Air Quality Monitoring and Sampling Summary Report

Air Quality Monitoring of the Work Zone Perimeter and Localized Weather Patterns

DWR Oroville Dam Recovery Operations

May 31, 2019 through June 13, 2019

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Approved by:

Date: June 28, 2019

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Summary

The work site air monitoring activities were stable during this time period. None of the established stations were modified or moved.

Air quality monitoring at the perimeter monitoring stations was continuous throughout this time period with few interruptions as noted in this report. Sampling methodology adhered to established protocols and there were no changes or modifications to test methodology. The air monitoring equipment is inspected throughout the sampling episodes to ensure proper operation and to assess the site conditions which may impact sample results. We experienced one (1) weather events during this time period.

The equipment in the field continues to perform as required and meets the sampling design for flow rates, volumes, and dependability for the CARB Modified AHERA TEM methodology. Post flow calibrations did not exceed a 5% increase/decrease during this time period.

The majority of the asbestos structure counts at the perimeter remain predominantly “None Detected”:

- Total number of samples: 196
- Total number of samples that were “None Detected”: 178 (90.82%)
- Total number of samples where asbestos was detected but the action level was not exceeded: 18 (9.18%)
- Total number of samples that exceeded the action level: 0
- Total number of samples that were not analyzed: 0
- Total number of samples that were “Overloaded”: 0

The Action Level of 0.0050 S/cc was not exceeded during this time frame for regulated asbestos minerals.

The actinolite and chrysotile asbestos types were detected during this sampling timeframe. Non-asbestos structures, including a contribution from non-regulated amphiboles, are detectible and noted in the sample summary and in the laboratory reports. There were concentrations of non-regulated amphibole structures identified at the Upper, Burma, and Launch Ramp zones.

Dry weather and diminishing soil moisture conditions require the continual application of water and dust mitigation techniques to maintain low structure and dust levels at the perimeter of the work zone.

1.0 Sample Locations

Sample locations are established and/or moved in cooperation and with advanced approval by Butte County Air Quality Management District (BCAQMD). The sites that have been selected best represents the quality of the air as it leaves the "outer work zone perimeter". Additionally, the locations are chosen based on alignment with "sensitive receptors".

Sensitive receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants. Extra care must be taken when dealing with contaminants and pollutants in close proximity to areas recognized as sensitive receptors.

Table 1 Dust and Asbestos Structure Monitoring Station Locations

Station	Location	Way Point ID	Latitude	Longitude
1	Intake Yard	WP 246	39°32'5.44"N	121°28'29.37"W
4	Canyon Drive	WP 249	39°31'40.23"N	121°28'52.17"W
9	Burma Road 01	WP 088A	39°32'26.4"N	121°30'24.7"W
11	Launch Ramp Parking	WP 009A	39°32'47.34"N	121°29'33.10"W
12	Launch Ramp Turnaround	WP 081A	39°32'51.01"N	121°29'53.76"W
24	Dan Beebe Trail	WP 083A	39°31'55.35" N	121°30'11.70" W
25	SW Upper Overlook	WP089A	39°31'47.5" N	121°28'42.3" W

Figure 1 Upper Overlook Sample Station Locations

Figure 2 Burma Road Sampling Locations

Figure 3 Launch Ramp Sampling Locations

2.0 Sample Time/Rates/Volume

Air monitoring Sample data is the crux of the monitoring program at the Oroville Dam project and strict quality assurance procedures are practiced.

The sampling strategy dictates that two (2) twelve (12) +/- hour samples are collected each day, representing a continuous history of dust and asbestos structures that are experienced at the work zone perimeter.

The following tables show the critical information that is collected on each sample and is provided for evaluation of the thoroughness and accuracy of air sampling episodes.

The headings of the tables are explained below:

- Sample Date – Date that the sample was started.
- Sample Number – A specific and unique alpha-numeric numbering system to identify and track each individual sample throughout the journey from collection, sample shipping preparation and Chain of Custody through the laboratory analysis and finally to the report.
- Chain of Custody (COC) – In order to use the results of a sampling program as evidence, a written record must always be available listing the location of the samples. This is also an important component of good laboratory practices. The COC record is necessary to make prima facie showing the integrity of the samples. The samples should be handled only by persons associated in some way with the monitoring program.
- Pre-flow Rate (L/min) – The pre-flow rate (liter/minute) is measured using a NIST traceable Primary Standard. Pumps are allowed a warm-up period according to manufactures specifications.
- Post-flow Rate (L/min) – The post-flow rate (liter/minute) is measured using a NIST traceable Primary Standard at the end of the sampling cycle.
- Avg (liter/min) – The average flow rate (liter/minute) is calculated by averaging the pre and post flow rates.
- Time On – Sample Start Time in hours and minutes.
- Time Off – Sample Stop Time in hours and minutes.
- Day/Night Shift – Identifies the portion of the day when this sample was collected.
- Total Minutes – Based on the difference, in minutes, between the start and stop time that the sample was collected.
- Sample Volume (Liters) – is calculated by using the total minutes samples multiplied by the average flow rate.

Table 2 Perimeter – Upper Overlook Sample Time/Rates/Volume

Upper Overlook Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
05/31/2019	90531-OFD-PMT-01	411905388	2.70	2.65	2.68	05:33	17:29	Day	716	1918.88
	90531-OFD-PMT-02		2.70	2.66	2.68	05:45	17:42		717	1921.56
	90531-OFD-PMT-03		2.70	2.68	2.69	06:02	17:51		709	1907.21
	90531-OFD-PMT-04		2.70	2.69	2.70	06:09	17:59		710	1917.00
	90531-OFD-PMT-05		2.70	2.68	2.69	17:30	05:31	Night	721	1939.49
	90531-OFD-PMT-06		2.70	2.69	2.70	17:43	05:46		723	1952.10
	90531-OFD-PMT-07		2.70	2.72	2.71	17:52	05:54		722	1956.62
	90531-OFD-PMT-08		2.70	2.68	2.69	18:00	06:02		722	1942.18
06/01/2019	90601-OFD-PMT-01	161910695	2.70	2.66	2.68	05:32	17:30	Day	718	1924.24
	90601-OFD-PMT-02		2.70	2.67	2.69	05:47	17:45		718	1931.42
	90601-OFD-PMT-03		2.70	2.69	2.70	05:55	17:52		717	1935.90
	90601-OFD-PMT-04		2.70	2.70	2.70	06:03	17:59		716	1933.20
	90601-OFD-PMT-05		2.70	2.73	2.72	17:31	05:20	Night	709	1928.48
	90601-OFD-PMT-06		2.70	2.73	2.72	17:46	05:35		709	1928.48
	90601-OFD-PMT-07		2.70	2.70	2.70	17:53	05:46		713	1925.10
	90601-OFD-PMT-08		2.70	2.72	2.71	18:00	05:55		715	1937.65
06/02/2019	90602-OFD-PMT-01	321912711	2.72	2.68	2.70	05:21	17:23	Day	722	1949.40
	90602-OFD-PMT-02		2.72	2.66	2.69	05:36	17:39		723	1944.87
	90602-OFD-PMT-03		2.70	2.70	2.70	05:47	17:48		721	1946.70
	90602-OFD-PMT-04		2.72	2.68	2.70	05:56	17:56		720	1944.00
	90602-OFD-PMT-05		2.70	2.70	2.70	17:24	05:29	Night	725	1957.50
	90602-OFD-PMT-06		2.70	2.70	2.70	17:40	05:40		720	1944.00
	90602-OFD-PMT-07		2.70	2.68	2.69	17:49	05:52		723	1944.87
	90602-OFD-PMT-08		2.70	2.71	2.71	17:57	06:01		724	1962.04
06/03/2019	90603-OFD-PMT-01	141902451	2.70	2.68	2.69	05:30	17:34	Day	724	1947.56
	90603-OFD-PMT-02		2.70	2.70	2.70	05:41	17:38		717	1935.90
	90603-OFD-PMT-03		2.70	2.67	2.69	05:53	17:45		712	1915.28
	90603-OFD-PMT-04		2.70	2.65	2.68	06:02	17:53		711	1905.48
	90603-OFD-PMT-05		2.70	2.71	2.71	17:25	05:28	Night	723	1959.33
	90603-OFD-PMT-06		2.70	2.71	2.71	17:39	05:42		723	1959.33
	90603-OFD-PMT-07		2.70	2.71	2.71	17:46	05:53		727	1970.17
	90603-OFD-PMT-08		2.70	2.71	2.71	17:54	05:59		725	1964.75

Upper Overlook Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
06/04/2019	90604-OFD-PMT-01	311901193	2.70	2.66	2.68	05:29	17:22	Day	713	1910.84
	90604-OFD-PMT-02		2.70	2.66	2.68	05:41	17:35		714	1913.52
	90604-OFD-PMT-03		2.70	2.69	2.70	05:54	17:42		708	1911.60
	90604-OFD-PMT-04		2.70	2.69	2.70	06:00	17:50		710	1917.00
	90604-OFD-PMT-05		2.70	2.71	2.71	17:23	05:29	Night	726	1967.46
	90604-OFD-PMT-06		2.70	2.72	2.71	17:36	05:44		728	1972.88
	90604-OFD-PMT-07		2.70	2.72	2.71	17:43	05:54		731	1981.01
	90604-OFD-PMT-08		2.70	2.71	2.71	17:51	06:02		731	1981.01
06/05/2019	90605-OFD-PMT-01	331911947	2.70	2.65	2.68	05:30	17:29	Day	719	1926.92
	90605-OFD-PMT-02		2.70	2.65	2.68	05:45	17:42		717	1921.56
	90605-OFD-PMT-03		2.70	2.68	2.69	05:55	17:50		715	1923.35
	90605-OFD-PMT-04		2.70	2.67	2.69	06:03	17:56		713	1917.97
	90605-OFD-PMT-05		2.70	2.71	2.71	17:30	05:27	Night	717	1943.07
	90605-OFD-PMT-06		2.70	2.73	2.72	17:43	05:41		718	1952.96
	90605-OFD-PMT-07		2.70	2.70	2.70	17:51	03:26		575	1552.50
	90605-OFD-PMT-08		2.70	2.72	2.71	17:57	05:57		720	1951.20
06/06/2019	90606-OFD-PMT-01	161911144	2.70	2.66	2.68	05:28	17:26	Day	718	1924.24
	90606-OFD-PMT-02		2.70	2.64	2.67	05:42	17:39		717	1914.39
	90606-OFD-PMT-03		2.70	2.67	2.69	05:50	17:47		717	1928.73
	90606-OFD-PMT-04		2.70	2.64	2.67	05:58	17:54		716	1911.72
	90606-OFD-PMT-05		2.70	2.70	2.70	17:27	05:30	Night	723	1952.10
	90606-OFD-PMT-06		2.70	2.70	2.70	17:40	05:41		721	1946.70
	90606-OFD-PMT-07		2.70	2.71	2.71	17:48	05:52		724	1962.04
	90606-OFD-PMT-08		2.70	2.70	2.70	17:55	06:00		725	1957.50
06/07/2019	90607-OFD-PMT-01	321913233	2.70	2.67	2.69	05:31	17:26	Day	715	1923.35
	90607-OFD-PMT-02		2.70	2.67	2.69	05:42	17:39		717	1928.73
	90607-OFD-PMT-03		2.70	2.68	2.69	05:53	17:44		711	1912.59
	90607-OFD-PMT-04		2.70	2.68	2.69	05:53	17:44		711	1912.59
	90607-OFD-PMT-05		2.70	2.71	2.71	17:27	05:28	Night	721	1953.91
	90607-OFD-PMT-06		2.70	2.71	2.71	17:40	05:40		720	1951.20
	90607-OFD-PMT-07		2.70	2.71	2.71	17:45	05:48		723	1959.33
	90607-OFD-PMT-08		2.70	2.69	2.70	17:54	05:54		720	1944.00

Upper Overlook Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
06/08/2019	90608-OFD-PMT-01	411905707	2.70	2.65	2.68	05:29	17:25	Day	716	1918.88
	90608-OFD-PMT-02		2.70	2.67	2.69	05:41	17:39		718	1931.42
	90608-OFD-PMT-03		2.70	2.67	2.69	05:49	17:45		716	1926.04
	90608-OFD-PMT-04		2.70	2.68	2.69	05:55	17:52		717	1928.73
	90608-OFD-PMT-05		2.70	2.71	2.71	17:26	05:29	Night	723	1959.33
	90608-OFD-PMT-06		2.70	2.70	2.70	17:40	05:43		723	1952.10
	90608-OFD-PMT-07		2.70	2.71	2.71	17:46	05:55		729	1975.59
	90608-OFD-PMT-08		2.70	2.71	2.71	17:53	06:04		731	1981.01
06/09/2019	90609-OFD-PMT-01	141902606	2.70	2.64	2.67	05:30	17:24	Day	714	1906.38
	90609-OFD-PMT-02		2.70	2.68	2.69	05:44	17:37		713	1917.97
	90609-OFD-PMT-03		2.70	2.70	2.70	05:56	07:09		73	197.10
	90609-OFD-PMT-03		2.70	2.68	2.69	09:42	17:48		486	1307.34
	90609-OFD-PMT-04		2.70	2.65	2.68	06:05	17:55		710	1902.80
	90609-OFD-PMT-05		2.70	2.70	2.70	17:25	05:25	Night	720	1944.00
	90609-OFD-PMT-06		2.70	2.69	2.70	17:38	05:39		721	1946.70
	90609-OFD-PMT-07		2.70	2.70	2.70	17:49	05:51		722	1949.40
	90609-OFD-PMT-08		2.70	2.71	2.71	17:56	05:57		721	1953.91
06/10/2019	90610-OFD-PMT-01	091913230	2.70	2.62	2.66	05:26	17:25	Day	719	1912.54
	90610-OFD-PMT-02		2.70	2.68	2.69	05:40	17:37		717	1928.73
	90610-OFD-PMT-03		2.70	2.66	2.68	05:52	17:45		713	1910.84
	90610-OFD-PMT-04		2.70	2.63	2.67	05:58	17:52		714	1906.38
	90610-OFD-PMT-05		2.70	2.70	2.70	17:26	05:30	Night	724	1954.80
	90610-OFD-PMT-06		2.70	2.70	2.70	17:38	05:43		725	1957.50
	90610-OFD-PMT-07		2.70	2.71	2.71	17:46	05:51		725	1964.75
	90610-OFD-PMT-08		2.70	2.70	2.70	17:53	05:59		726	1960.20
06/11/2019	90611-OFD-PMT-01	311901244	2.70	2.63	2.67	05:31	17:26	Day	715	1909.05
	90611-OFD-PMT-02		2.70	2.64	2.67	05:44	17:40		716	1911.72
	90611-OFD-PMT-03		2.70	2.67	2.69	05:52	17:49		717	1928.73
	90611-OFD-PMT-04		2.70	2.68	2.69	06:00	17:56		716	1926.04
	90611-OFD-PMT-05		2.70	2.70	2.70	17:27	05:25	Night	718	1938.60
	90611-OFD-PMT-06		2.70	2.70	2.70	17:41	05:40		719	1941.30
	90611-OFD-PMT-07		2.70	2.70	2.70	17:50	05:49		719	1941.30
	90611-OFD-PMT-08		2.70	2.71	2.71	17:57	05:54		717	1943.07

Upper Overlook Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
06/12/2019	90612-OFD-PMT-01	531900791	2.70	2.62	2.66	05:26	17:25	Day	719	1912.54
	90612-OFD-PMT-02		2.70	2.65	2.68	05:41	17:39		718	1924.24
	90612-OFD-PMT-03		2.70	2.65	2.68	05:50	17:46		716	1918.88
	90612-OFD-PMT-04		2.70	2.65	2.68	05:55	17:53		718	1924.24
	90612-OFD-PMT-05		2.70	2.71	2.71	17:26	05:30	Night	724	1962.04
	90612-OFD-PMT-06		2.70	2.71	2.71	17:40	05:41		721	1953.91
	90612-OFD-PMT-07		2.70	2.70	2.70	17:47	05:50		723	1952.10
	90612-OFD-PMT-08		2.70	2.70	2.70	17:54	05:57		723	1952.10
06/13/2019	90613-OFD-PMT-01	161911698	2.70	2.69	2.70	05:31	17:23	Day	712	1922.40
	90613-OFD-PMT-02		2.70	2.68	2.69	05:42	17:36		714	1920.66
	90613-OFD-PMT-03		2.70	2.69	2.70	05:51	17:43		712	1922.40
	90613-OFD-PMT-04		2.70	2.67	2.69	05:58	17:50		712	1915.28
	90613-OFD-PMT-05		2.70	2.71	2.71	17:24	05:26	Night	722	1956.62
	90613-OFD-PMT-06		2.70	2.71	2.71	17:37	05:39		722	1956.62
	90613-OFD-PMT-07		2.70	2.72	2.71	17:44	05:45		721	1953.91
	90613-OFD-PMT-08		2.70	2.72	2.71	17:51	05:51		720	1951.20

Table 3 Perimeter – Burma Road Perimeter Sample Time/Rates/Volume

Burma Road Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
05/31/2019	90531-OFD-BPT-01	411905390	2.70	2.71	2.71	05:20	17:29	Day	729	1975.59
	90531-OFD-BPT-02		2.70	2.74	2.72	17:30	05:27	Night	717	1950.24
06/01/2019	90601-OFD-BPT-01	161910687	2.70	2.75	2.73	05:28	17:26	Day	718	1960.14
	90601-OFD-BPT-02		2.70	2.73	2.72	17:27	05:24	Night	717	1950.24
06/02/2019	90602-OFD-BPT-01	321912705	2.70	2.71	2.71	05:25	17:31	Day	726	1967.46
	90602-OFD-BPT-02		2.70	2.74	2.72	17:32	05:20	Night	708	1925.76
06/03/2019	90603-OFD-BPT-01	141902450	2.70	2.69	2.70	05:21	17:31	Day	730	1971.00
	90603-OFD-BPT-02		2.70	2.69	2.70	17:31	05:25	Night	714	1927.80
06/04/2019	90604-OFD-BPT-01	311901195	2.70	2.69	2.70	05:25	17:28	Day	723	1952.10
	90604-OFD-BPT-02		2.70	2.69	2.70	17:28	05:25	Night	717	1935.90
06/05/2019	90605-OFD-BPT-01	331911963	2.70	2.72	2.71	05:26	17:25	Day	719	1948.49
	90605-OFD-BPT-02		2.70	2.72	2.71	17:26	05:26	Night	720	1951.20
06/06/2019	90606-OFD-BPT-01	161911142	2.70	2.71	2.71	05:27	17:30	Day	723	1959.33
	90606-OFD-BPT-02		2.70	2.69	2.70	17:31	05:25	Night	714	1927.80
06/07/2019	90607-OFD-BPT-01	321913223	2.70	2.70	2.70	05:26	17:26	Day	720	1944.00
	90607-OFD-BPT-02		2.70	2.69	2.70	17:26	05:25	Night	719	1941.30
06/08/2019	90608-OFD-BPT-01	411905709	2.70	2.70	2.70	05:26	17:25	Day	719	1941.30
	90608-OFD-BPT-02		2.70	2.72	2.71	17:25	05:26	Night	721	1953.91
06/09/2019	90609-OFD-BPT-01	141902613	2.70	2.70	2.70	05:26	17:27	Day	721	1946.70
	90609-OFD-BPT-02		2.70	2.73	2.72	17:27	05:25	Night	718	1952.96
06/10/2019	90610-OFD-BPT-01	091913229	2.70	2.69	2.70	05:26	17:34	Day	728	1965.60
	90610-OFD-BPT-02		2.70	2.72	2.71	17:35	05:25	Night	710	1924.10
06/11/2019	90611-OFD-BPT-01	311901245	2.70	2.64	2.67	05:26	17:29	Day	723	1930.41
	90611-OFD-BPT-02		2.70	2.64	2.67	17:30	05:25	Night	715	1909.05
06/12/2019	90612-OFD-BPT-01	531900792	2.70	2.67	2.69	05:26	17:34	Day	728	1958.32
	90612-OFD-BPT-02		2.70	2.70	2.70	17:35	05:25	Night	710	1917.00
06/13/2019	90613-OFD-BPT-01	161911696	2.70	2.70	2.70	05:26	17:31	Day	725	1957.50
	90613-OFD-BPT-02		2.70	2.72	2.71	17:32	05:25	Night	713	1932.23

Table 4 Perimeter – Launch Ramp Perimeter Sample Time/Rates/Volume

Launch Ramp Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
05/31/2019	90531-OFD-LRP-01	411905389	2.70	2.69	2.70	06:31	18:21	Day	710	1917.00
	90531-OFD-LRP-02		2.70	2.68	2.69	06:24	18:14		710	1909.90
	90531-OFD-LRP-03		2.70	2.70	2.70	18:22	06:30	Night	728	1965.60
	90531-OFD-LRP-04		2.70	2.73	2.72	18:15	06:22		727	1977.44
06/01/2019	90601-OFD-LRP-01	161910691	2.70	2.66	2.68	06:31	18:19	Day	708	1897.44
	90601-OFD-LRP-02		2.70	2.67	2.69	06:23	18:13		710	1909.90
	90601-OFD-LRP-03		2.70	2.70	2.70	18:20	06:08	Night	708	1911.60
	90601-OFD-LRP-04		2.70	2.73	2.72	18:14	06:19		725	1972.00
06/02/2019	90602-OFD-LRP-01	321912709	2.70	2.68	2.69	06:09	18:08	Day	719	1934.11
	90602-OFD-LRP-02		2.72	2.67	2.70	06:20	18:19		719	1941.30
	90602-OFD-LRP-03		2.70	2.74	2.72	18:09	06:17	Night	728	1980.16
	90602-OFD-LRP-04		2.70	2.70	2.70	18:20	06:26		726	1960.20
06/03/2019	90603-OFD-LRP-01	141902452	2.70	2.67	2.69	06:18	18:04	Day	706	1899.14
	90603-OFD-LRP-02		2.70	2.69	2.70	06:27	18:17		710	1917.00
	90603-OFD-LRP-03		2.70	2.70	2.70	18:05	06:15	Night	730	1971.00
	90603-OFD-LRP-04		2.70	2.70	2.70	18:18	06:25		727	1962.90
06/04/2019	90604-OFD-LRP-01	311901194	2.70	2.67	2.69	06:16	18:00	Day	704	1893.76
	90604-OFD-LRP-02		2.70	2.67	2.69	06:26	18:11		705	1896.45
	90604-OFD-LRP-03		2.70	2.68	2.69	18:01	06:15	Night	734	1974.46
	90604-OFD-LRP-04		2.70	2.70	2.70	18:12	06:24		732	1976.40
06/05/2019	90605-OFD-LRP-01	331911959	2.70	2.70	2.70	06:16	15:52	Day	576	1555.20
	90605-OFD-LRP-02		2.70	2.66	2.68	06:25	18:19		714	1913.52
	90605-OFD-LRP-03		2.70	2.67	2.69	18:08	06:08	Night	720	1936.80
	90605-OFD-LRP-04		2.70	2.71	2.71	18:20	06:19		719	1948.49
06/06/2019	90606-OFD-LRP-01	161911143	2.70	2.69	2.70	06:09	18:05	Day	716	1933.20
	90606-OFD-LRP-02		2.70	2.67	2.69	06:20	18:15		715	1923.35
	90606-OFD-LRP-03		2.72	2.68	2.70	18:06	06:11	Night	725	1957.50
	90606-OFD-LRP-04		2.70	2.66	2.68	18:15	06:20		725	1943.00
06/07/2019	90607-OFD-LRP-01	321913230	2.70	2.68	2.69	06:12	18:04	Day	712	1915.28
	90607-OFD-LRP-02		2.70	2.69	2.70	06:21	18:14		713	1925.10
	90607-OFD-LRP-03		2.70	2.70	2.70	18:05	06:06	Night	721	1946.70
	90607-OFD-LRP-04		2.70	2.71	2.71	18:15	06:16		721	1953.91

Launch Ramp Perimeter Samples										
Sample Date	Sample Number	COC	Pre-flow Rate (L/min)	Post-flow Rate (L/min)	Avg (L/min)	Time On	Time Off	Day/Night Shift	Total Minutes	Sample Volume (Liters)
06/08/2019	90608-OFD-LRP-01	411905708	2.70	2.67	2.69	06:07	18:04	Day	717	1928.73
	90608-OFD-LRP-02		2.70	2.70	2.70	06:17	18:13		716	1933.20
	90608-OFD-LRP-03		2.70	2.70	2.70	18:05	06:15	Night	730	1971.00
	90608-OFD-LRP-04		2.70	2.70	2.70	18:14	06:26		732	1976.40
06/09/2019	90609-OFD-LRP-01	141902611	2.70	2.67	2.69	06:16	18:06	Day	710	1909.90
	90609-OFD-LRP-02		2.70	2.69	2.70	06:27	18:15		708	1911.60
	90609-OFD-LRP-03		2.70	2.69	2.70	18:07	06:09	Night	722	1949.40
	90609-OFD-LRP-04		2.70	2.70	2.70	18:16	06:17		721	1946.70
06/10/2019	90610-OFD-LRP-01	091913227	2.70	2.67	2.69	06:10	18:05	Day	715	1923.35
	90610-OFD-LRP-02		2.70	2.68	2.69	06:18	18:14		716	1926.04
	90610-OFD-LRP-03		2.70	2.70	2.70	18:06	06:13	Night	727	1962.90
	90610-OFD-LRP-04		2.70	2.67	2.69	18:15	06:21		726	1952.94
06/11/2019	90611-OFD-LRP-01	311901246	2.70	2.68	2.69	06:12	18:05	Day	713	1917.97
	90611-OFD-LRP-02		2.70	2.67	2.69	06:22	18:14		712	1915.28
	90611-OFD-LRP-03		2.70	2.70	2.70	18:06	06:06	Night	720	1944.00
	90611-OFD-LRP-04		2.70	2.74	2.72	18:15	06:15		720	1958.40
06/12/2019	90612-OFD-LRP-01	531900790	2.70	2.67	2.69	06:07	18:04	Day	717	1928.73
	90612-OFD-LRP-02		2.70	2.66	2.68	06:16	18:12		716	1918.88
	90612-OFD-LRP-03		2.70	2.69	2.70	18:05	06:09	Night	724	1954.80
	90612-OFD-LRP-04		2.70	2.70	2.70	18:13	06:17		724	1954.80
06/13/2019	90613-OFD-LRP-01	161911697	2.70	2.68	2.69	06:10	18:02	Day	712	1915.28
	90613-OFD-LRP-02		2.70	2.69	2.70	06:18	18:13		715	1930.50
	90613-OFD-LRP-03		2.70	2.72	2.71	18:14	06:17	Night	723	1959.33
	90613-OFD-LRP-04		2.70	2.72	2.71	18:14	06:17		723	1959.33

3.0 Sampling Media and Target Analysis

Dust Monitoring Sample Methods

TSI DustTrak DRX 8533

The DustTrak DRX Aerosol Monitors are laser photometers that simultaneously measure mass and size fraction. These monitors are continuous, real-time, 90˚ light-scattering laser photometers that simultaneously measure size-segregated mass fraction concentration corresponding to PM2.5, PM10, and Total PM size fraction. They combine both particle cloud (total area of scattered light) and single particle detection to achieve mass fraction measurements. This size-segregated mass fraction measurement technique is superior to either a basic photometer or optical counter (OPC). It delivers the mass concentration of a photometer and the size resolution of an OPC.

