation pond and further to the natural drain.</p>	<p>Complied The area between the gabion wall and garland drainage is concreted for the proper channelization of storm water.</p>

S. No.	Condition	Compliance
		 <p data-bbox="975 1048 1171 1077" style="text-align: center;">Garland Drain</p>
8.	<p>Temporary shelters for the mine workers should be provided to safeguard themselves during the blasting events.</p>	<p>Complied A temporary shelter is available at the site for workers to safeguard themselves during blasting events.</p>  <p data-bbox="943 1731 1209 1760" style="text-align: center;">Temporary Shelter</p>
9.	<p>The Audit report received from the Mining & Geology Department should be shared with the SEIAA.</p>	<p>Complied The audit report by Director of Mining & Geology was submitted to SEIAA vide our letter AVPPL/SEIAA/2022-23/1981 dated 07.06.2022; which was also included as a part of the Half Yearly Compliance Report for the Period April 2022 to September 2022 as Annexure 3.</p>

**Annexure 4: Email Submission of HYCR
for the period April 2022 to
September 2022**

Jesse Benjamin Fullonton

From: Rajesh Kumar Jha
Sent: Wednesday, November 30, 2022 12:51 PM
To: rosz.bng-mefcc@gov.in; rosz.bng-mef@nic.in
Cc: seiaa kerala; Hebin Chenthamarakshan; Jesse Benjamin Fullonton; Snehal Jariwala; Environment Avppl; Palanivelu Kumar
Subject: EC No. 1200/EC2/2018/SEIAA dated 01.03.2019 - HYCR - Apr 2022 to Sep 2022 - Kadavilla-1 - Reg.
Attachments: EC No.1200_EC2_2018_SEIAA dated 01.03.2019-HYCR-Apr22-Sep22_22.11.2022.pdf

Dear Madam/Sir,

This has reference to the Environmental Clearance (EC) Order **No. 1200/EC2/2018/SEIAA issued on 01.03.2019** by State Environmental Impact Assessment Authority (SEIAA), Kerala to Adani Vizhinjam Port Private Limited (AVPPL) for our **Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District.**

The Half Yearly Compliance Report (HYCR) of the conditions stipulated in the EC for the period **April 2022 to September 2022** is attached vide reference AVPPL/MoEF/2022-23/2223 dated 22.11.2022; for record and reference please.

You are requested to kindly acknowledge the receipt of the same.

Thanks & Regards,

Rajesh Jha
MD & CEO
Adani Vizhinjam Port Pvt Limited
Third Floor, Aspinwall House, Kuravankonam, Kowdiar, Thiruvananthapuram, Kerala - 695003
Mobile: +91 471 277 2116
www.adani.com



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**Annexure 5: Ambient Air Quality
Monitoring Report**

TEST REPORT

ULR No: TC54022300003281F		
LRI No.: SEAAL23021248A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 14-02-2023

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN23020414
Sample Name	Ambient Air	Sample Received on	17-02-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	17-02-2023
Sampled by	Lab Authorized Sampler	Test Completed on	24-02-2023

DETAILS OF SAMPLING			
Sampling Location	Project Site	Date of Sampling	14-02-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	72 %
Latitude	8° 43'42.7" N	Longitude	76° 50'16.1" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS - CHEMICAL DISCIPLINE					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM ₁₀)	IS 5182 (Part 23): 2006	µg/m ³	58.7	100 (Max)
2	Particulate matter (PM _{2.5})	IS 5182 (Part 24):2019	µg/m ³	31.4	60.0 (Max)
3	Sulphur dioxide (SO ₂)	IS 5182 (Part 2): 2001	µg/m ³	< 4.00	80.0 (Max)
4	Nitrogen dioxide (NO ₂)	IS 5182 (Part 6): 2006	µg/m ³	< 4.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

End of Report



Shency Joy
Dy. TM-Chemical
Checked by:




Laiju P.N.
Laboratory Head
Authorized Signatory

The results are related only to the samples submitted for analysis and this test report shall not be reproduced except in full, without the written approval of the laboratory.