- Photometers can be used at high mass concentration, but they do not give any size information and significantly underestimate large particle mass concentrations.
- OPC's provide size and count information; however, they do not provide any mass concentration information and cannot be used in high mass concentration environments.

TrakPro™ software shall be utilized for exposure studies and environmental dust monitoring. TrakPro™ Data Analysis Software is a Microsoft Windows®-based software program that works with a variety of TSI data logging instruments. This software helps pre-program instruments, store and organize test data, and generate detailed graphs and reports needed to effectively communicate results.

Perimeter Air Sample Methods – CARB Modified TEM

Analysis of all air samples shall follow the analytical method specified by the United States Environmental Protection Agency, Asbestos Hazard Emergency Response ACT (AHERA) criteria for asbestos (40 CFR, Part 763 Subpart E, Appendix A, adopted October 30, 1987), with the following exceptions CARB Modified TEM:

- The analytical sensitivity shall be 0.001 structures per cubic centimeter (0.001 s/cc); and
- All asbestos structures with an aspect ratio greater than three to one (3 to 1) shall be counted irrespective of length.

The results of the analysis of air samples shall be reported as transmission electron microscopy (TEM) asbestos structures per cubic centimeter (s/cc).

The method requires the use of TEM 25 mm air sampling cassettes, designed and manufactured to meet all applicable NIOSH, OSHA, and EPA standards.

Sampling media for perimeter sampling shall comply with the following:

- 0.45 µm pore size, Mixed Cellulose Esther (MCE) Filter Material
- 5.0 µm Filter is placed under the 0.45 µm filter as a diffuser
- 2" Static Conductive Extension Cowl
- Meets AHERA Requirements Asbestos TEM 25 mm 0.45 µm Cassette-Individual

4.0 Photo Documentation

Table 5 Photo Documentation of Air Monitoring Stations and Weather Stations – Current Condition

Station 1 – WP 246 Intake Yard	Station 4 – WP 249 Canyon Drive
Station 9 – WP 088A Burma Road 01	Station 11 – WP 009A Launch Ramp Parking

Station 12 – WP 081A Launch Ramp Turnaround	Station 24 – WP 083A Dan Beebe Trail
	Intentionally Left Blank
Station 25 – WP 089A SW Upper Overlook	

Weather Station #1 – WP 045A	Weather Station #2 – WP 085A

5.0 Air Sampling Equipment Malfunctions & Corrective Actions

Table 6 – Equipment Failures

Equipment	Date/Time	Exception	Remedy
DM04	2019.06.08 09:38	WP249 Canyon Drive– DustTrak data flatlined.	The station was restarted, and the issue was resolved on 2019.06.08 at 11:41.

Table 7 – Sample Failure

Date	Sample ID	Discussion
No sample failures during this time period.		

6.0 Exceedances & Corrective Actions

Figure 4 - Exceedance Chart

No exceedances were recorded during this time period.

7.0 Laboratory Analysis Summary

Copies of the Laboratory reports are included as Appendix A – Laboratory

Table Heading Explanations

Zone	A designation of area of the work zone.
Sample ID	An alpha-numeric identified, unique to a particular sample.
Location	A description of the location where the sample was collected, often accompanied by a way point.
Non – Asbestos Structures	Non-asbestos minerals that have fibrous morphology and aspect ratio of 3:1, irrespective of length.
Asbestos Type	Regulated asbestiforms of the following minerals: chrysotile (fibrous serpentine), crocidolite (fibrous riebeckite), amosite (fibrous cummingtonite—grunerite), fibrous tremolite, fibrous actinolite, and fibrous anthophyllite.
Structure	A microscopic bundle, cluster, fiber, or matrix which may contain asbestos ranked by aspect ratio of 3:1 and length.
Analytical Sensitivity	The analytical sensitivity is defined as the concentration that would result from the finding of one fiber or structure. The higher the total volume of air pulled through the filter and the more filter area analyzed the lower the analytical sensitivity. The target analytical sensitivity for this method is 0.001 structures per cc of air (s/cc).
Asbestos Concentration	The asbestos concentration in structures per cc (S/cc) is equal to the analytical sensitivity for that sample multiplied by the number of asbestos structures identified. BCAQMD has approved the DWR Community Action Level at the Perimeter of the Oroville Dam property of 0.005 regulated asbestos structures/cubic centimeter (S/cc) of air.

Table 8 - 2019.05.31 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90531-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90531-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0010	<0.0010
	90531-OFD-PMT-03	WP089A AM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90531-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90531-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90531-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0009	<0.0010
	90531-OFD-PMT-07	WP089A PM SW Upper Overlook	0	None Detected			0.0009	<0.0010
	90531-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90531-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90531-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0009	<0.0010
Launch Ramp	90531-OFD-LRP-01	WP009A AM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90531-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010
	90531-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0009	<0.0009
	90531-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 9 - 2019.06.01 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90601-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	Chrysotile	0	1	0.0010	0.00095
	90601-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0010	<0.0010
	90601-OFD-PMT-03	WP089A AM SW Upper Overlook	0	None Detected			0.0009	<0.0010
	90601-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90601-OFD-PMT-05	WP083A PM Dan Beebe Trail	3	None Detected			0.0010	<0.0010
	90601-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0010	<0.0010
	90601-OFD-PMT-07	WP089A PM SW Upper Overlook	2	None Detected			0.0010	<0.0010
	90601-OFD-PMT-08	WP246 PM Intake Yard	1	None Detected			0.0009	<0.0010
Burma Road	90601-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90601-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0009	<0.0009
Launch Ramp	90601-OFD-LRP-01	WP009A AM Launch Ramp Parking	1	None Detected			0.0010	<0.0010
	90601-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	2	None Detected			0.0010	<0.0010
	90601-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90601-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 10 - 2019.06.02 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90602-OFD-PMT-01	WP083A AM Dan Beebe Trail	1	None Detected			0.0010	<0.0010
	90602-OFD-PMT-02	WP249 AM Canyon Drive	3	Chrysotile	1	0	0.0010	0.00096
	90602-OFD-PMT-03	WP089A AM SW Upper Overlook	3	None Detected			0.0010	<0.0010
	90602-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90602-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90602-OFD-PMT-06	WP249 PM Canyon Drive	2	Actinolite	0	1	0.0010	0.00096
	90602-OFD-PMT-07	WP089A PM SW Upper Overlook	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90602-OFD-PMT-08	WP246 PM Intake Yard	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
Burma Road	90602-OFD-BPT-01	WP088A AM Burma Road 01	3	Actinolite	1	0	0.0009	0.00095
	90602-OFD-BPT-02	WP088A PM Burma Road 01	5	None Detected			0.0010	<0.0010
Launch Ramp	90602-OFD-LRP-01	WP009A AM Launch Ramp Parking	4	None Detected			0.0010	<0.0010
	90602-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010
	90602-OFD-LRP-03	WP009A PM Launch Ramp Parking	3	None Detected			0.0009	<0.0009
	90602-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 11 – 2019.06.03 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90603-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90603-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0010	<0.0010
	90603-OFD-PMT-03	WP089A AM SW Upper Overlook	0	None Detected			0.0009	<0.0010
	90603-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0009	<0.0010
	90603-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90603-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0010	<0.0010
	90603-OFD-PMT-07	WP089A PM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90603-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90603-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90603-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0009	<0.0009
Launch Ramp	90603-OFD-LRP-01	WP009A AM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90603-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	0	None Detected			0.0009	<0.0009
	90603-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90603-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 12 – 2019.06.04 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90604-OFD-PMT-01	WP083A AM Dan Beebe Trail	5	None Detected			0.0010	<0.0010
	90604-OFD-PMT-02	WP249 AM Canyon Drive	2	None Detected			0.0010	<0.0010
	90604-OFD-PMT-03	WP089A AM SW Upper Overlook	4	None Detected			0.0010	<0.0010
	90604-OFD-PMT-04	WP246 AM Intake Yard	7	None Detected			0.0010	<0.0010
	90604-OFD-PMT-05	WP083A PM Dan Beebe Trail	8	None Detected			0.0009	<0.0009
	90604-OFD-PMT-06	WP249 PM Canyon Drive	9	None Detected			0.0009	<0.0009
	90604-OFD-PMT-07	WP089A PM SW Upper Overlook	5	None Detected			0.0010	<0.0010
	90604-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90604-OFD-BPT-01	WP088A AM Burma Road 01	8	None Detected			0.0009	<0.0010
	90604-OFD-BPT-02	WP088A PM Burma Road 01	10	None Detected			0.0010	<0.0010
Launch Ramp	90604-OFD-LRP-01	WP009A AM Launch Ramp Parking	6	None Detected			0.0010	<0.0010
	90604-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	7	None Detected			0.0010	<0.0010
	90604-OFD-LRP-03	WP009A PM Launch Ramp Parking	2	None Detected			0.0010	<0.0010
	90604-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	3	None Detected			0.0010	<0.0010

Table 13 – 2019.06.05 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90605-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90605-OFD-PMT-02	WP249 AM Canyon Drive	1	None Detected			0.0010	<0.0010
	90605-OFD-PMT-03	WP089A AM SW Upper Overlook	1	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90605-OFD-PMT-04	WP246 AM Intake Yard	1	None Detected			0.0010	<0.0010
	90605-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90605-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0010	<0.0010
	90605-OFD-PMT-07	WP089A PM SW Upper Overlook	1	None Detected			0.0010	<0.0010
	90605-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90605-OFD-BPT-01	WP088A AM Burma Road 01	1	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90605-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0010	<0.0010
Launch Ramp	90605-OFD-LRP-01	WP009A AM Launch Ramp Parking	1	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90605-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	2	Chrysotile	1	0	0.0010	0.00099
	90605-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90605-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 14 – 2019.06.06 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90606-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90606-OFD-PMT-02	WP249 AM Canyon Drive	1	Actinolite	1	0	0.0010	0.00096
	90606-OFD-PMT-03	WP089A AM SW Upper Overlook	1	None Detected			0.0010	<0.0010
	90606-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90606-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	Actinolite	0	1	0.0009	0.00094
	90606-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0009	<0.0009
	90606-OFD-PMT-07	WP089A PM SW Upper Overlook	1	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90606-OFD-PMT-08	WP246 PM Intake Yard	2	Chrysotile	0	1	0.0009	0.00094
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
Burma Road	90606-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90606-OFD-BPT-02	WP088A PM Burma Road 01	1	None Detected			0.0010	<0.0010
Launch Ramp	90606-OFD-LRP-01	WP009A AM Launch Ramp Parking	2	None Detected			0.0010	<0.0010
	90606-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	2	Actinolite	1	0	0.0010	0.00096
	90606-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0009	<0.0009
	90606-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	1	None Detected			0.0009	<0.0010

Table 15 – 2019.06.07 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90607-OFD-PMT-01	WP083A AM Dan Beebe Trail	1	None Detected			0.0010	<0.0010
	90607-OFD-PMT-02	WP249 AM Canyon Drive	3	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90607-OFD-PMT-03	WP089A AM SW Upper Overlook	3	None Detected			0.0010	<0.0010
	90607-OFD-PMT-04	WP246 AM Intake Yard	3	None Detected			0.0010	<0.0010
	90607-OFD-PMT-05	WP083A PM Dan Beebe Trail	2	None Detected			0.0010	<0.0010
	90607-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0010	<0.0010
	90607-OFD-PMT-07	WP089A PM SW Upper Overlook	2	Chrysotile	1	0	0.0010	0.00095
	90607-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90607-OFD-BPT-01	WP088A AM Burma Road 01	1	Actinolite	0	1	0.0010	0.00096
	90607-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0010	<0.0010
Launch Ramp	90607-OFD-LRP-01	WP009A AM Launch Ramp Parking	1	None Detected			0.0010	<0.0010
	90607-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	2	None Detected			0.0010	<0.0010
	90607-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90607-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 16 – 2019.06.08 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90608-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90608-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0010	<0.0010
	90608-OFD-PMT-03	WP089A AM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90608-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90608-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0009	<0.0010
	90608-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0009	<0.0010
	90608-OFD-PMT-07	WP089A PM SW Upper Overlook	0	None Detected			0.0009	<0.0010
	90608-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90608-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90608-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0009	<0.0010
Launch Ramp	90608-OFD-LRP-01	WP009A AM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90608-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010
	90608-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0009	<0.0009
	90608-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 17 – 2019.06.09 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90609-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0009	<0.0010
	90609-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0009	<0.0009
	90609-OFD-PMT-03	WP089A AM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90609-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90609-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90609-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0010	<0.0010
	90609-OFD-PMT-07	WP089A PM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90609-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90609-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90609-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0010	<0.0010
Launch Ramp	90609-OFD-LRP-01	WP009A AM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90609-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010
	90609-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90609-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 18 – 2019.06.10 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90610-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90610-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0010	<0.0010
	90610-OFD-PMT-03	WP089A AM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90610-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0009	<0.0009
	90610-OFD-PMT-05	WP083A PM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90610-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0010	<0.0010
	90610-OFD-PMT-07	WP089A PM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90610-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0010	<0.0010
Burma Road	90610-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0010	<0.0010
	90610-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0010	<0.0010
Launch Ramp	90610-OFD-LRP-01	WP009A AM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90610-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010
	90610-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90610-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

Table 19 – 2019.06.11 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90611-OFD-PMT-01	WP083A AM Dan Beebe Trail	9	Actinolite	1	0	0.0010	0.00097
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-PMT-02	WP249 AM Canyon Drive	6	None Detected			0.0010	<0.0010
	90611-OFD-PMT-03	WP089A AM SW Upper Overlook	4	Actinolite	1	1	0.0010	0.0019
	90611-OFD-PMT-04	WP246 AM Intake Yard	7	Actinolite	2	0	0.0010	0.0019
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-PMT-05	WP083A PM Dan Beebe Trail	4	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-PMT-06	WP249 PM Canyon Drive	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-PMT-07	WP089A PM SW Upper Overlook	5	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-PMT-08	WP246 PM Intake Yard	7	None Detected			0.0010	<0.0010
Burma Road	90611-OFD-BPT-01	WP088A AM Burma Road 01	13	None Detected			0.0010	<0.0010
	90611-OFD-BPT-02	WP088A PM Burma Road 01	2	None Detected			0.0010	<0.0010
Launch Ramp	90611-OFD-LRP-01	WP009A AM Launch Ramp Parking	4	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	3	Actinolite	1	0	0.0010	0.00097
	90611-OFD-LRP-03	WP009A PM Launch Ramp Parking	7	Actinolite	0	1	0.0010	0.00095
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
	90611-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	3	None Detected			0.0009	<0.0010

Table 20 – 2019.06.12 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90612-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90612-OFD-PMT-02	WP249 AM Canyon Drive	0	None Detected			0.0010	<0.0010
	90612-OFD-PMT-03	WP089A AM SW Upper Overlook	7	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90612-OFD-PMT-04	WP246 AM Intake Yard	1	None Detected			0.0010	<0.0010
	90612-OFD-PMT-05	WP083A PM Dan Beebe Trail	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90612-OFD-PMT-06	WP249 PM Canyon Drive	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90612-OFD-PMT-07	WP089A PM SW Upper Overlook	0	None Detected			0.0010	<0.0010
	90612-OFD-PMT-08	WP246 PM Intake Yard	1	None Detected			0.0010	<0.0010
Burma Road	90612-OFD-BPT-01	WP088A AM Burma Road 01	4	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90612-OFD-BPT-02	WP088A PM Burma Road 01	0	None Detected			0.0010	<0.0010
Launch Ramp	90612-OFD-LRP-01	WP009A AM Launch Ramp Parking	1	None Detected			0.0010	<0.0010
	90612-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90612-OFD-LRP-03	WP009A PM Launch Ramp Parking	0	None Detected			0.0010	<0.0010
	90612-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					

Table 21 – 2019.06.13 Laboratory Analysis Summary

Zone	Sample ID	Location	Non-Asbestos Structures	Asbestos Type	# Structures		Analytical Sensitivity (S/cc)	Asbestos Concentration (S/cc)
					≥0.5µm <5µm	≥5µm		
Upper Perimeter	90613-OFD-PMT-01	WP083A AM Dan Beebe Trail	0	None Detected			0.0010	<0.0010
	90613-OFD-PMT-02	WP249 AM Canyon Drive	1	None Detected			0.0010	<0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90613-OFD-PMT-03	WP089A AM SW Upper Overlook	3	Actinolite	0	1	0.0010	0.00096
	90613-OFD-PMT-04	WP246 AM Intake Yard	0	None Detected			0.0010	<0.0010
	90613-OFD-PMT-05	WP083A PM Dan Beebe Trail	1	None Detected			0.0009	<0.0009
	90613-OFD-PMT-06	WP249 PM Canyon Drive	0	None Detected			0.0009	<0.0009
	90613-OFD-PMT-07	WP089A PM SW Upper Overlook	1	None Detected			0.0009	<0.0009
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90613-OFD-PMT-08	WP246 PM Intake Yard	0	None Detected			0.0009	<0.0009
Burma Road	90613-OFD-BPT-01	WP088A AM Burma Road 01	0	None Detected			0.0009	<0.0009
	90613-OFD-BPT-02	WP088A PM Burma Road 01	2	None Detected			0.0010	<0.0010
			Non-asbestos structures reported include a contribution from non-regulated amphiboles.					
Launch Ramp	90613-OFD-LRP-01	WP009A AM Launch Ramp Parking	3	None Detected			0.0010	<0.0010
	90613-OFD-LRP-02	WP081A AM Launch Ramp Turnaround	1	None Detected			0.0010	<0.0010
	90613-OFD-LRP-03	WP009A PM Launch Ramp Parking	2	Actinolite	1	0	0.0010	0.0010
			Non-asbestos structures reported includes a contribution from non-regulated amphiboles.					
	90613-OFD-LRP-04	WP081A PM Launch Ramp Turnaround	0	None Detected			0.0010	<0.0010

8.0 Perimeter Dust Monitoring Summary

The dust monitoring data is compiled in twelve (12) hour increments for day/night shifts. Information is logged for PM10, PM2.5, and Total Dust.

Particle pollution includes:

- PM10: inhalable particles, with diameters that are generally 10 micrometers and smaller; and
- PM2.5: fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.
- Total inhalable dust is the fraction of airborne material which enters the nose and mouth during breathing and is therefore liable to deposition anywhere in the respiratory tract. The particle sizes of total inhalable dust are up to 100 microns.

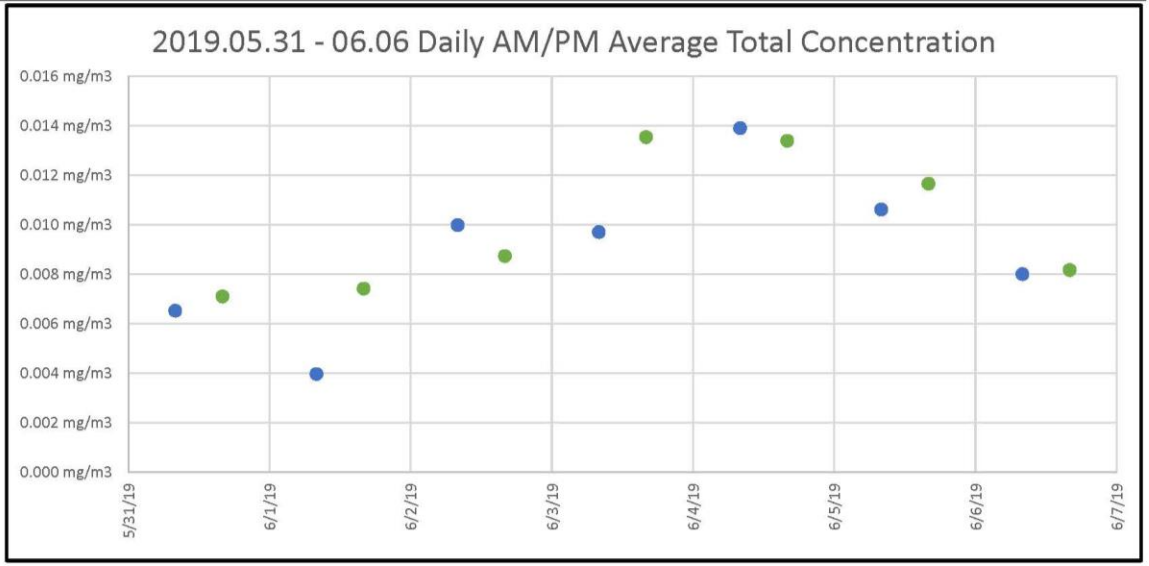
Perimeter dust levels for this time period were unremarkable, with intermittent spikes due to wind gust. There were no citable episodes of “visible emissions” at the work zone perimeter.

Dust results are presented in Appendix B.