Standard^S Environmental & Analytical Laboratories

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Web: www.sealabs.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC540223000003282F		
LRI No.: SEAAL23021249A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 14-02-2023

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN23020415
Sample Name	Ambient Air	Sample Received on	17-02-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	17-02-2023
Sampled by	Lab Authorized Sampler	Test Completed on	24-02-2023

DETAILS OF SAMPLING			
Sampling Location	Near Operators Rest Room North Side (2.33 km away from Project Site)	Date of Sampling	14-02-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	73 %
Latitude	8° 43'11.2" N	Longitude	76° 49'6.9" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS - CHEMICAL DISCIPLINE					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM ₁₀)	IS 5182 (Part 23): 2006	µg/m ³	52.6	100 (Max)
2	Particulate matter (PM _{2.5})	IS 5182 (Part 24):2019	µg/m ³	29.1	60.0 (Max)
3	Sulphur dioxide (SO ₂)	IS 5182 (Part 2): 2001	µg/m ³	< 4.00	80.0 (Max)
4	Nitrogen dioxide (NO ₂)	IS 5182 (Part 6): 2006	µg/m ³	< 4.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

End of Report


Shency Joy
 Dy.TM-Chemical
 Checked by:




Laiju P.N.
 Laboratory Head
 Authorized Signatory

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 Web: www.sealabs.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC540223000003283F		
LRI No.: SEAAL23021250A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 14-02-2023

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN23020416
Sample Name	Ambient Air	Sample Received on	17-02-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	17-02-2023
Sampled by	Lab Authorized Sampler	Test Completed on	24-02-2023

DETAILS OF SAMPLING			
Sampling Location	Vanchiyoor UP School West Side (0.85 km away from Project Site)	Date of Sampling	14-02-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	73 %
Latitude	8° 43'16.5" N	Longitude	76° 50'7.1" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS - CHEMICAL DISCIPLINE					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM ₁₀)	IS 5182 (Part 23): 2006	µg/m ³	55.3	100 (Max)
2	Particulate matter (PM _{2.5})	IS 5182 (Part 24):2019	µg/m ³	32.7	60.0 (Max)
3	Sulphur dioxide (SO ₂)	IS 5182 (Part 2): 2001	µg/m ³	< 4.00	80.0 (Max)
4	Nitrogen dioxide (NO ₂)	IS 5182 (Part 6): 2006	µg/m ³	< 4.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

End of Report



Shency Joy
Dy.TM-Chemical
Checked by:




Laiju P.N.
Laboratory Head
Authorized Signatory

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Web: www.sealabs.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC54022300003284F		
LRI No.: SEAAL23021251A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 14-02-2023

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN23020417
Sample Name	Ambient Air	Sample Received on	17-02-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	17-02-2023
Sampled by	Lab Authorized Sampler	Test Completed on	24-02-2023

DETAILS OF SAMPLING			
Sampling Location	St. Joseph of Cluny Public School South side (1.01 km away from Project Site)	Date of Sampling	14-02-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	73 %
Latitude	8° 43'35.3" N	Longitude	76° 50'48.2" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS - CHEMICAL DISCIPLINE					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM ₁₀)	IS 5182 (Part 23): 2006	µg/m ³	57.4	100 (Max)
2	Particulate matter (PM _{2.5})	IS 5182 (Part 24):2019	µg/m ³	34.6	60.0 (Max)
3	Sulphur dioxide (SO ₂)	IS 5182 (Part 2): 2001	µg/m ³	< 4.00	80.0 (Max)
4	Nitrogen dioxide (NO ₂)	IS 5182 (Part 6): 2006	µg/m ³	< 4.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

End of Report


Shency Joy
 Dy.TM-Chemical
 Checked by:




Laiju P.N.
 Laboratory Head
 Authorized Signatory

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TEST REPORT

ULR No: TC540223000003285F		
LRI No.: SEAAL23021252A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 14-02-2023

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN23020418
Sample Name	Ambient Air	Sample Received on	17-02-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	17-02-2023
Sampled by	Lab Authorized Sampler	Test Completed on	24-02-2023

DETAILS OF SAMPLING			
Sampling Location	Viswanadhapuram Shiva Temple East Side (1.09 km away from Project Site)	Date of Sampling	14-02-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	73 %
Latitude	8° 44'17.6" N	Longitude	76° 50'10.4" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS - CHEMICAL DISCIPLINE					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM ₁₀)	IS 5182 (Part 23): 2006	µg/m ³	50.9	100 (Max)
2	Particulate matter (PM _{2.5})	IS 5182 (Part 24):2019	µg/m ³	28.3	60.0 (Max)
3	Sulphur dioxide (SO ₂)	IS 5182 (Part 2): 2001	µg/m ³	< 4.00	80.0 (Max)
4	Nitrogen dioxide (NO ₂)	IS 5182 (Part 6): 2006	µg/m ³	< 4.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

End of Report


Shency Joy
 Dy.TM-Chemical
 Checked by:




Laiju P.N.
 Laboratory Head
 Authorized Signatory

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Annexure 6: Noise Monitoring Report

TEST REPORT

ULR No: TC540223000003286F		
LRI No.: SEAAL23021253A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt: 14-02-2023

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN23020419
Sample Name	Ambient Noise	Monitoring Commenced on	14-02-2023
Monitoring Location	Project Site	Monitoring Completed on	15-02-2023
Test Method	IS 9989:1981	Monitored by	Lab Authorized Sampler
Latitude	8° 43'42.7" N	Longitude	76° 50'16.1" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	44.6	14:00	59.8	22:00	43.2
07:00	47.8	15:00	60.3	23:00	39.1
08:00	52.9	16:00	61.6	24:00	41.9
09:00	57.0	17:00	62.1	01:00	42.7
10:00	59.8	18:00	55.7	02:00	42.3
11:00	63.5	19:00	51.5	03:00	43.1
12:00	60.3	20:00	46.9	04:00	41.9
13:00	59.3	21:00	46.4	05:00	43.9

TEST RESULTS- CHEMICAL DISCIPLINE				
Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	58.3	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	42.3	70 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution (Regulation and Control) Rules, 2000 (Rules3 (1) and 4(1)).

End of Report



Shency Joy
 Dy.TM-Chemical
 Checked by:




Laiju P.N.
 Laboratory Head
 Authorized Signatory

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 Web: www.sealabs.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC540223000003287F		
LRI No.: SEAAL23021254A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt: 14-02-2023

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN23020420
Sample Name	Ambient Noise	Monitoring Commenced on	14-02-2023
Monitoring Location	Near Operators Rest Room North Side (2.33 km away from Project Site)	Monitoring Completed on	15-02-2023
Test Method	IS 9989:1981	Monitored by	Lab Authorized Sampler
Latitude	8° 43'11.2" N	Longitude	76° 49'6.9" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	41.3	14:00	55.4	22:00	40.0
07:00	44.3	15:00	55.8	23:00	38.6
08:00	49.0	16:00	57.1	24:00	41.4
09:00	52.8	17:00	57.5	01:00	42.2
10:00	55.4	18:00	51.5	02:00	41.8
11:00	58.8	19:00	47.7	03:00	42.6
12:00	55.8	20:00	43.5	04:00	41.4
13:00	55.0	21:00	42.9	05:00	43.4

TEST RESULTS- CHEMICAL DISCIPLINE				
Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	53.9	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	41.8	70 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution (Regulation and Control) Rules, 2000 (Rules3 (1) and 4(1)).

End of Report



Shency Joy
Dy.TM-Chemical
Checked by:




Laiju P.N.
Laboratory Head
Authorized Signatory

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Web: www.sealabs.in, E-mail: seaalab@gmail.com

TEST REPORT

ULR No: TC540223000003288F		
LRI No.: SEAAL23021255A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt: 14-02-2023

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN23020421
Sample Name	Ambient Noise	Monitoring Commenced on	14-02-2023
Monitoring Location	Vanchiyoor UP School West Side (0.85 km away from Project Site)	Monitoring Completed on	15-02-2023
Test Method	IS 9989:1981	Monitored by	Lab Authorized Sampler
Latitude	8° 43'16.5" N	Longitude	76° 50'7.1" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	40.4	14:00	54.1	22:00	39.1
07:00	43.3	15:00	54.5	23:00	38.4
08:00	47.8	16:00	55.7	24:00	41.2
09:00	51.6	17:00	56.2	01:00	42.0
10:00	54.1	18:00	50.3	02:00	41.6
11:00	57.4	19:00	46.6	03:00	42.4
12:00	54.5	20:00	42.4	04:00	41.2
13:00	53.7	21:00	41.9	05:00	43.2

TEST RESULTS- CHEMICAL DISCIPLINE				
Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	52.6	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	41.6	70 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution (Regulation and Control) Rules, 2000 (Rules3 (1) and 4(1)).

End of Report


Shency Joy
 Dy.TM-Chemical
 Checked by:




Laiju P.N.
 Laboratory Head
 Authorized Signatory

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TEST REPORT

ULR No: TC540223000003289F		
LRI No.: SEAAL23021256A	Date: 25-02-2023	Page 1 of 1

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt: 14-02-2023

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN23020422
Sample Name	Ambient Noise	Monitoring Commenced on	14-02-2023
Monitoring Location	St. Joseph of Cluny Public School South side (1.01 km away from Project Site)	Monitoring Completed on	15-02-2023
Test Method	IS 9989:1981	Monitored by	Lab Authorized Sampler
Latitude	8° 43'35.3" N	Longitude	76° 50'48.2" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	38.9	14:00	52.1	22:00	37.7
07:00	41.7	15:00	52.5	23:00	38.1
08:00	46.1	16:00	53.7	24:00	40.9
09:00	49.7	17:00	54.1	01:00	41.7
10:00	52.1	18:00	48.5	02:00	41.3
11:00	55.3	19:00	44.9	03:00	42.1
12:00	52.5	20:00	40.9	04:00	40.9
13:00	51.7	21:00	40.4	05:00	42.8

TEST RESULTS- CHEMICAL DISCIPLINE				
Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	50.6	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	41.3	70 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution (Regulation and Control) Rules, 2000 (Rules3 (1) and 4(1)).