Figure 5 WP 246 Intake Yard Dust Daily Average (mg/m^3) 05/31-06/06

WP 246 Intake Yard

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:00 AM
Intake Yd	Dustrak DRX	8533142502	39° 32' 5.44"N, 121°28'29.37"W	Episode Stop:	6/7/19 5:59 AM

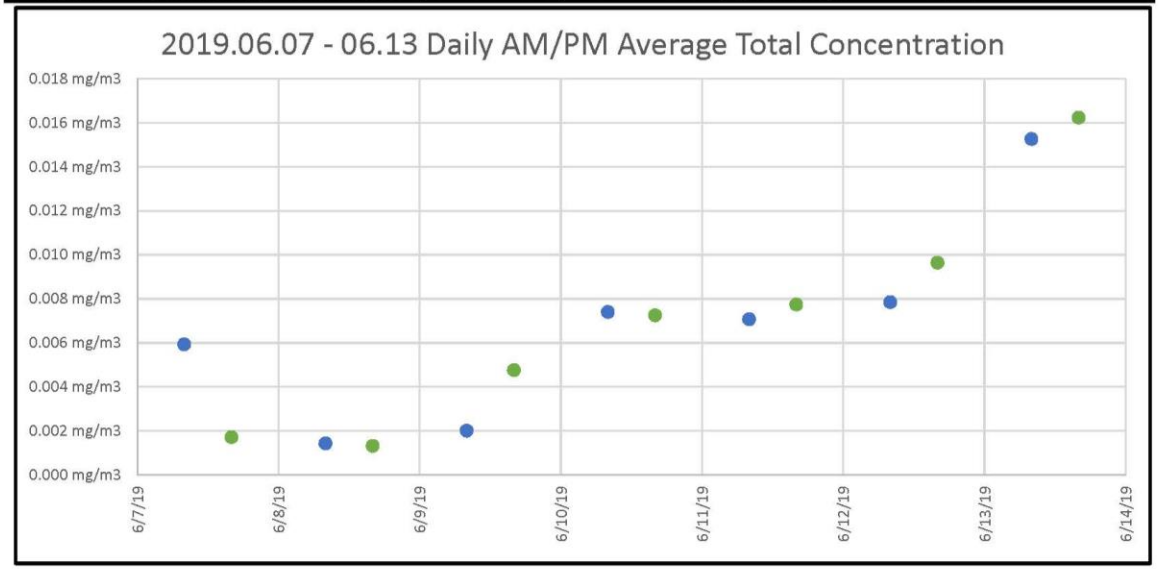


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.007	0.004	0.010	0.010	0.014	0.011	0.008
Night Shift	0.007	0.007	0.009	0.014	0.013	0.012	0.008

Figure 6 WP 246 Intake Yard Dust Daily Average (mg/m^3) 06/07-06/13

WP 246 Intake Yard

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:00 AM
Intake Yd	Dustrak DRX	8533142502	39° 32' 5.44"N, 121°28'29.37"W	Episode Stop:	6/14/19 5:59 AM

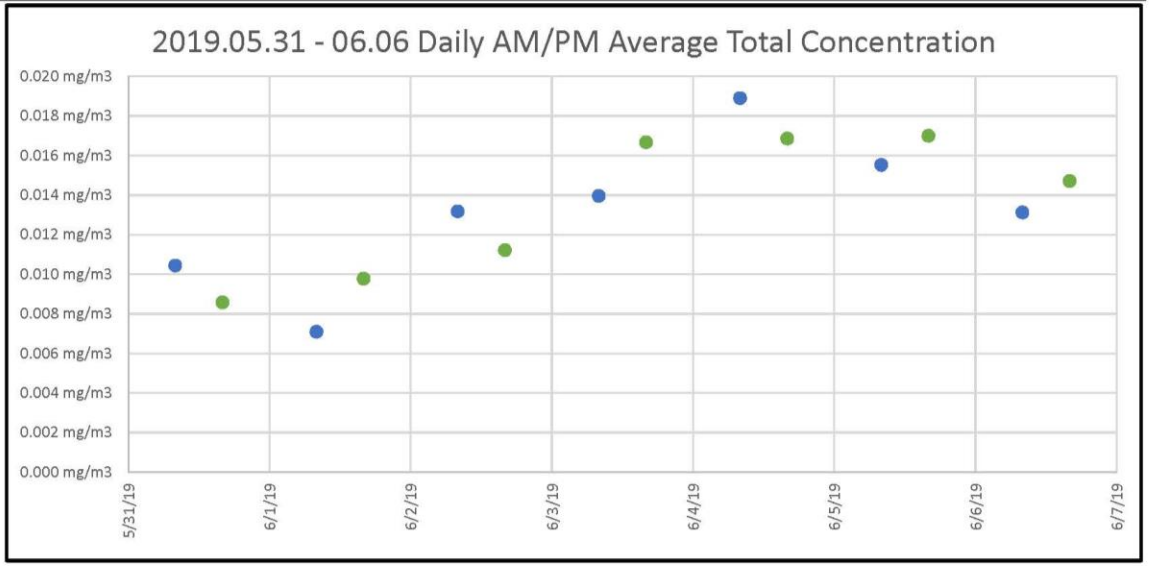


	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.006	0.001	0.002	0.007	0.007	0.008	0.015
Night Shift	0.002	0.001	0.005	0.007	0.008	0.010	0.016

Figure 7 WP 249 Canyon Drive Dust Daily Average (mg/m^3) 05/31-06/06

WP 249 Canyon Drive

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:00 AM
Canyon Dr	Dustrak DRX	8533123508	39°31'40.23"N, 121°28' 52.17"W	Episode Stop:	6/7/19 5:59 AM

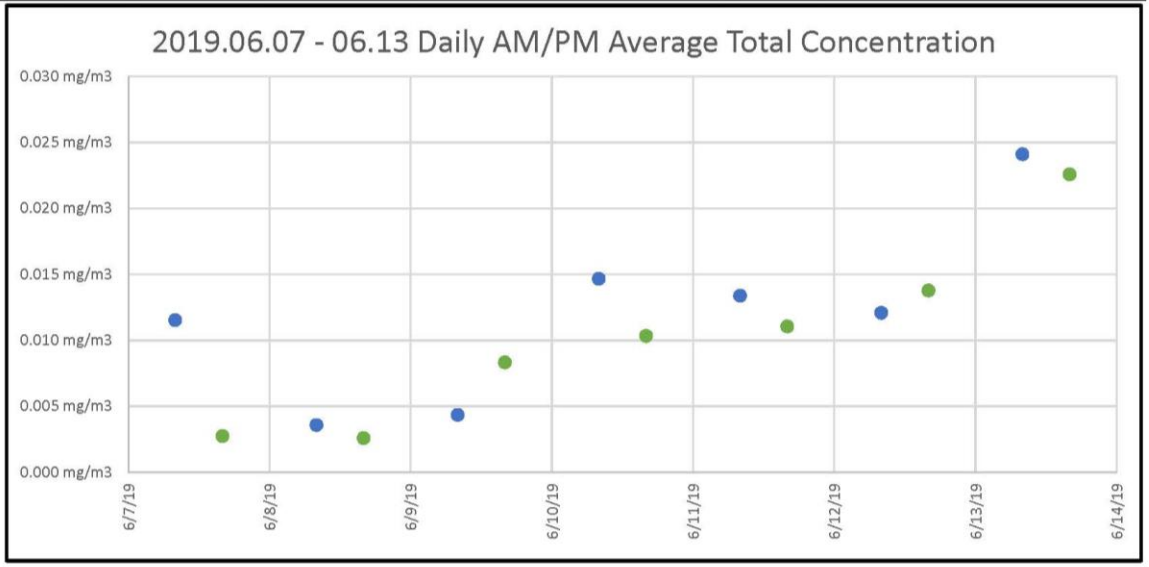


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.010	0.007	0.013	0.014	0.019	0.016	0.013
Night Shift	0.009	0.010	0.011	0.017	0.017	0.017	0.015

Figure 8 WP 249 Canyon Drive Dust Daily Average (mg/m^3) 06/07-06/13

WP 249 Canyon Drive

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:00 AM
Canyon Dr	Dustrak DRX	8533123508	39°31'40.23"N, 121°28' 52.17"W	Episode Stop:	6/14/19 5:59 AM

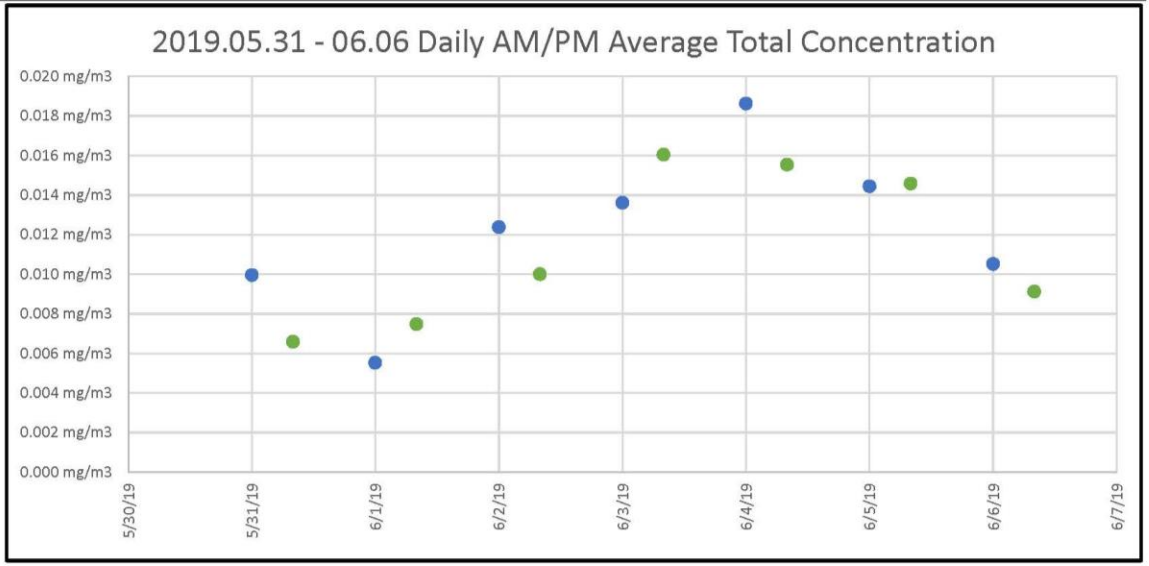


	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.012	0.004	0.004	0.015	0.013	0.012	0.024
Night Shift	0.003	0.003	0.008	0.010	0.011	0.014	0.023

Figure 9 WP 088A Burma Road 01 Daily Dust Average (mg/m^3) 05/31-06/06

WP 088A Burma Road 01

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:01 AM
Burma Rd 01	Dustrak DRX	8533182503	39°32'26.4"N, 121°30'24.7"W	Episode Stop:	6/7/19 5:31 AM

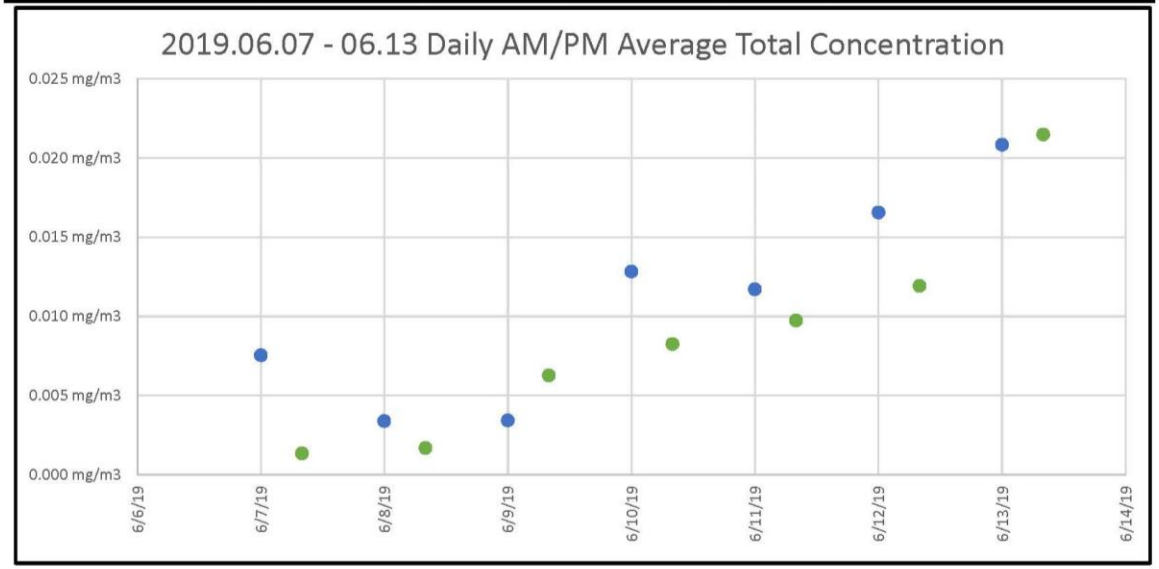


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.010	0.006	0.012	0.014	0.019	0.014	0.011
Night Shift	0.007	0.007	0.010	0.016	0.016	0.015	0.009

Figure 10 WP 088A Burma Road 01 Daily Dust Average (mg/m^3) 06/07-06/13

WP 088A Burma Road 01

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:01 AM
Burma Rd 01	Dustrak DRX	8533182503	39°32'26.4"N, 121°30'24.7"W	Episode Stop:	6/14/19 5:30 AM

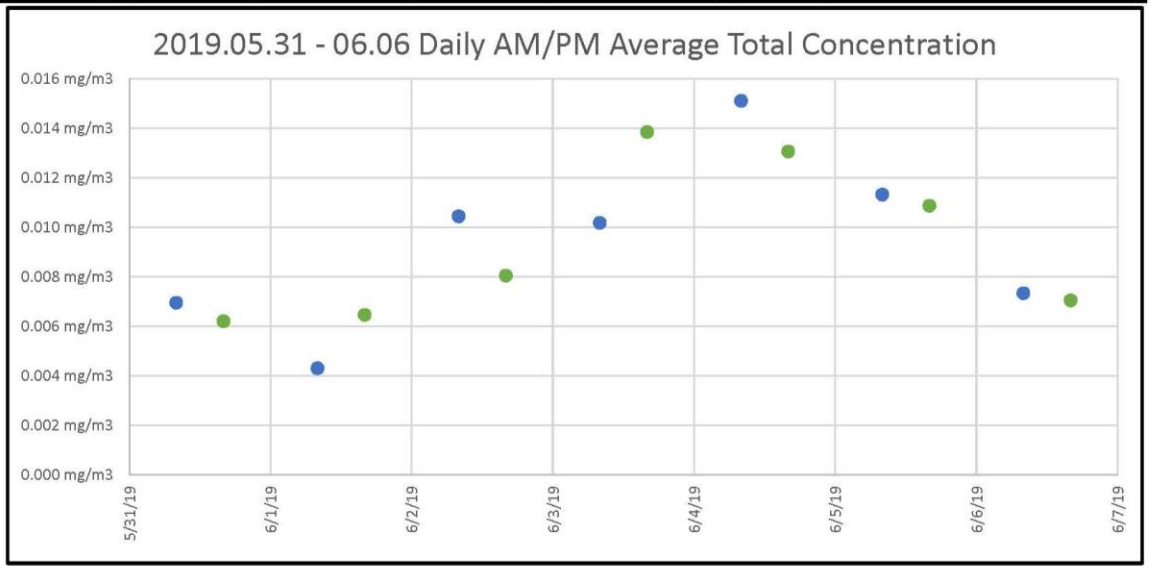


	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.008	0.003	0.003	0.013	0.012	0.017	0.021
Night Shift	0.001	0.002	0.006	0.008	0.010	0.012	0.021

Figure 11 WP 009A Launch Ramp Parking Daily Dust Average (mg/m³) 05/31-06/06

WP 009A Launch Ramp Parking

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:00 AM
LR Parking	Dustrak DRX	8533173905	39°32'47.34"N, 121°29'33.10"W	Episode Stop:	6/7/19 5:59 AM

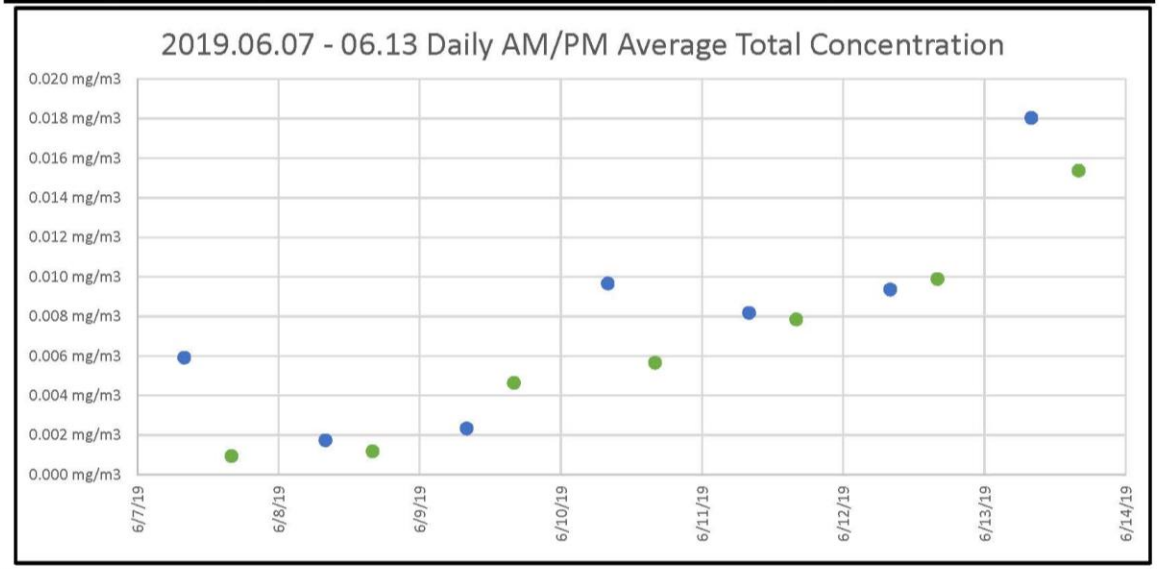


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.007	0.004	0.010	0.010	0.015	0.011	0.007
Night Shift	0.006	0.006	0.008	0.014	0.013	0.011	0.007

Figure 12 WP 009A Launch Ramp Parking Daily Dust Average (mg/m³) 06/07-06/13

WP 009A Launch Ramp Parking

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:00 AM
LR Parking	Dustrak DRX	8533173905	39°32'47.34"N, 121°29'33.10"W	Episode Stop:	6/14/19 5:59 AM

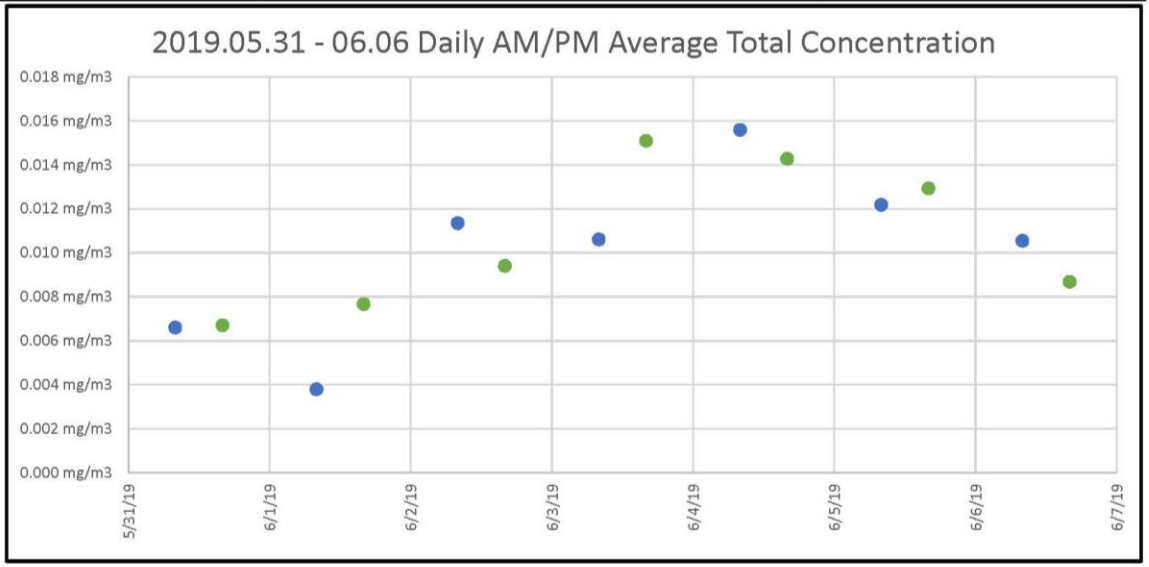


	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.006	0.002	0.002	0.010	0.008	0.009	0.018
Night Shift	0.001	0.001	0.005	0.006	0.008	0.010	0.015

Figure 13 WP 081A Launch Ramp Turnaround Daily Dust Average (mg/m^3) 05/31-06/06

WP 081A Launch Ramp Turnaround

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:00 AM
LR Turnaround	Dustrak DRX	8533172301	39°32'51.01"N, 121°29'53.76"W	Episode Stop:	6/7/19 5:59 AM

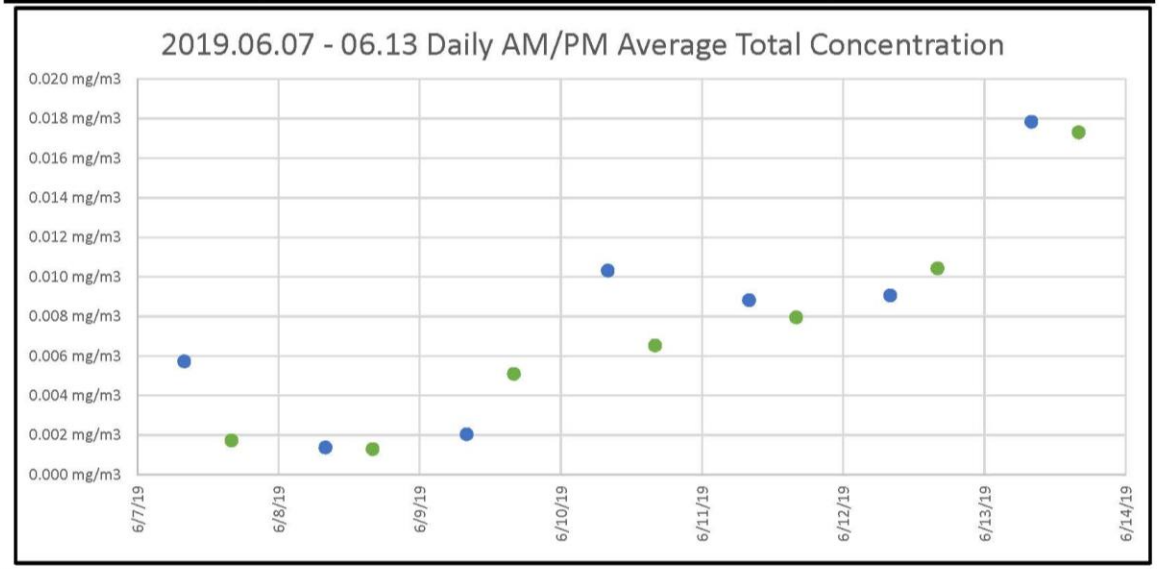


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.007	0.004	0.011	0.011	0.016	0.012	0.011
Night Shift	0.007	0.008	0.009	0.015	0.014	0.013	0.009

Figure 14 WP 081A Launch Ramp Turnaround Daily Dust Average (mg/m^3) 06/07-06/13

WP 081A Launch Ramp Turnaround

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:00 AM
LR Turnaround	Dustrak DRX	8533172301	39°32'51.01"N, 121°29'53.76"W	Episode Stop:	6/14/19 5:59 AM

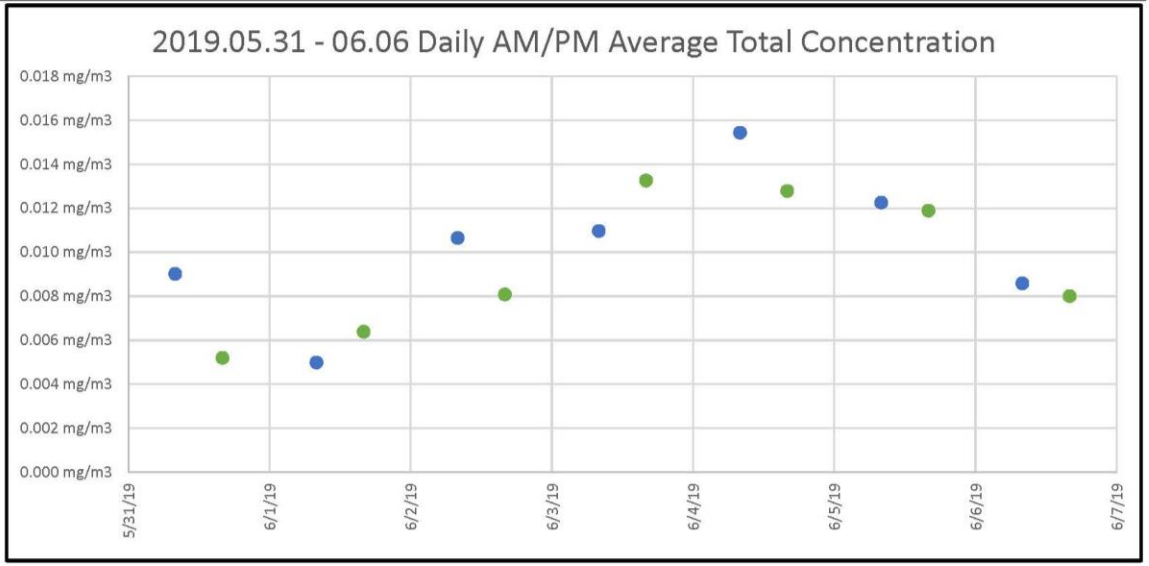


	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.006	0.001	0.002	0.010	0.009	0.009	0.018
Night Shift	0.002	0.001	0.005	0.007	0.008	0.010	0.017

Figure 15 WP 083A Dan Beebe Trail Daily Dust Average (mg/m^3) 05/31-06/06

WP 083A Dan Beebe Trail

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:00 AM
Beebe Trail	Dustrak DRX	8533103707	39°31'55.35"N , 121°30'11.70"W	Episode Stop:	6/7/19 5:59 AM

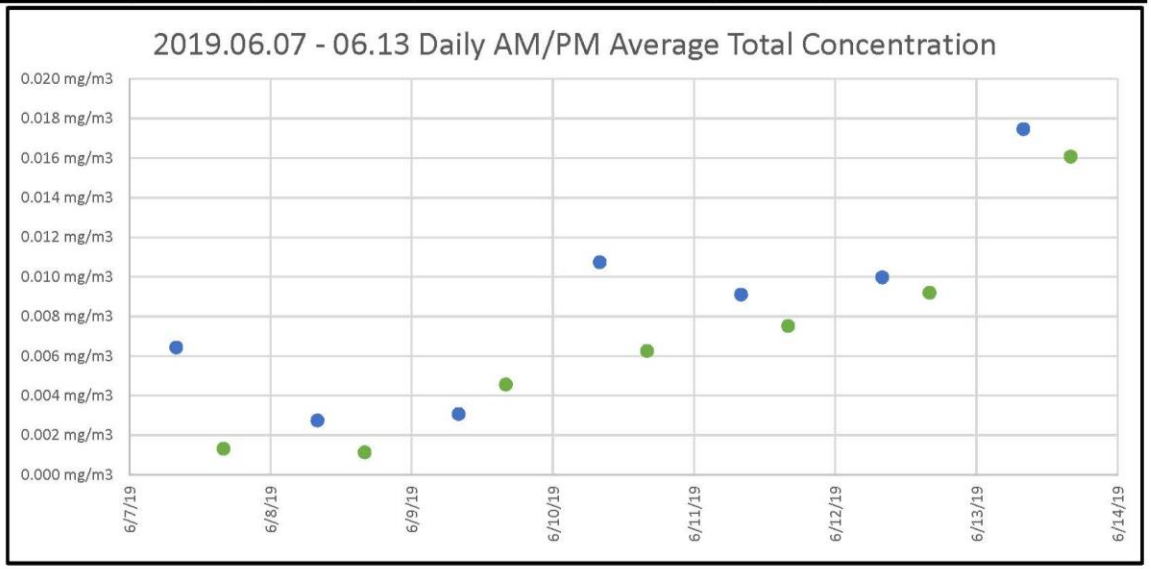


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.009	0.005	0.011	0.011	0.015	0.012	0.009
Night Shift	0.005	0.006	0.008	0.013	0.013	0.012	0.008

Figure 16 WP 083A Dan Beebe Trail Daily Dust Average (mg/m^3) 06/07-06/13

WP 083A Dan Beebe Trail

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:00 AM
Beebe Trail	Dustrak DRX	8533103707	39°31'55.35"N , 121°30'11.70"W	Episode Stop:	6/14/19 5:59 AM

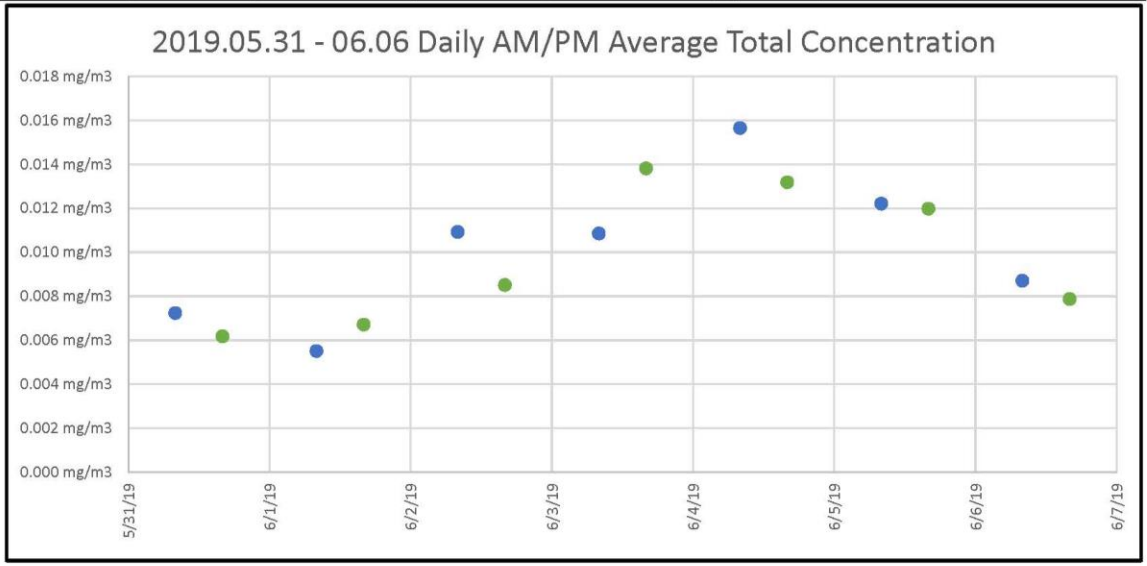


	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.006	0.003	0.003	0.011	0.009	0.010	0.017
Night Shift	0.001	0.001	0.005	0.006	0.008	0.009	0.016

Figure 17 WP 089A SW Upper Overlook Daily Dust Average (mg/m^3) 05/31-06/06

WP 089A SW Upper Overlook

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	5/31/19 6:00 AM
SW Overlook	Dustrak DRX	8533151202	39°31'47.5"N, 121°28'42.3"W	Episode Stop:	6/7/19 5:59 AM

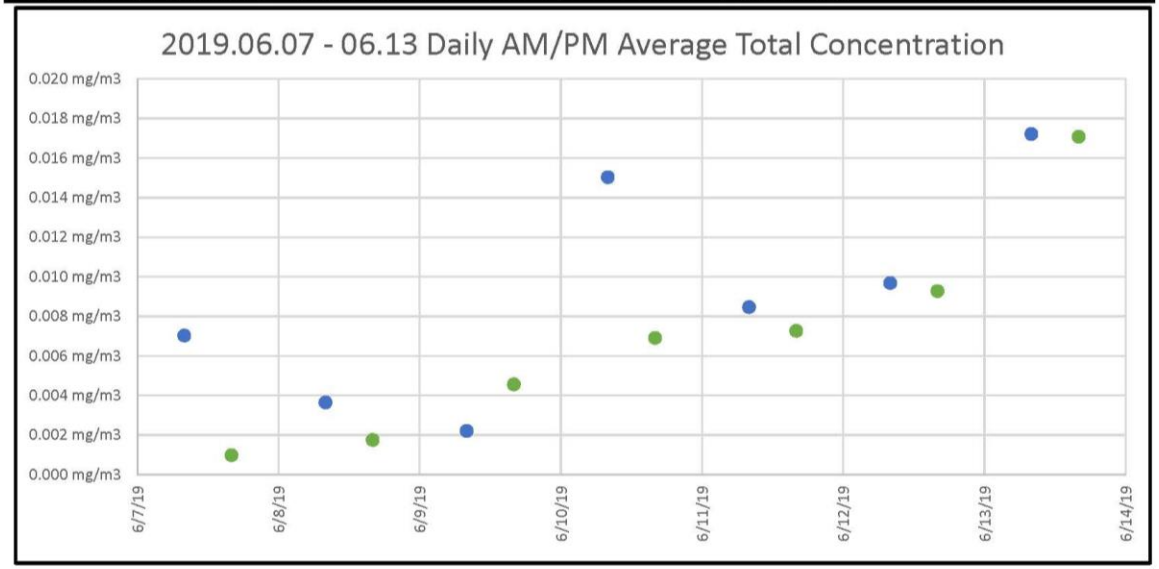


	5/31/19	6/1/19	6/2/19	6/3/19	6/4/19	6/5/19	6/6/19
Day Shift	0.007	0.006	0.011	0.011	0.016	0.012	0.009
Night Shift	0.006	0.007	0.009	0.014	0.013	0.012	0.008

Figure 18 WP 089A SW Upper Overlook Daily Dust Average (mg/m^3) 06/07-06/13

WP 089A SW Upper Overlook

INSTRUMENT				DATA PROPERTIES	
Location:	Model:	Instrument S/N:	GPS Coordinates:	Episode Start:	6/7/19 6:00 AM
SW Overlook	Dustrak DRX	8533151202	39°31'47.5"N, 121°28'42.3"W	Episode Stop:	6/14/19 5:59 AM



	6/7/19	6/8/19	6/9/19	6/10/19	6/11/19	6/12/19	6/13/19
Day Shift	0.007	0.004	0.002	0.015	0.008	0.010	0.017
Night Shift	0.001	0.002	0.005	0.007	0.007	0.009	0.017

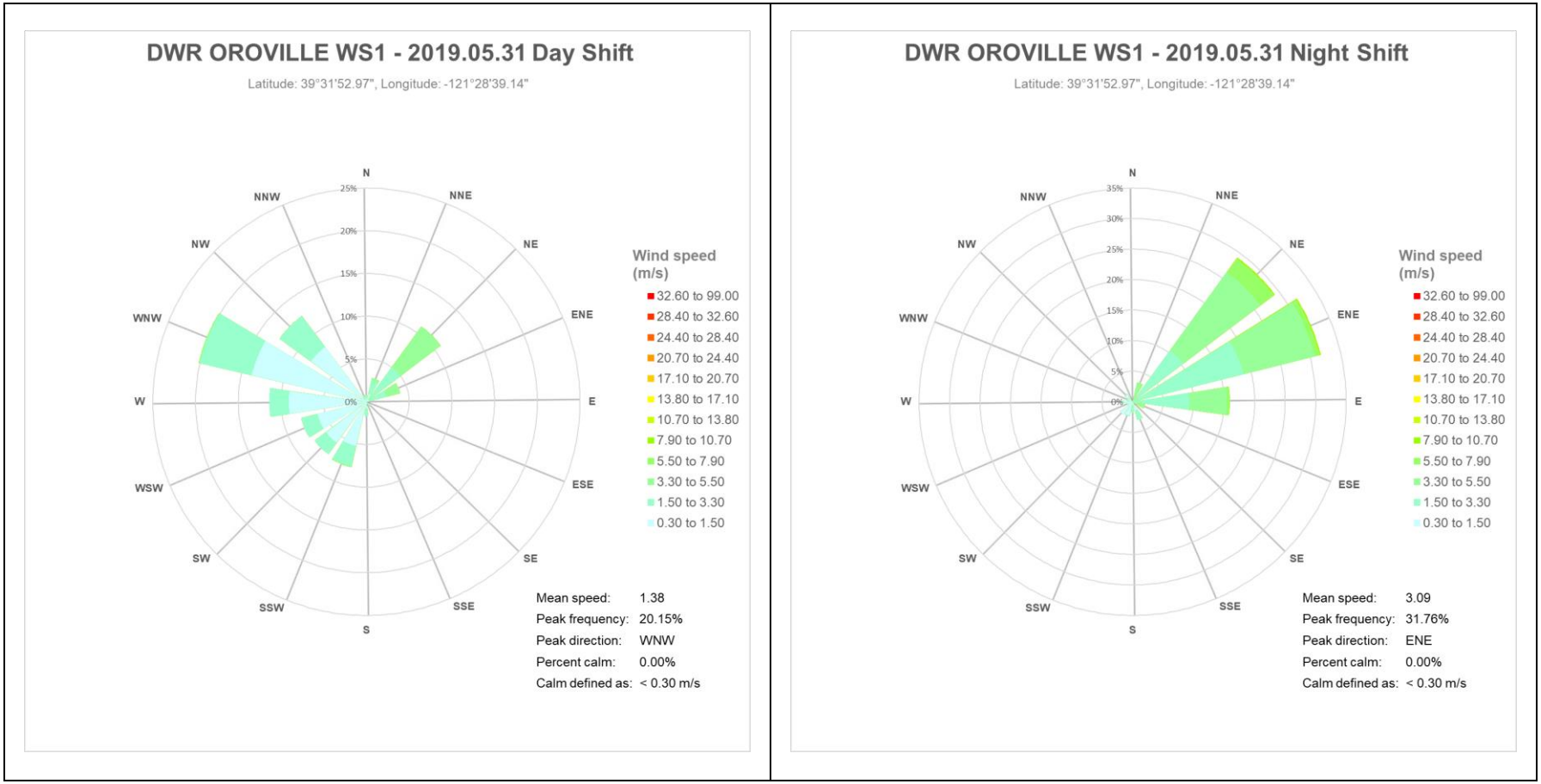
9.0 Meteorological Data & Daily Wind Rose

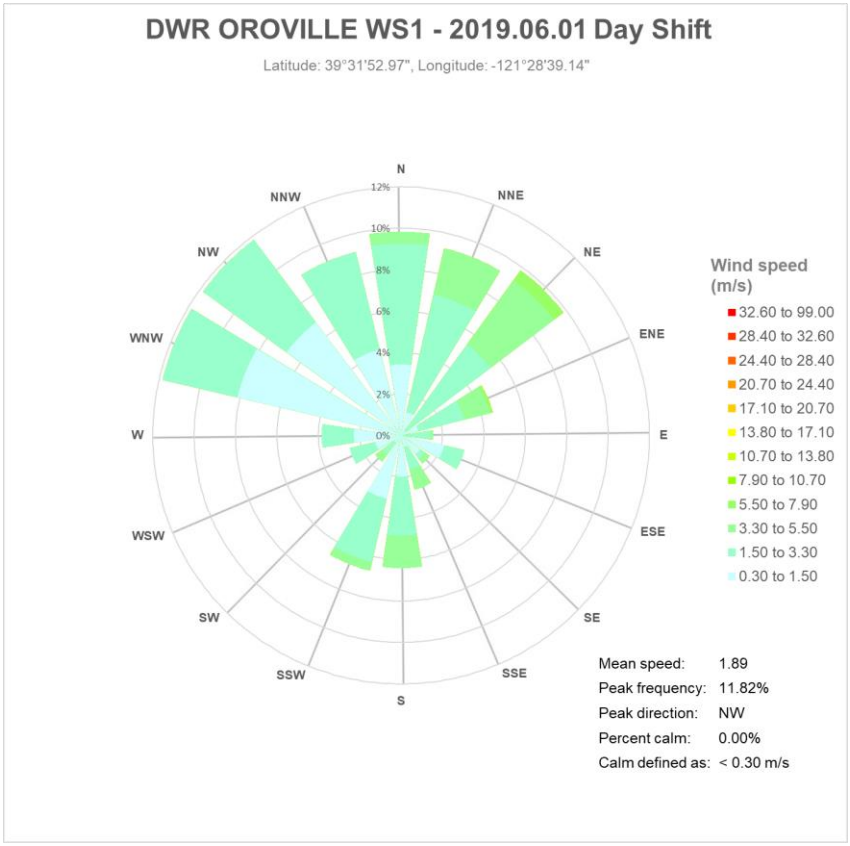
WS1 Weather Station is a Davis Instruments Vantage Pro2. This station is at WP045A 39˚31’52.97” N, 121˚28’39.14” W at the Upper Overlook area.

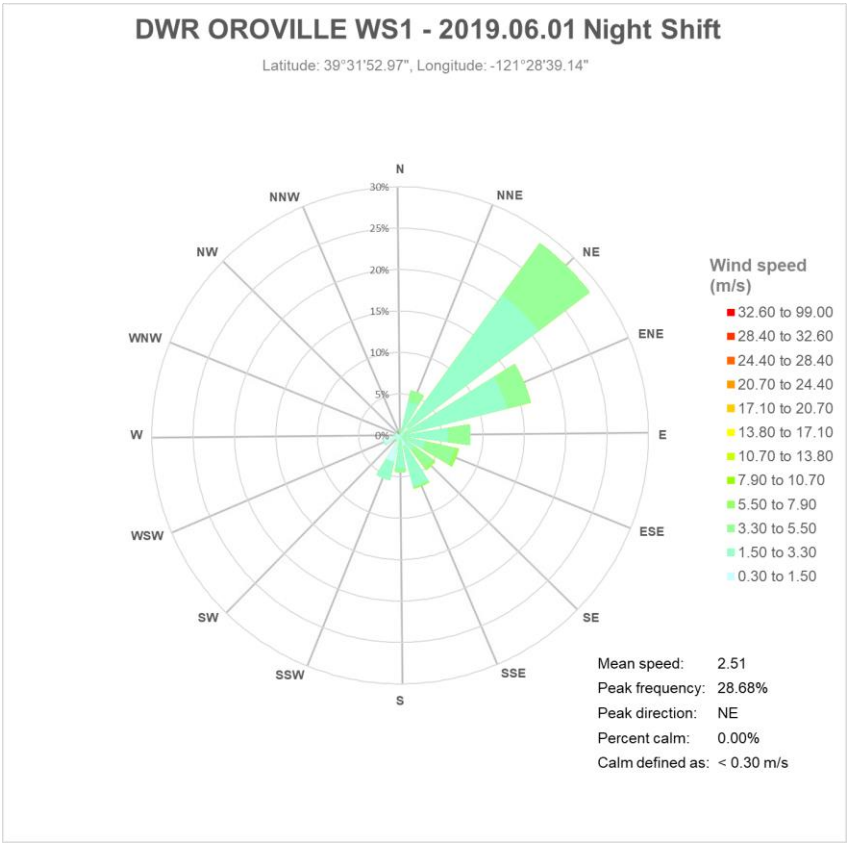
WS2 Weather Station is a Davis Instruments Vantage Pro2. This station was located at WP085A 39°31’55.35” N, 121°30’11.70” W Dan Beebe Trail.

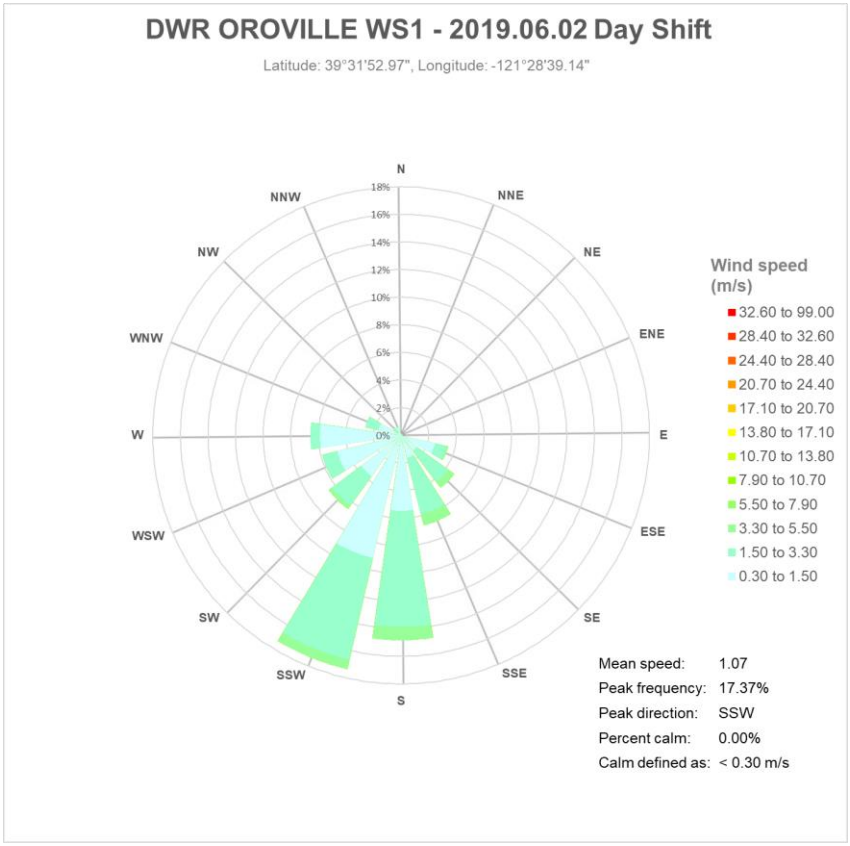
The standard Vantage Pro 2 station consists of three main components: the indoor console on which all the weather readings are displayed; the anemometer for measuring wind speed and direction; and an assembly known as the Integrated Sensor Suite (ISS for short) that contains all the other outside sensors, such as those for temperature, humidity, rainfall etc.