End of Report



Shency Joy
Dy.TM-Chemical
Checked by:




Laiju P.N.
Laboratory Head
Authorized Signatory

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TEST REPORT**ULR No: TC540223000003290F**

LRI No.: SEAAL23021257A

Date: 25-02-2023

Page 1 of 1

CUSTOMER DETAILS

Customer Name & Address
M/s Adani Vizhinjam Port Pvt Ltd
Nagaroor, Chirayinkeezhu,
Thiruvananthapuram District.

Customer Reference Test Request dt: 14-02-2023

DETAILS OF MONITORING

Product Category	Atmospheric Pollution	Sample Code	EN23020423
Sample Name	Ambient Noise	Monitoring Commenced on	14-02-2023
Monitoring Location	Viswanadhapuram Shiva Temple East Side (1.09 km away from Project Site)	Monitoring Completed on	15-02-2023
Test Method	IS 9989:1981	Monitored by	Lab Authorized Sampler
Latitude	8° 44'17.6" N	Longitude	76° 50'10.4" E

INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS

Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq

TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	38.7	14:00	51.9	22:00	37.5
07:00	41.5	15:00	52.3	23:00	37.4
08:00	45.9	16:00	53.5	24:00	40.1
09:00	49.5	17:00	53.9	01:00	40.9
10:00	51.9	18:00	48.3	02:00	40.5
11:00	55.1	19:00	44.7	03:00	41.3
12:00	52.3	20:00	40.7	04:00	40.1
13:00	51.5	21:00	40.2	05:00	42.1

TEST RESULTS - CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	50.4	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	40.6	70 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution (Regulation and Control) Rules, 2000 (Rules3 (1) and 4(1)).

End of Report



Shency Joy
Dy.TM-Chemical
Checked by:




Laiju P.N.
Laboratory Head
Authorized Signatory

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**Annexure 7: CER and EMP Expenditure
Statement**

Expenditure Statement for CER for the FY 2022-2023:

S. No.	CER Activity	Expenditure (Rs. Lakhs)
Total FY 2020-2021		8.05
Total FY 2021-2022		6.25
1.	Onam Kit (Groceries & Provisions) Distribution to BPL Families	3.00
2.	Strengthening of Ayiravally Temple Road	18.59
Total FY 2022-2023		21.59
Cumulative Total till date		35.89

Expenditure Statement for EMP for the FY 2022-2023:

S. No.	EMP Expenditure	Expenditure (Rs. Lakhs)
Total FY 2019-2020		4.95
Total FY 2020-2021		7.34
Total FY 2021-2022		8.89
1.	Water Sprinkling	10.40
2.	Greenbelt Development/Sapling Plantation	3.51
3.	Environmental Monitoring	0.68
Total FY 2022-2023 (till 30.09.2022)		14.59
Cumulative Total till date		35.77

**Half Yearly Compliance Report (HYCR)
October 2022 to March 2023**

**Building Stone Quarry Project: Survey No. 555/2 at Nagaroor Village,
Chirayinkeezhu Taluk, Thiruvananthapuram District**



Adani Vizhinjam Port Private Ltd. (AVPPL)

3797



Rajesh Chauhan <chauhanrajes@gmail.com>

RE: Service of Reply on behalf of on behalf of Respondent Adani Vizhinjam Port Private Limited in Original Application No. 304 of 2019 in the matter of "M. Haridasan Vs. State of Kerala & Ors."

1 message

Arshit Anand <arshit@aglaw.in>

Sat, Feb 24, 2024 at 5:55 PM

To: "panjwanivijay62@gmail.com" <panjwanivijay62@gmail.com>, "2abhilashmr@gmail.com" <2abhilashmr@gmail.com>, "56chamber@gmail.com" <56chamber@gmail.com>

Cc: Rajesh Chauhan <chauhanrajes@gmail.com>, Geetika Sharma <geetika.sharma@aglaw.in>

SERVICE OF REPLY

Dear sir/mam,

Please find below one drive link containing Service of Reply in captioned Original Application No. 304 of 2019 in the matter of "M. Haridasan Vs. State of Kerala & Ors." on behalf of Respondent Adani Vizhinjam Port Private Limited for your kind reference.

You are requested to kindly acknowledge receipt of the service of the same.

 [M Haridas Vs. State of Kerala - Additional Reply Vol-I.pdf](#)

 [M Haridas Vs. State of Kerala - Additional Reply Vol-II.pdf](#)

**Best Regards,
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Contact: +919818137051**