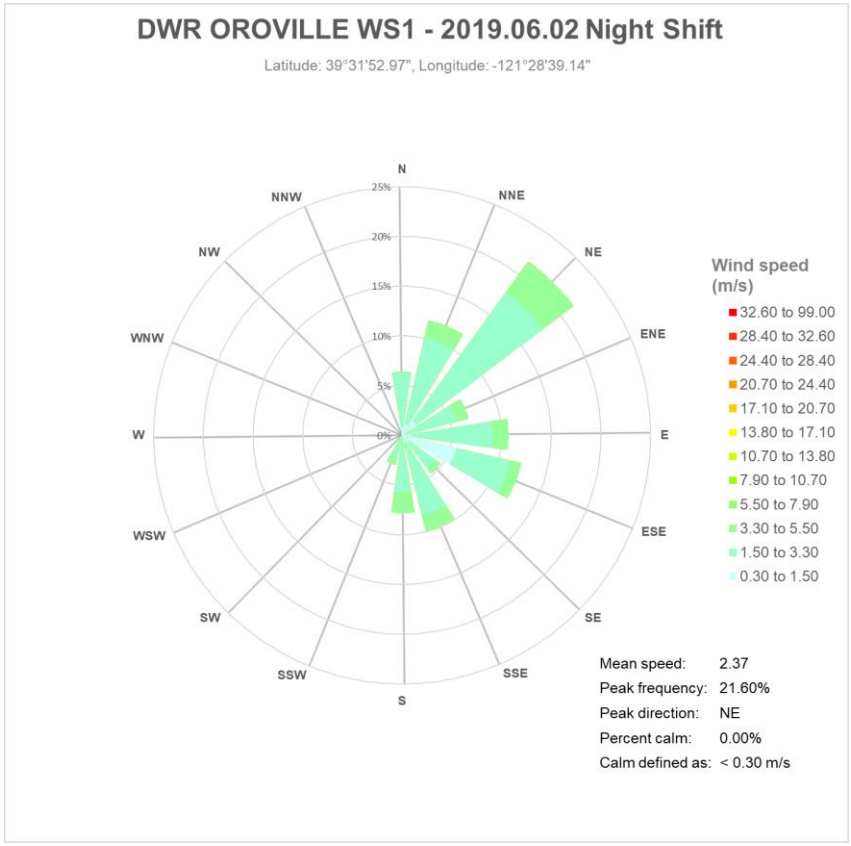
Figure 19 Wind Rose – Day & Night Shift Upper Overlook

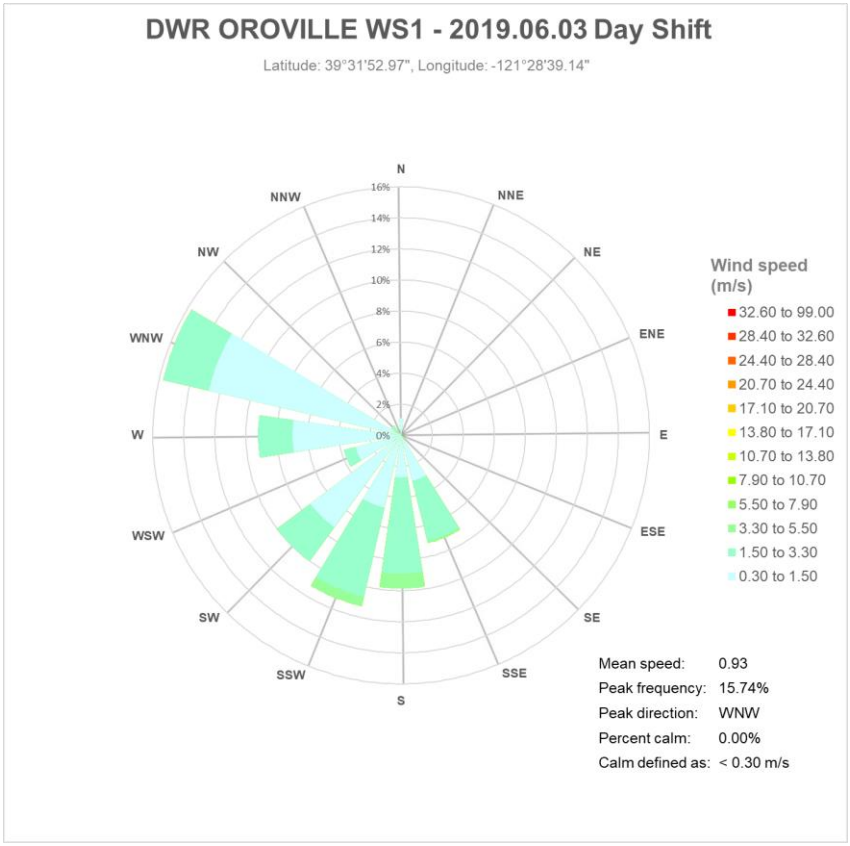


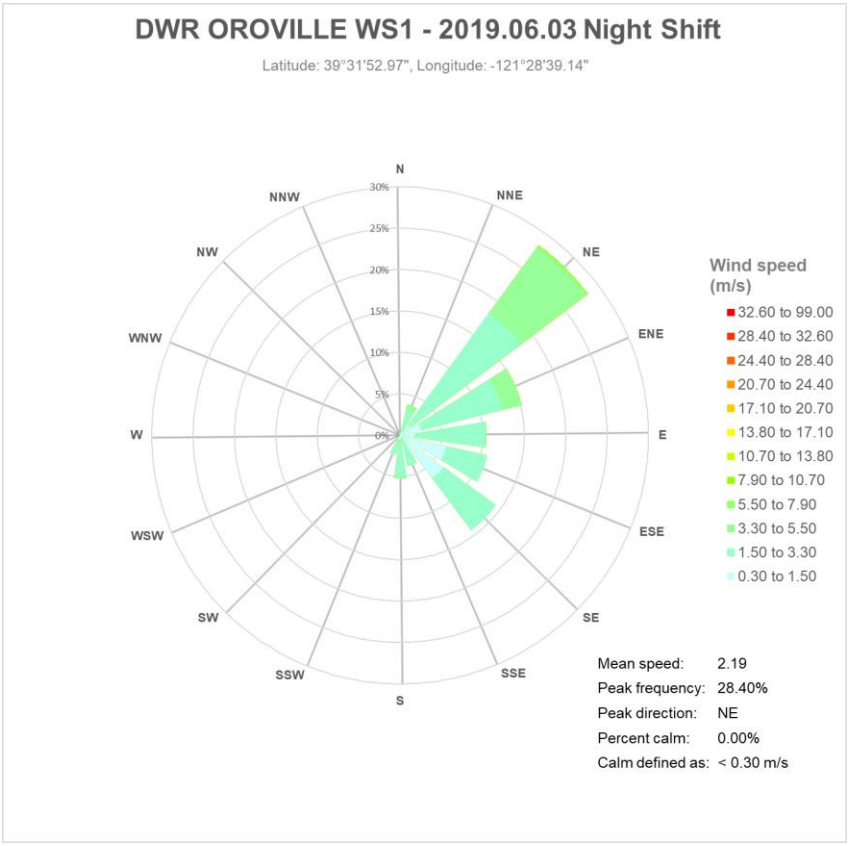

DWR OROVILLE WS1 - 2019.06.01 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.89
Peak frequency: 11.82%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

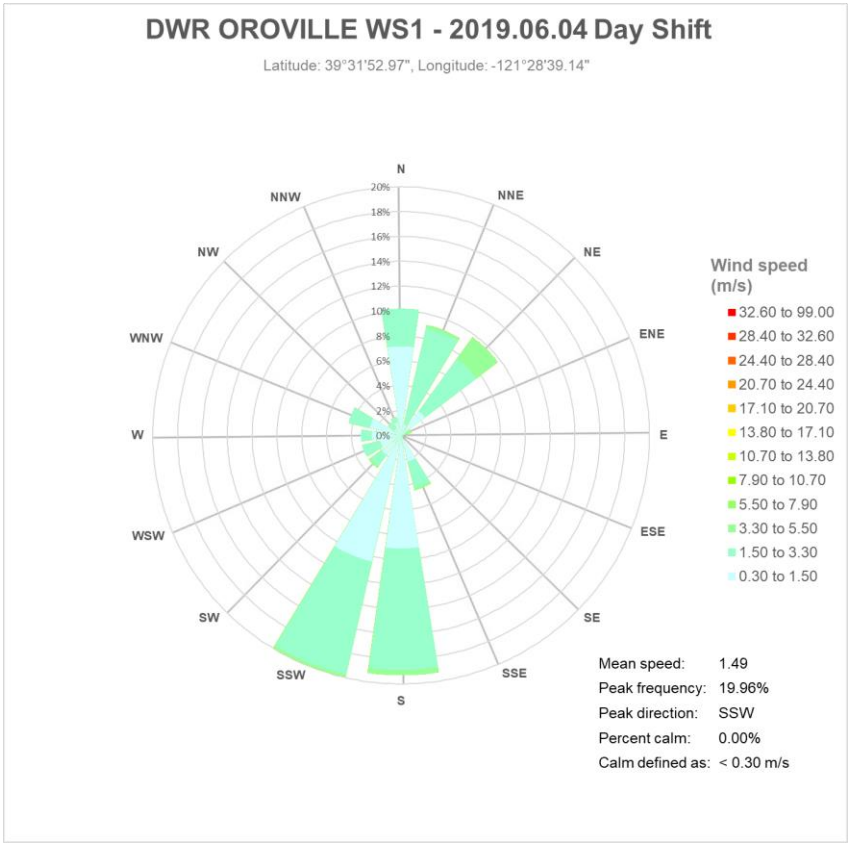

DWR OROVILLE WS1 - 2019.06.01 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.51
Peak frequency: 28.68%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

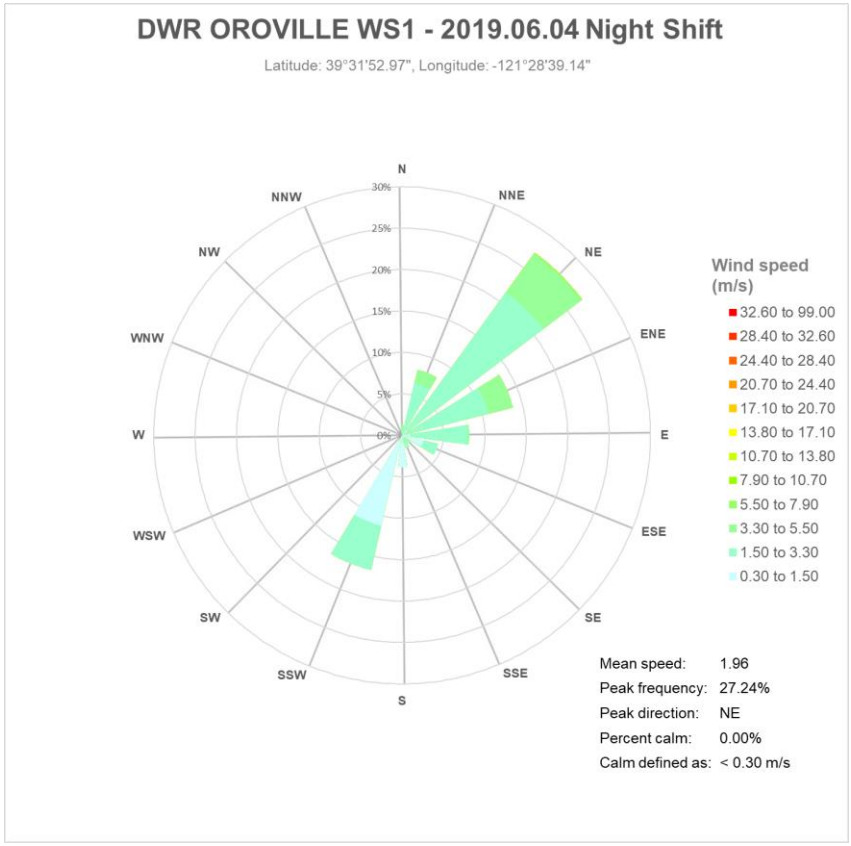

DWR OROVILLE WS1 - 2019.06.02 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.07
Peak frequency: 17.37%
Peak direction: SSW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

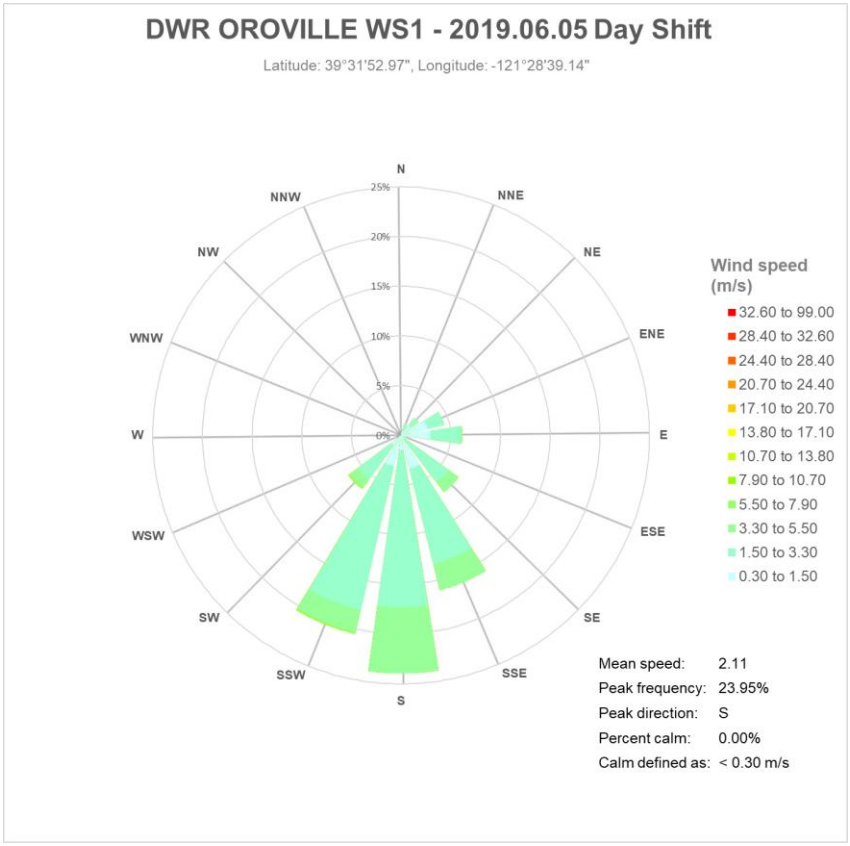

DWR OROVILLE WS1 - 2019.06.02 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.37
Peak frequency: 21.60%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

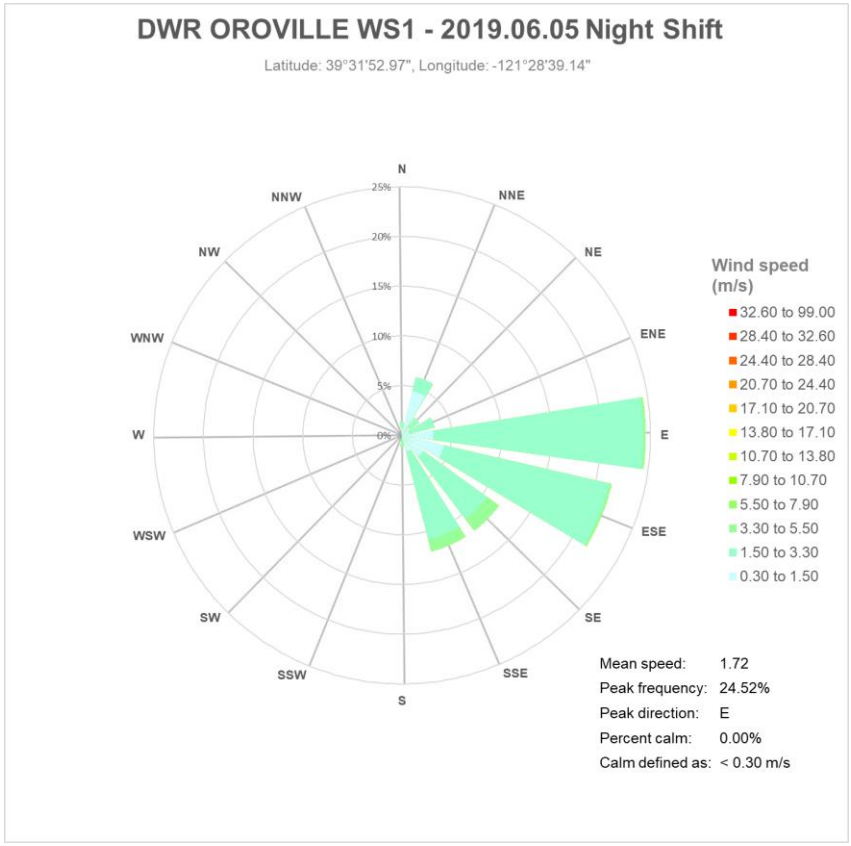

DWR OROVILLE WS1 - 2019.06.03 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.93
Peak frequency: 15.74%
Peak direction: WNW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

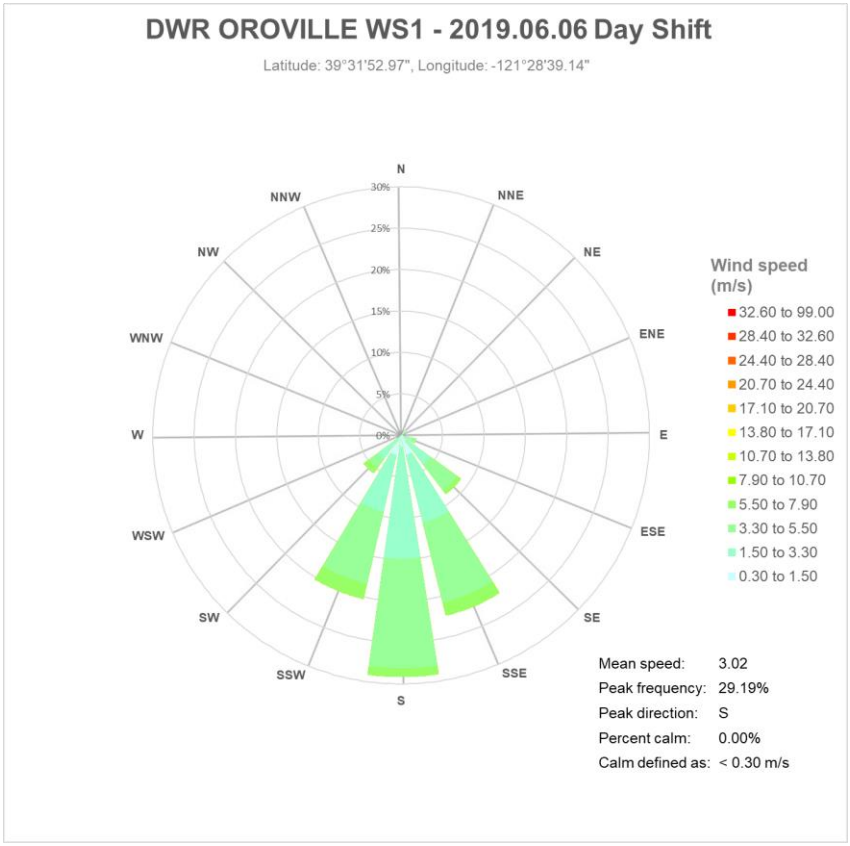

DWR OROVILLE WS1 - 2019.06.03 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.19
Peak frequency: 28.40%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

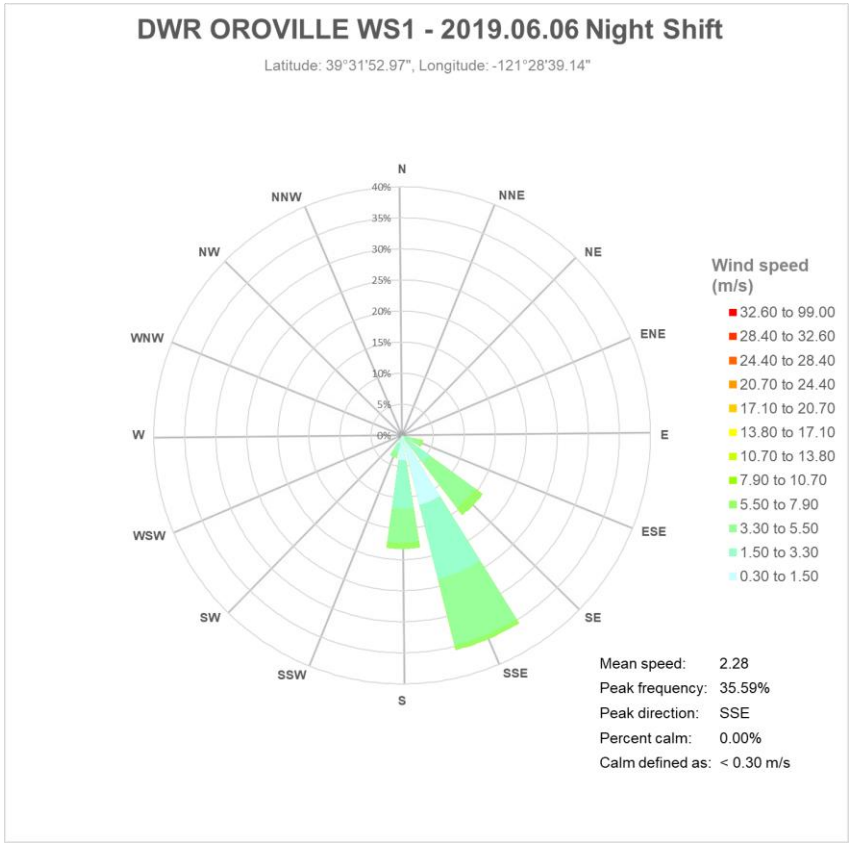

DWR OROVILLE WS1 - 2019.06.04 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.49
Peak frequency: 19.96%
Peak direction: SSW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

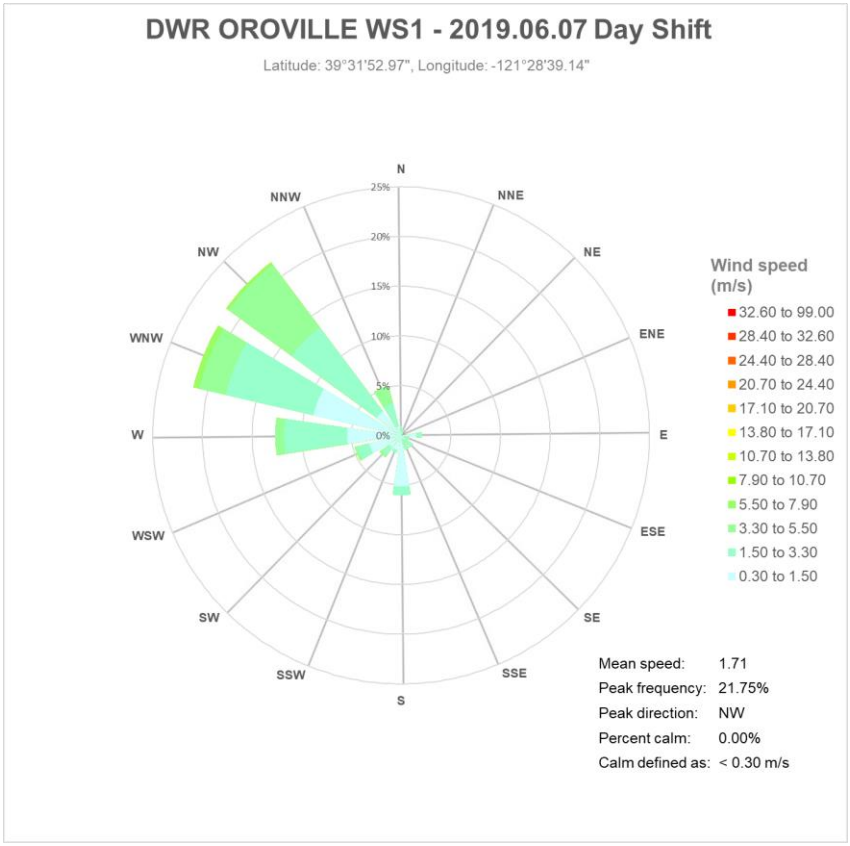

DWR OROVILLE WS1 - 2019.06.04 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.96
Peak frequency: 27.24%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

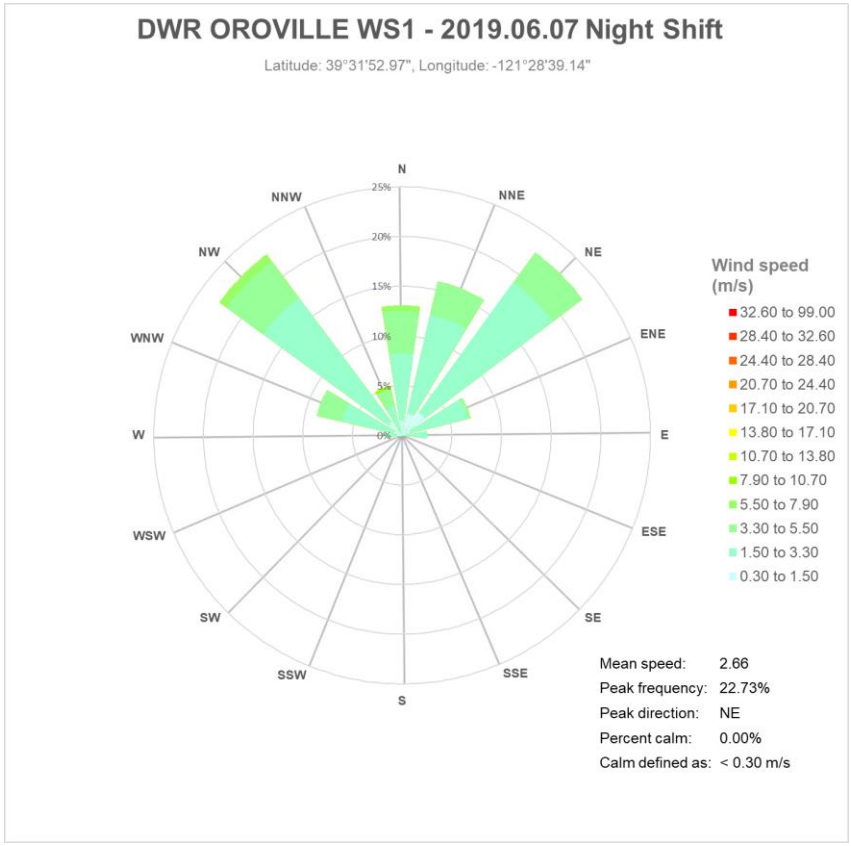

DWR OROVILLE WS1 - 2019.06.05 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.11
Peak frequency: 23.95%
Peak direction: S
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

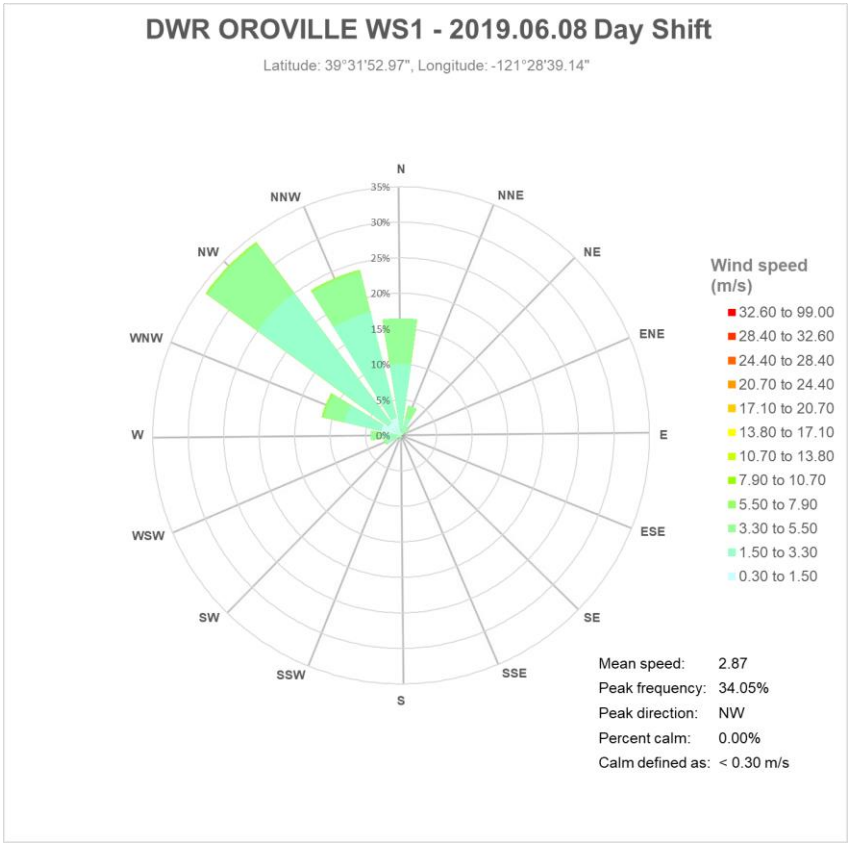

DWR OROVILLE WS1 - 2019.06.05 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.72
Peak frequency: 24.52%
Peak direction: E
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

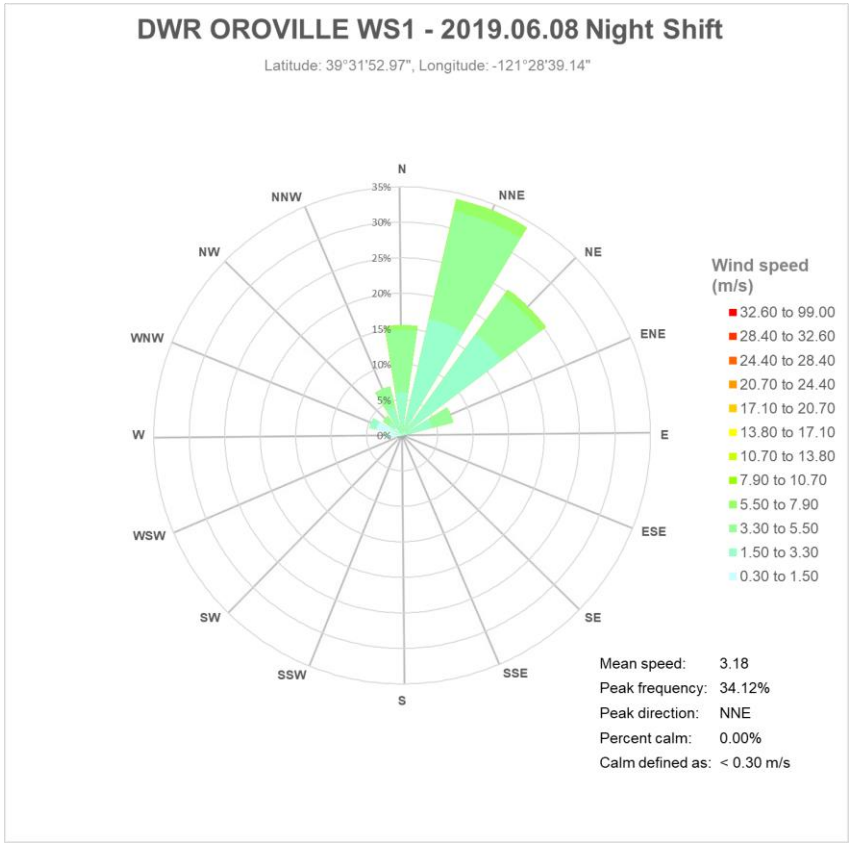

DWR OROVILLE WS1 - 2019.06.06 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.02
Peak frequency: 29.19%
Peak direction: S
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

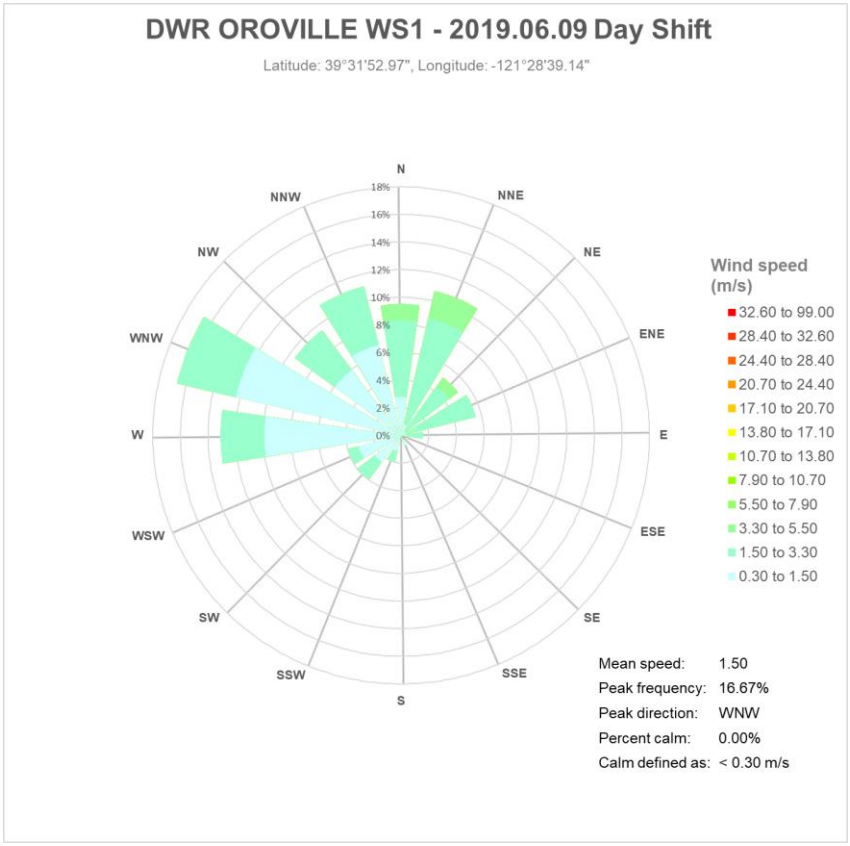

DWR OROVILLE WS1 - 2019.06.06 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
40%
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.28
Peak frequency: 35.59%
Peak direction: SSE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

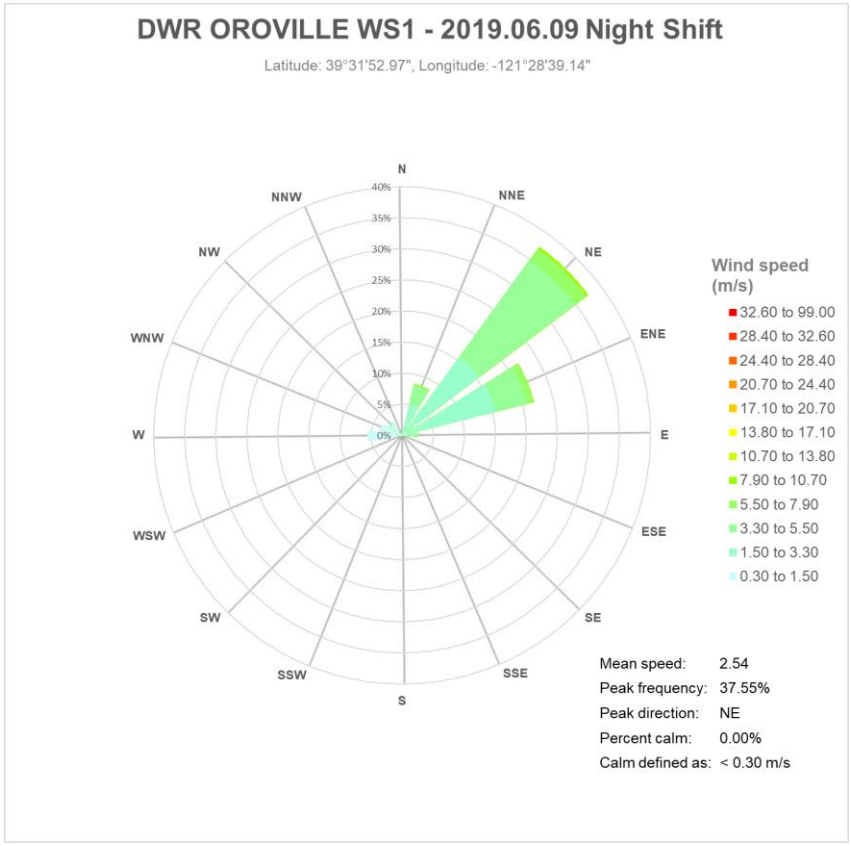

DWR OROVILLE WS1 - 2019.06.07 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.71
Peak frequency: 21.75%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

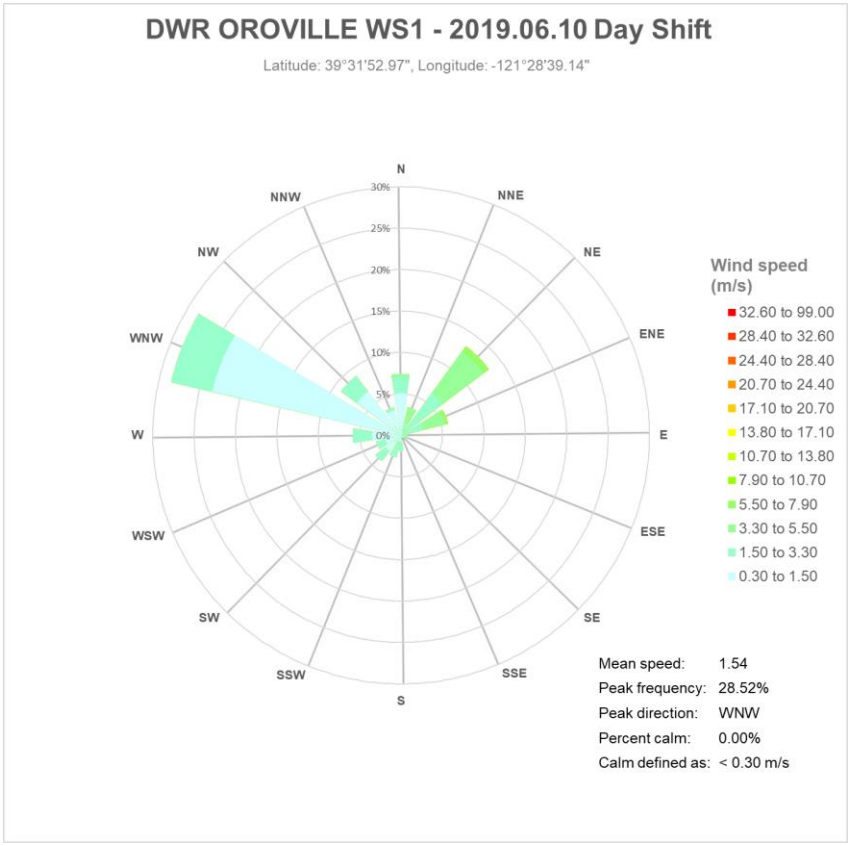

DWR OROVILLE WS1 - 2019.06.07 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.66
Peak frequency: 22.73%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

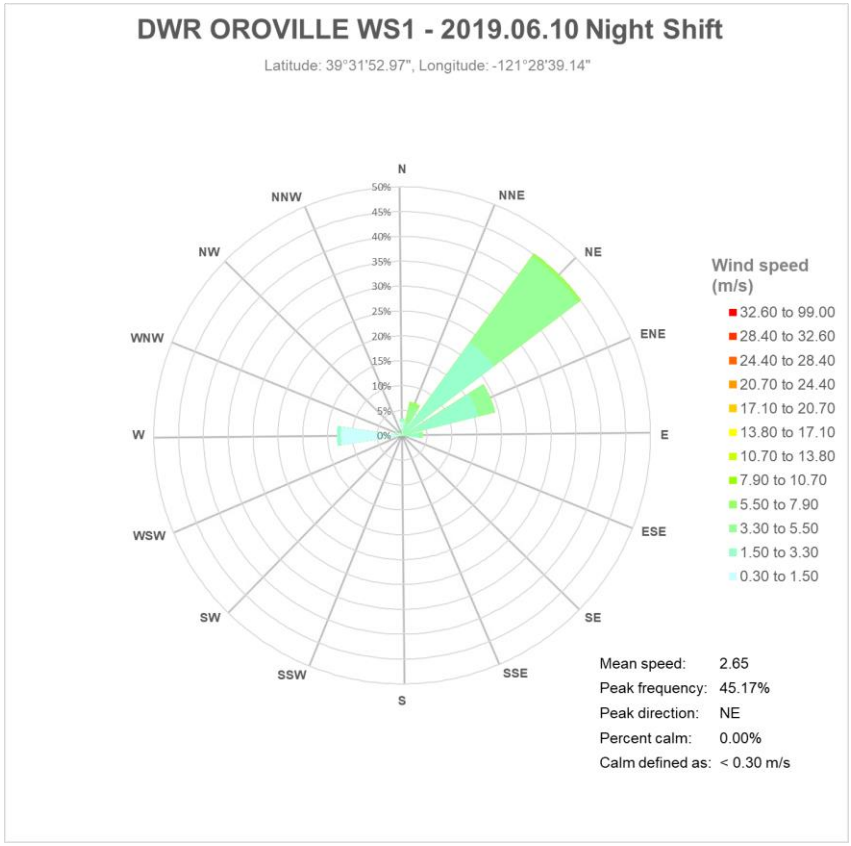

DWR OROVILLE WS1 - 2019.06.08 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.87
Peak frequency: 34.05%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

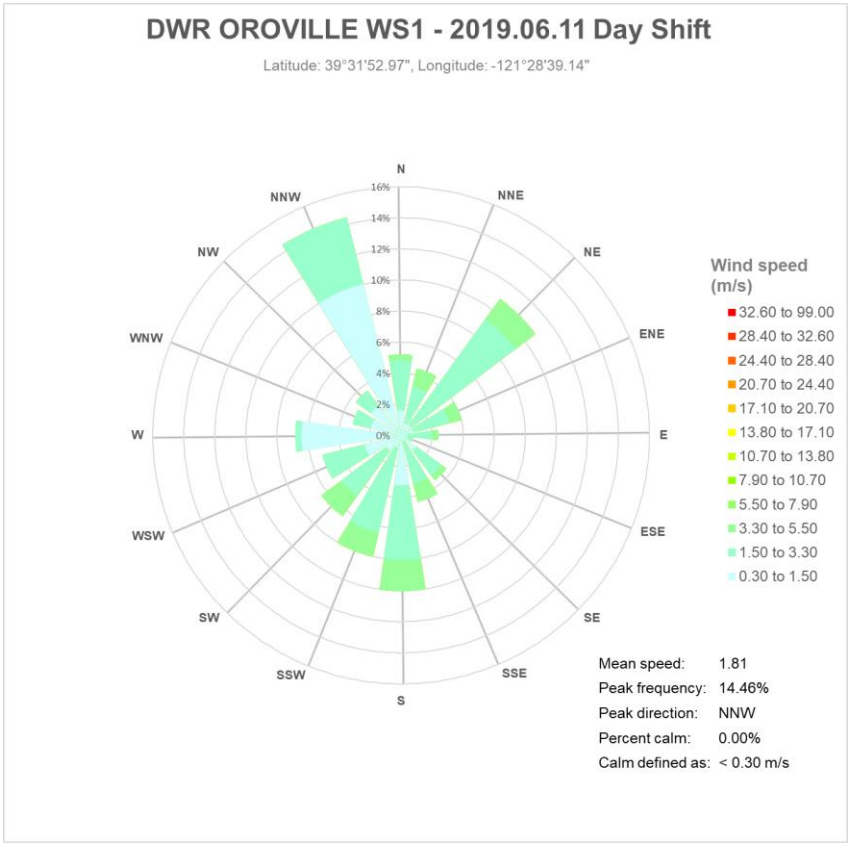

DWR OROVILLE WS1 - 2019.06.08 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.18
Peak frequency: 34.12%
Peak direction: NNE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

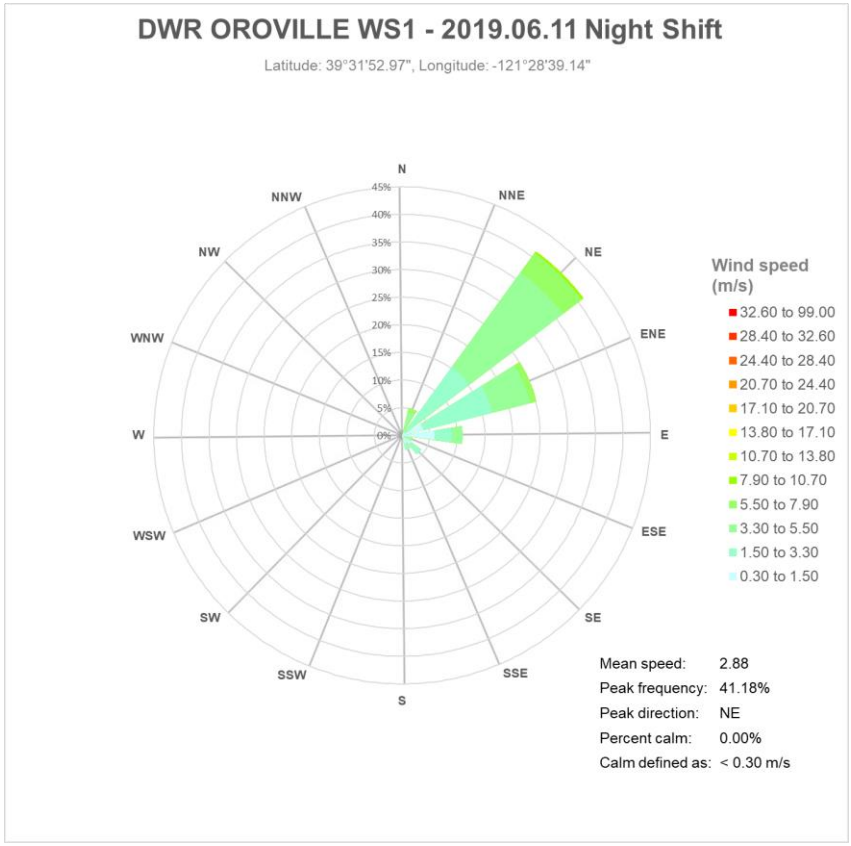

DWR OROVILLE WS1 - 2019.06.09 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.50
Peak frequency: 16.67%
Peak direction: WNW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

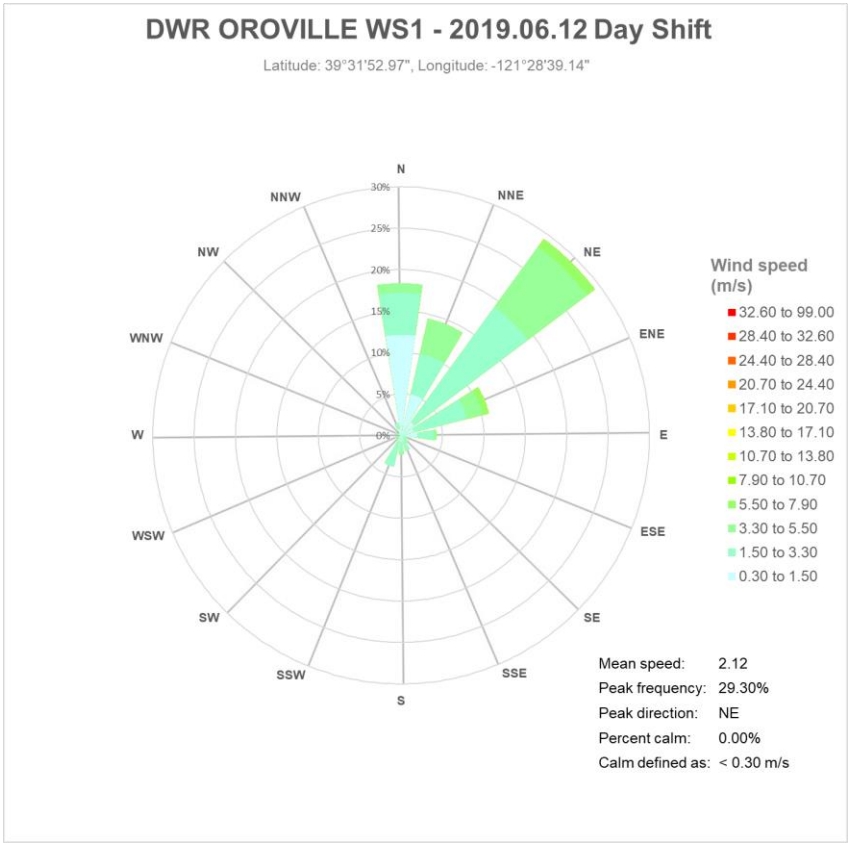

DWR OROVILLE WS1 - 2019.06.09 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
40%
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.54
Peak frequency: 37.55%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

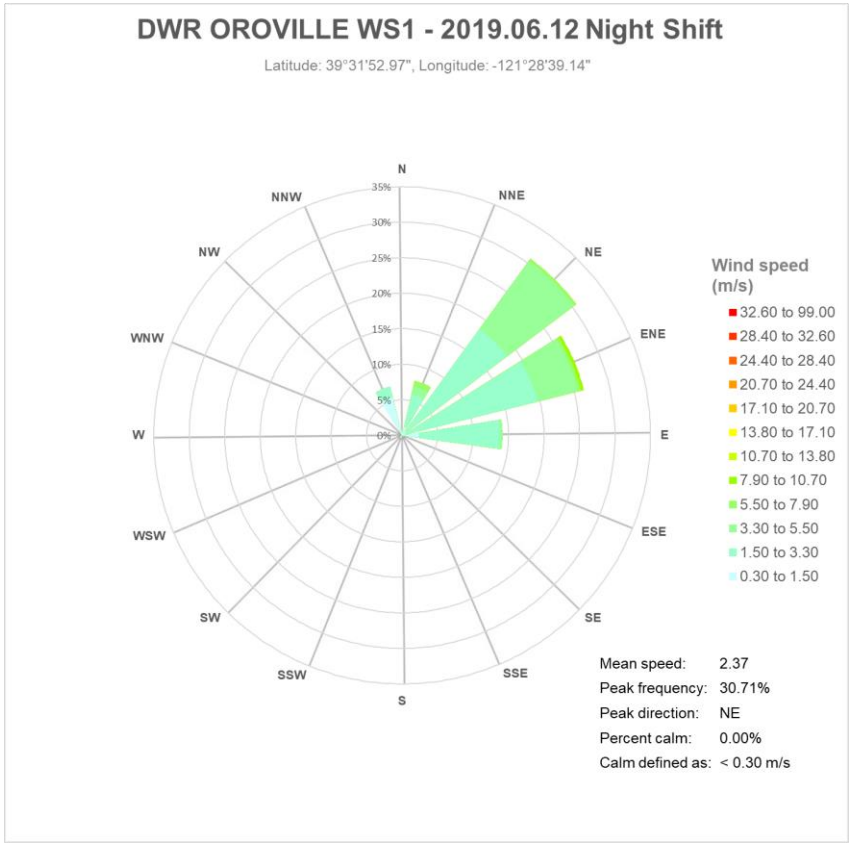

DWR OROVILLE WS1 - 2019.06.10 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.54
Peak frequency: 28.52%
Peak direction: WNW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

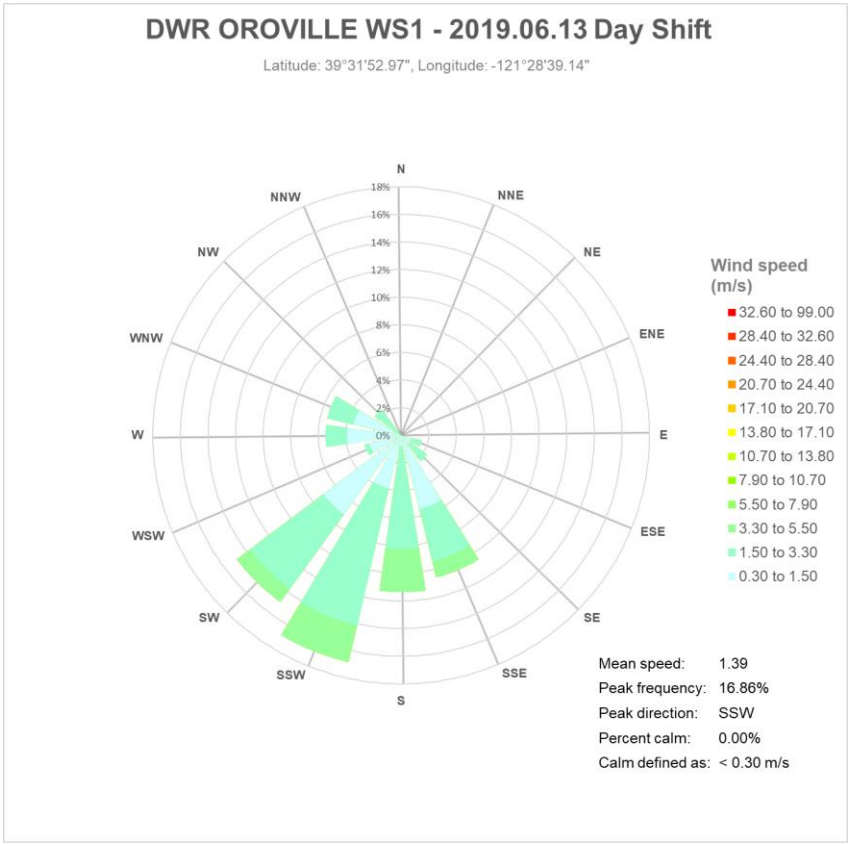

DWR OROVILLE WS1 - 2019.06.10 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.65
Peak frequency: 45.17%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS1 - 2019.06.11 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.81
Peak frequency: 14.46%
Peak direction: NNW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS1 - 2019.06.11 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.88
Peak frequency: 41.18%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS1 - 2019.06.12 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.12
Peak frequency: 29.30%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS1 - 2019.06.12 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.37
Peak frequency: 30.71%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS1 - 2019.06.13 Day Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.39
Peak frequency: 16.86%
Peak direction: SSW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

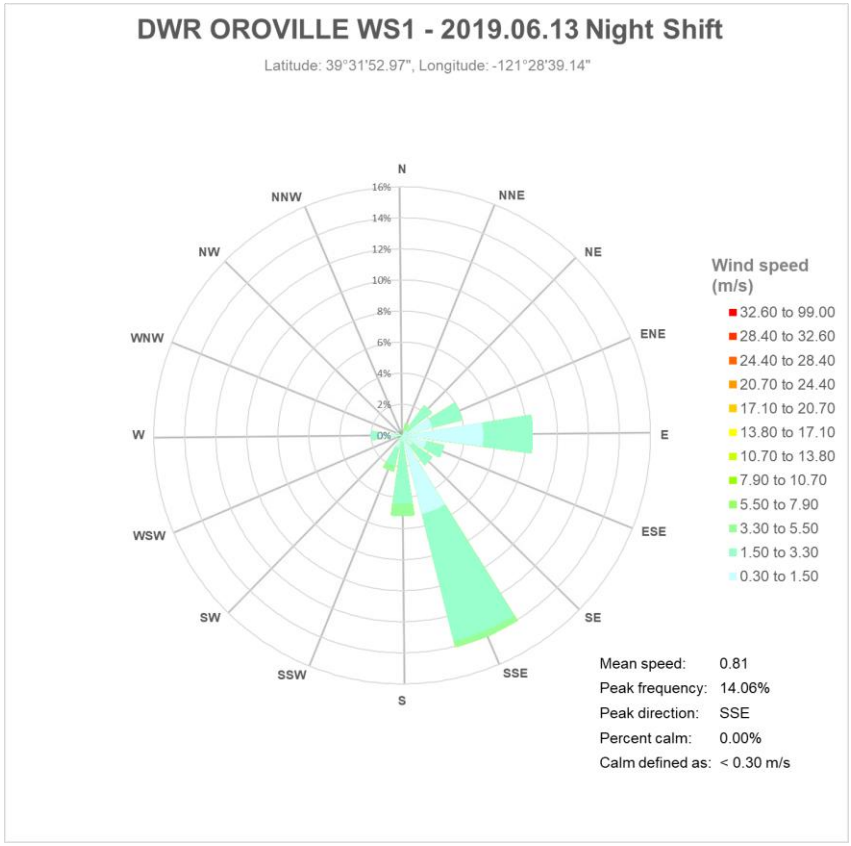
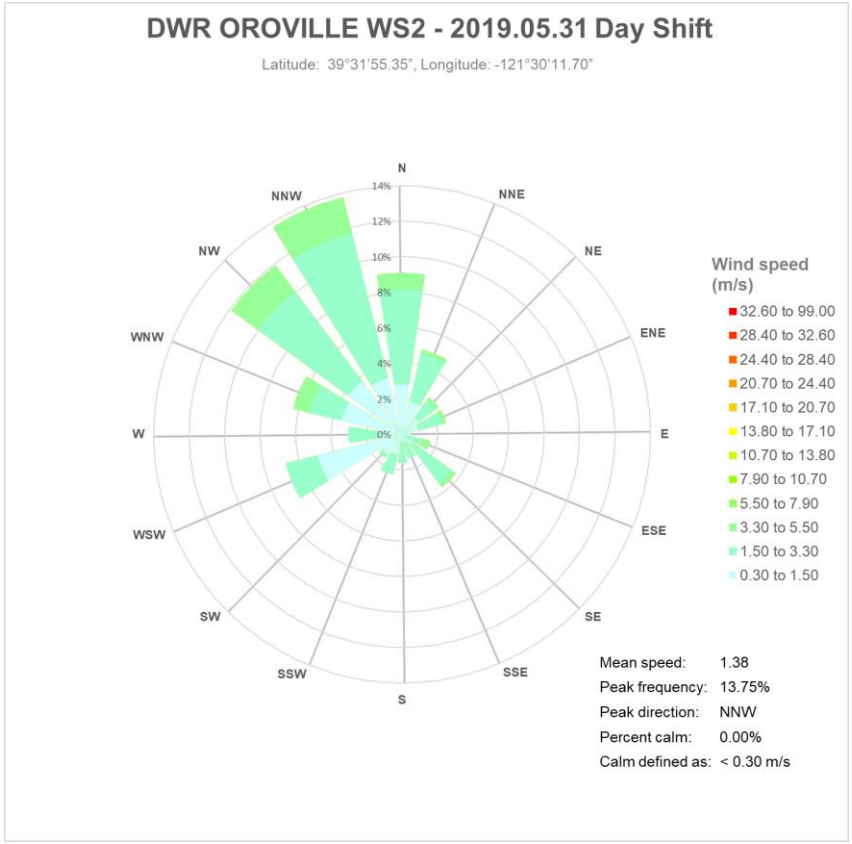
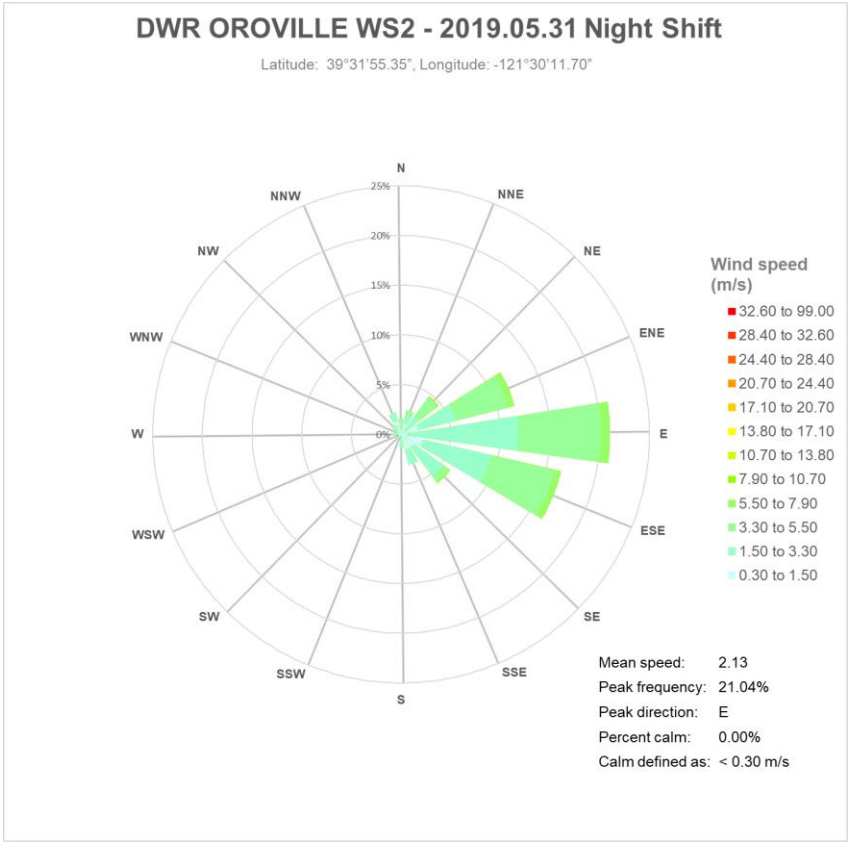
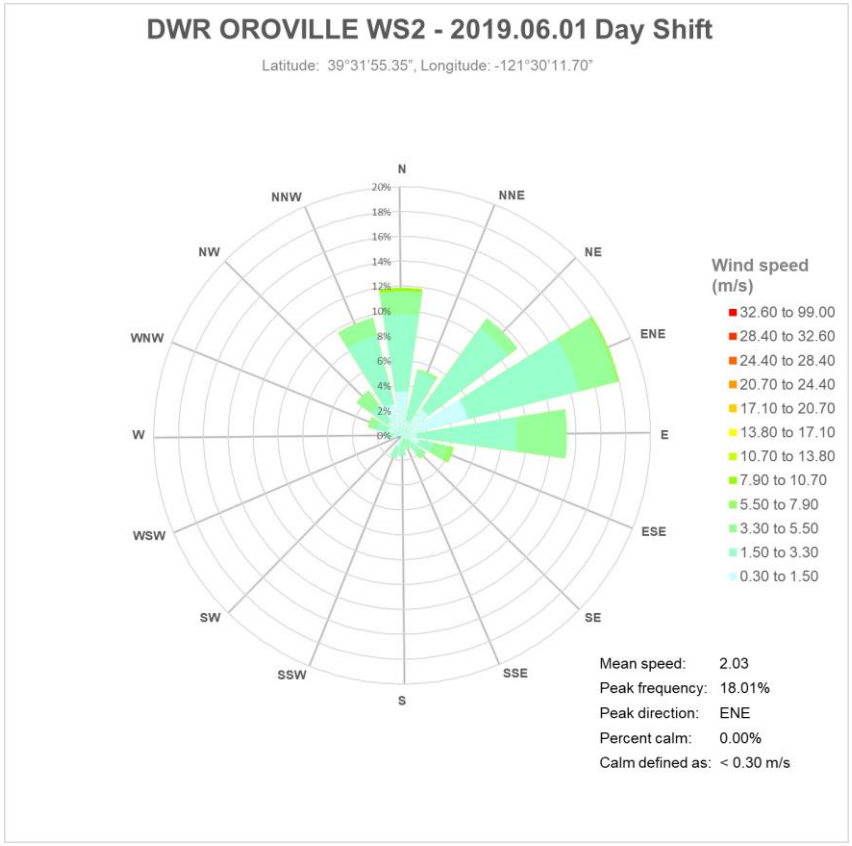
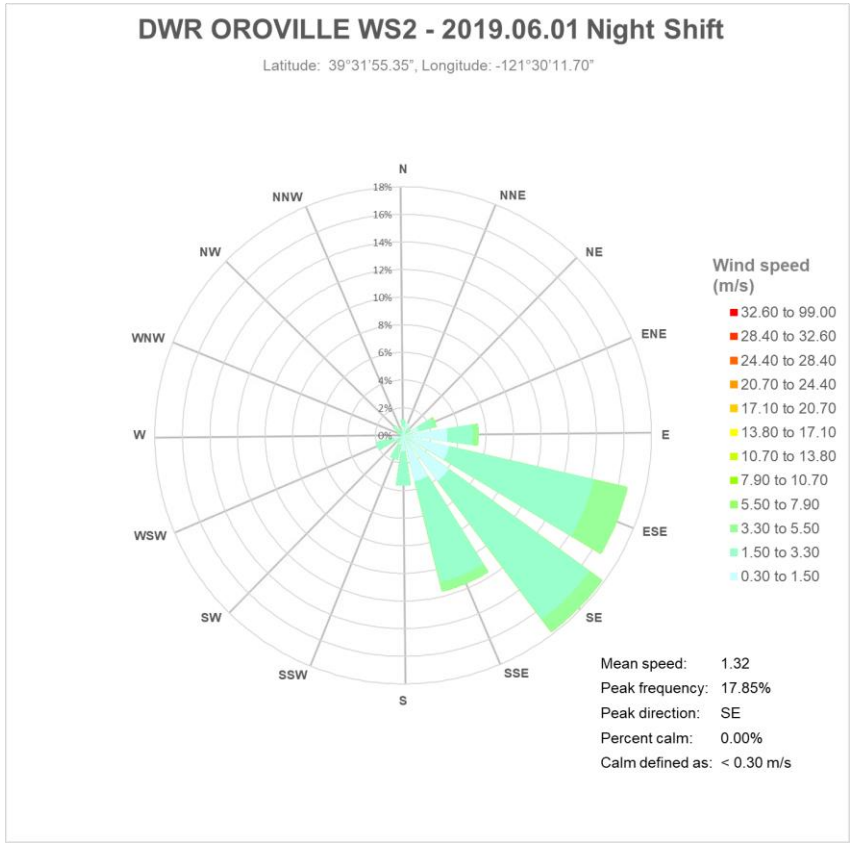

DWR OROVILLE WS1 - 2019.06.13 Night Shift
Latitude: 39°31'52.97", Longitude: -121°28'39.14"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.81
Peak frequency: 14.06%
Peak direction: SSE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

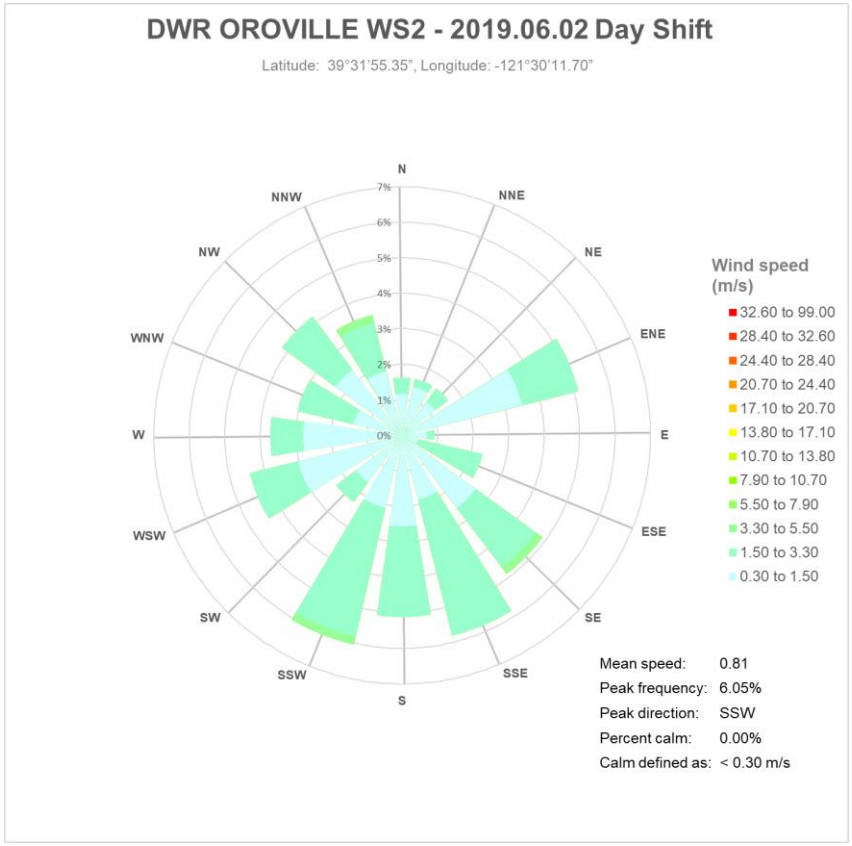
Figure 20 Wind Rose – Day & Night Shift Dan Beebe Trail

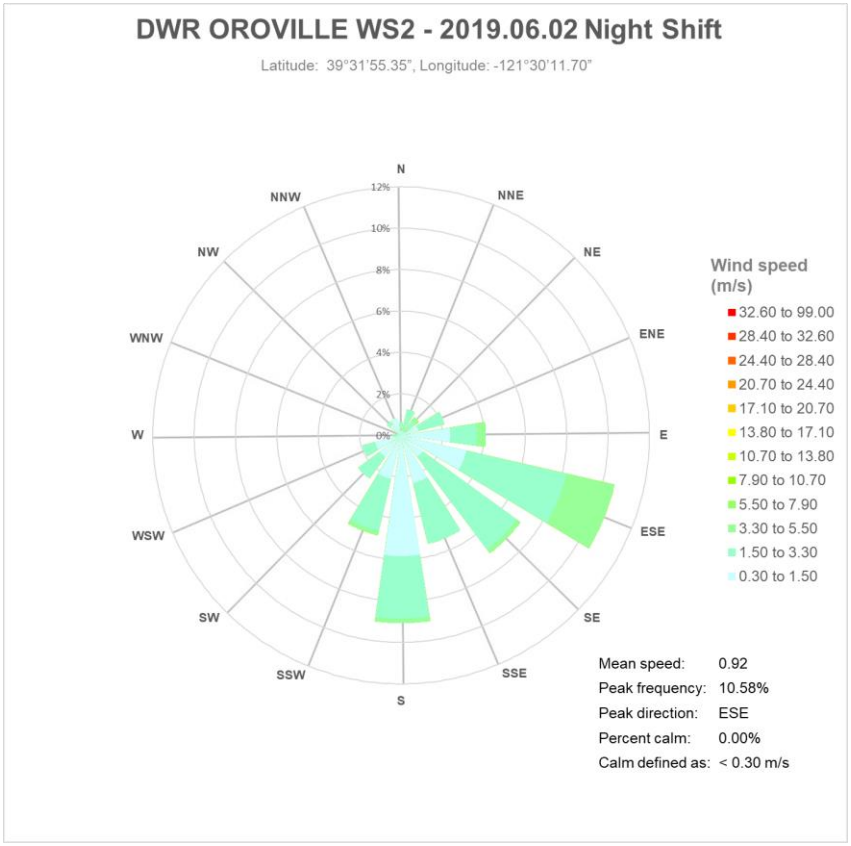


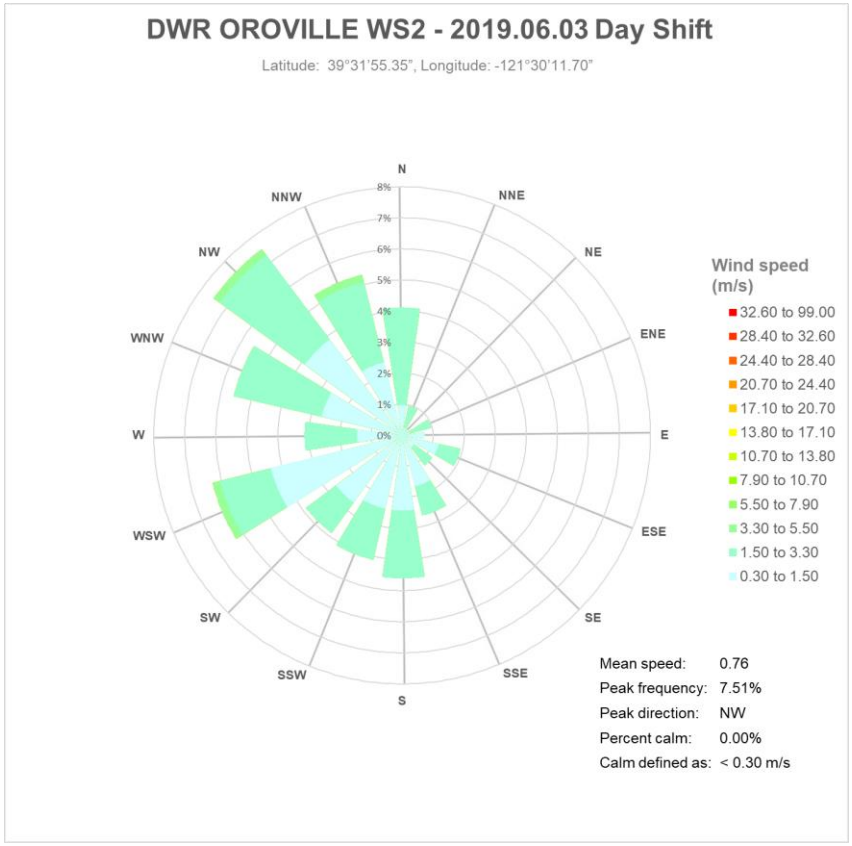


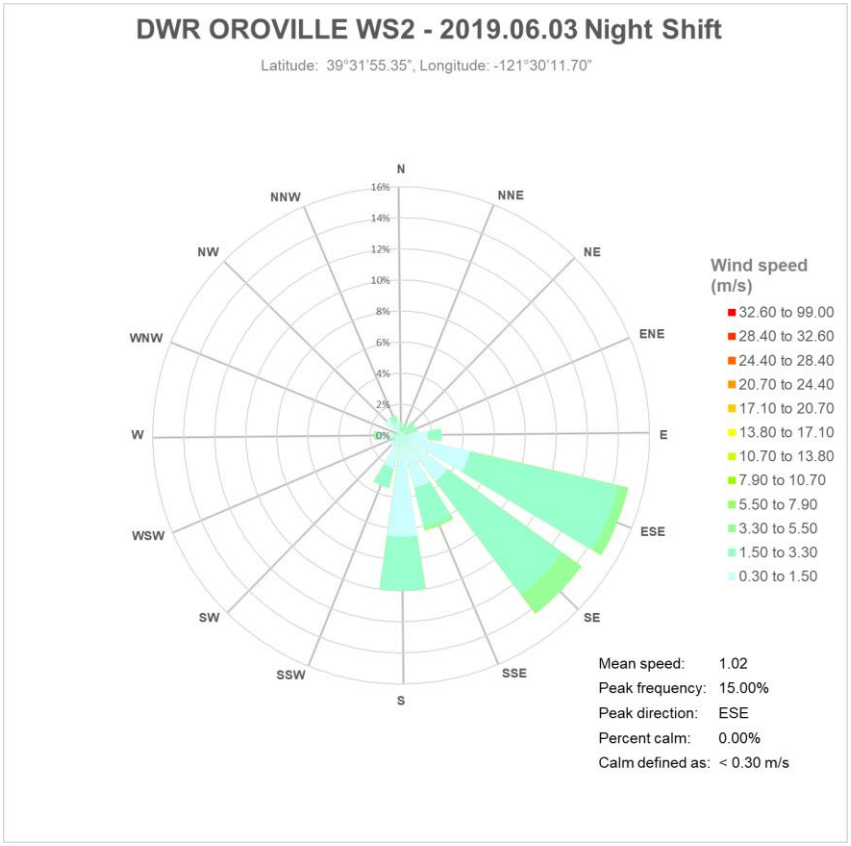

DWR OROVILLE WS2 - 2019.06.01 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.03
Peak frequency: 18.01%
Peak direction: ENE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

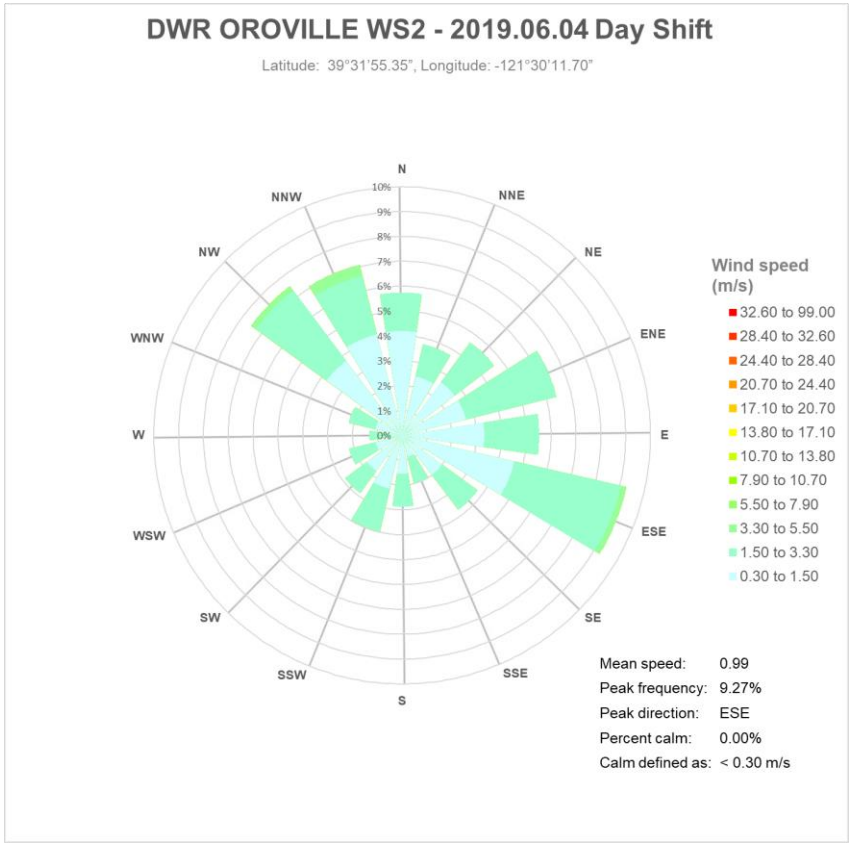

DWR OROVILLE WS2 - 2019.06.01 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.32
Peak frequency: 17.85%
Peak direction: SE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

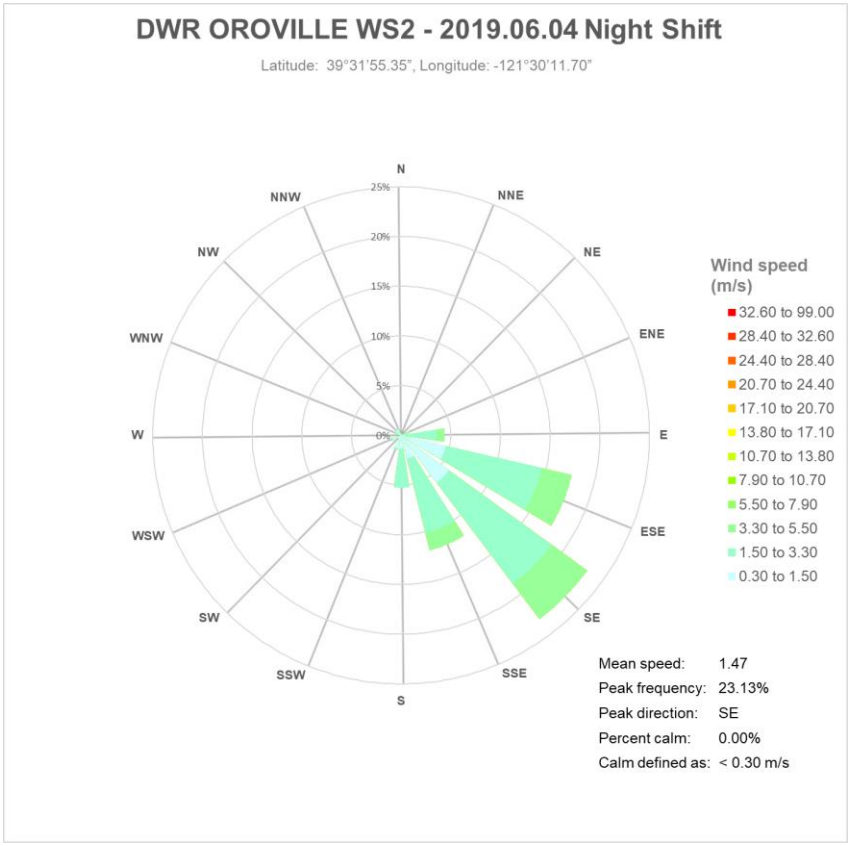

DWR OROVILLE WS2 - 2019.06.02 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
7%
6%
5%
4%
3%
2%
1%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.81
Peak frequency: 6.05%
Peak direction: SSW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

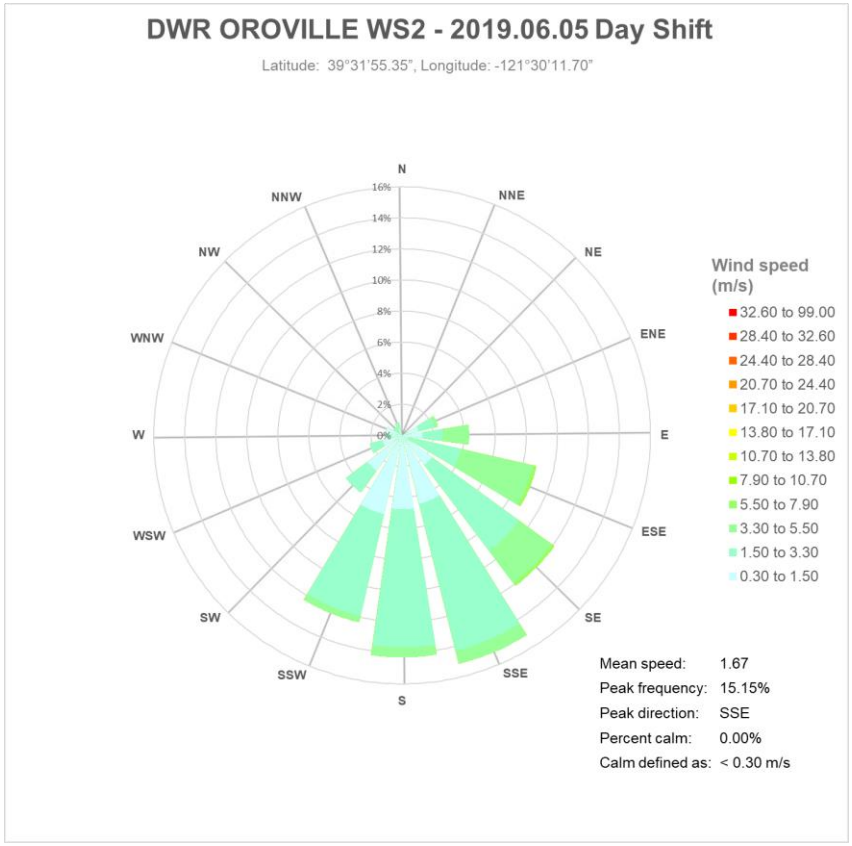

DWR OROVILLE WS2 - 2019.06.02 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.92
Peak frequency: 10.58%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

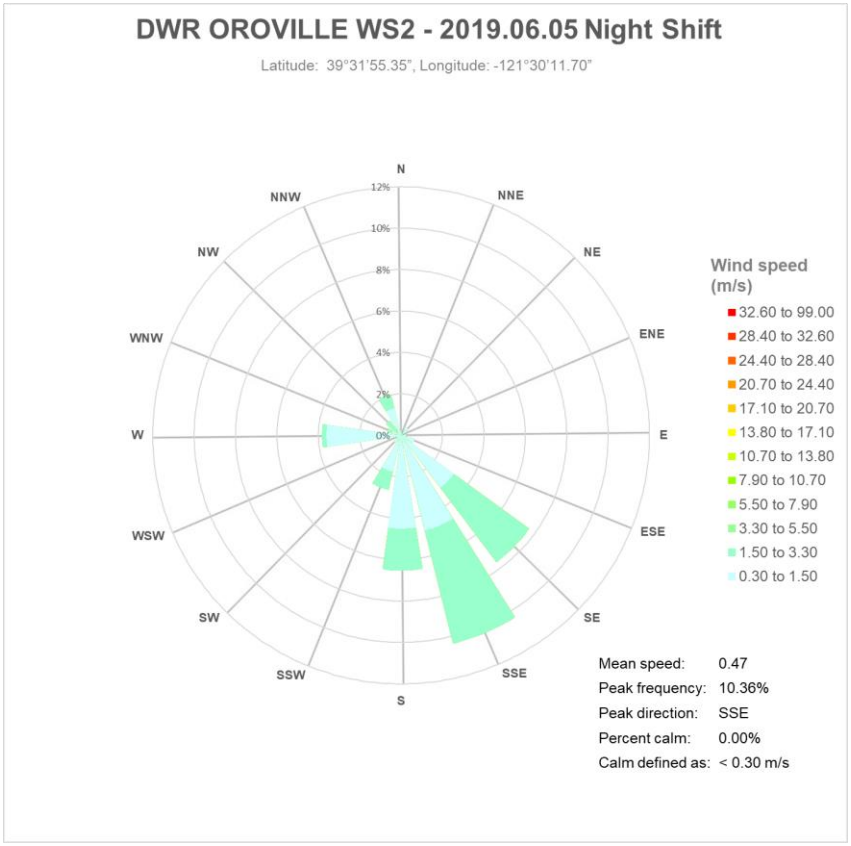

DWR OROVILLE WS2 - 2019.06.03 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
8%
7%
6%
5%
4%
3%
2%
1%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.76
Peak frequency: 7.51%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

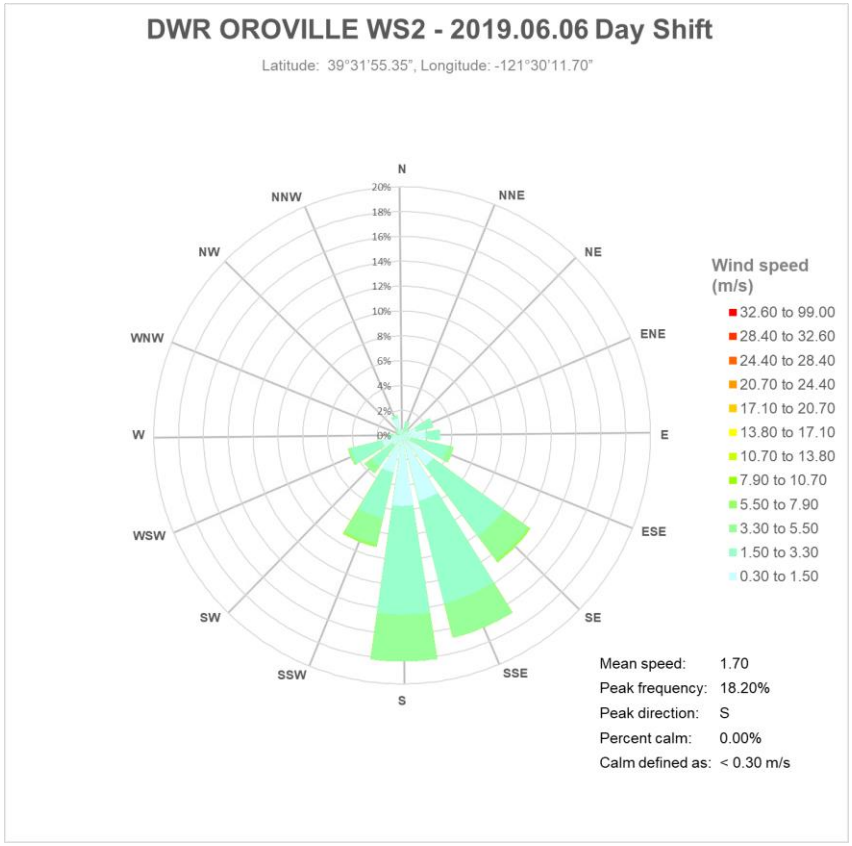

DWR OROVILLE WS2 - 2019.06.03 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.02
Peak frequency: 15.00%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

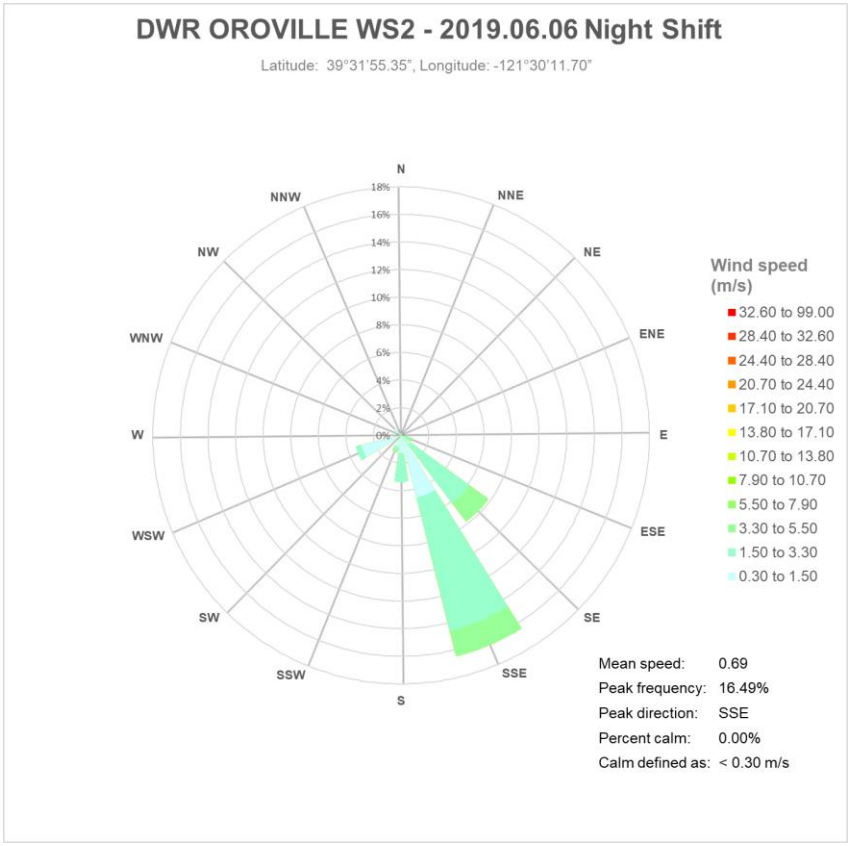

DWR OROVILLE WS2 - 2019.06.04 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.99
Peak frequency: 9.27%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

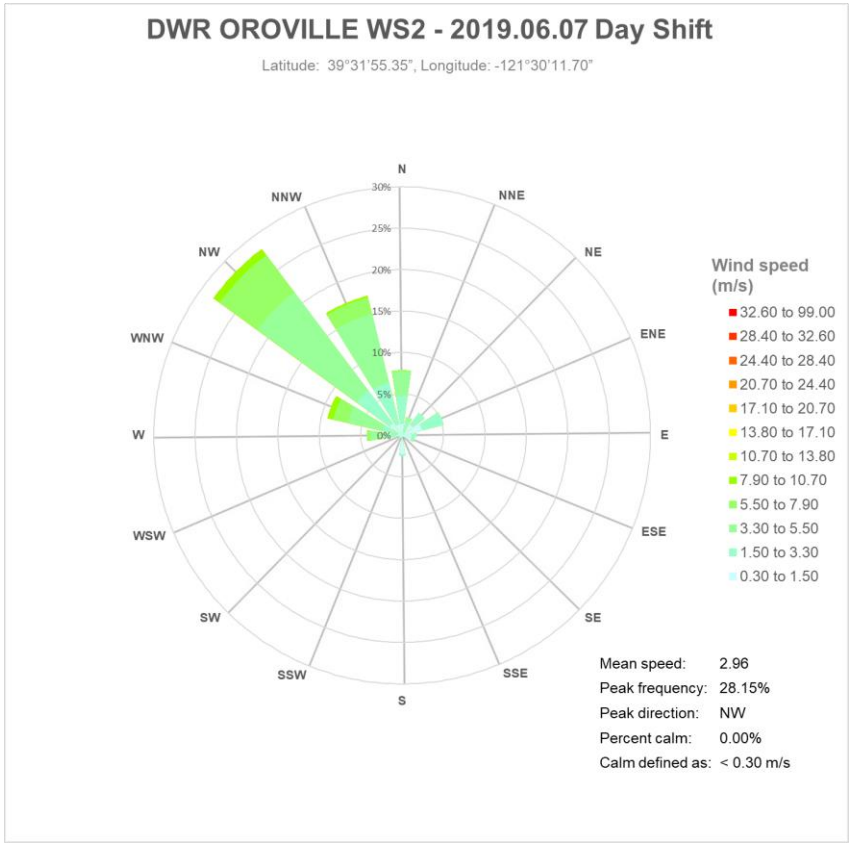

DWR OROVILLE WS2 - 2019.06.04 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.47
Peak frequency: 23.13%
Peak direction: SE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

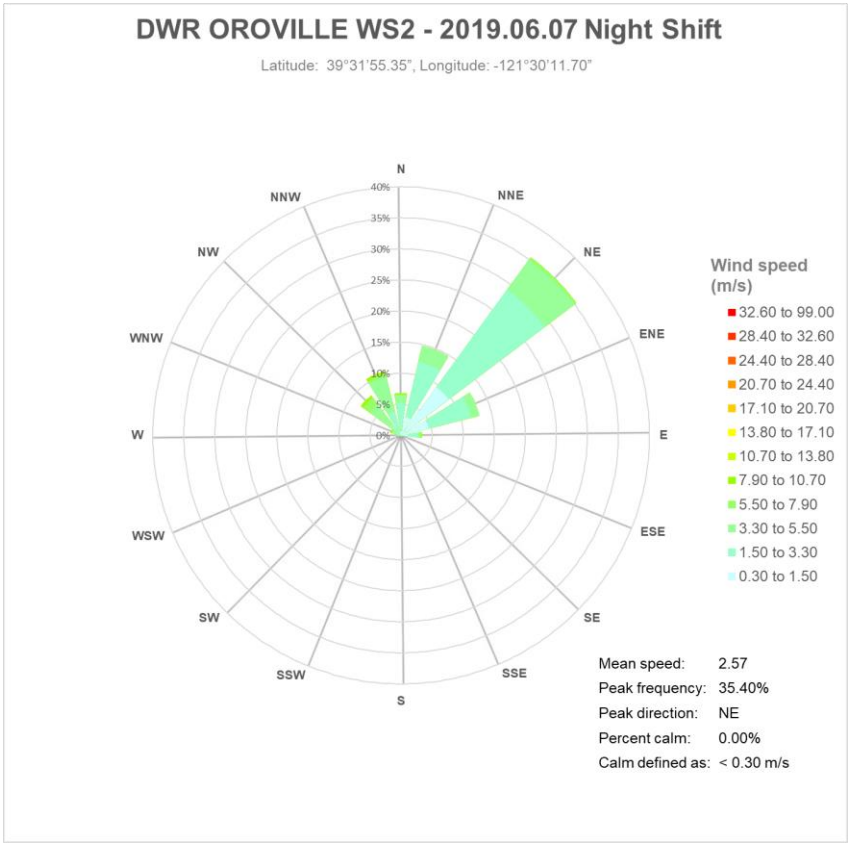

DWR OROVILLE WS2 - 2019.06.05 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.67
Peak frequency: 15.15%
Peak direction: SSE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

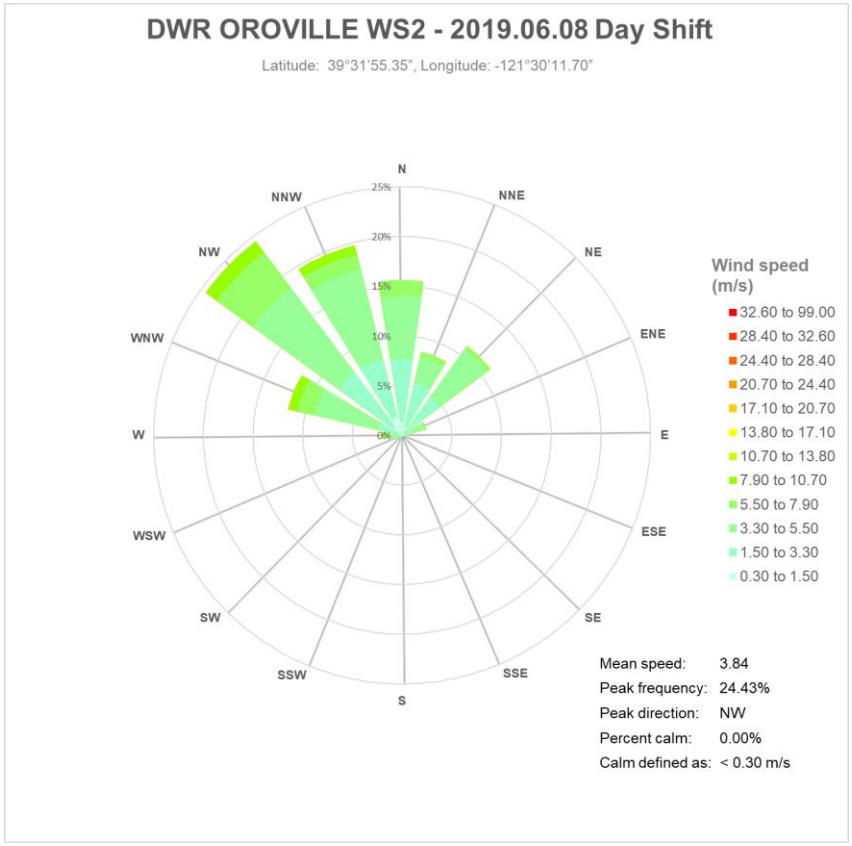

DWR OROVILLE WS2 - 2019.06.05 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.47
Peak frequency: 10.36%
Peak direction: SSE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

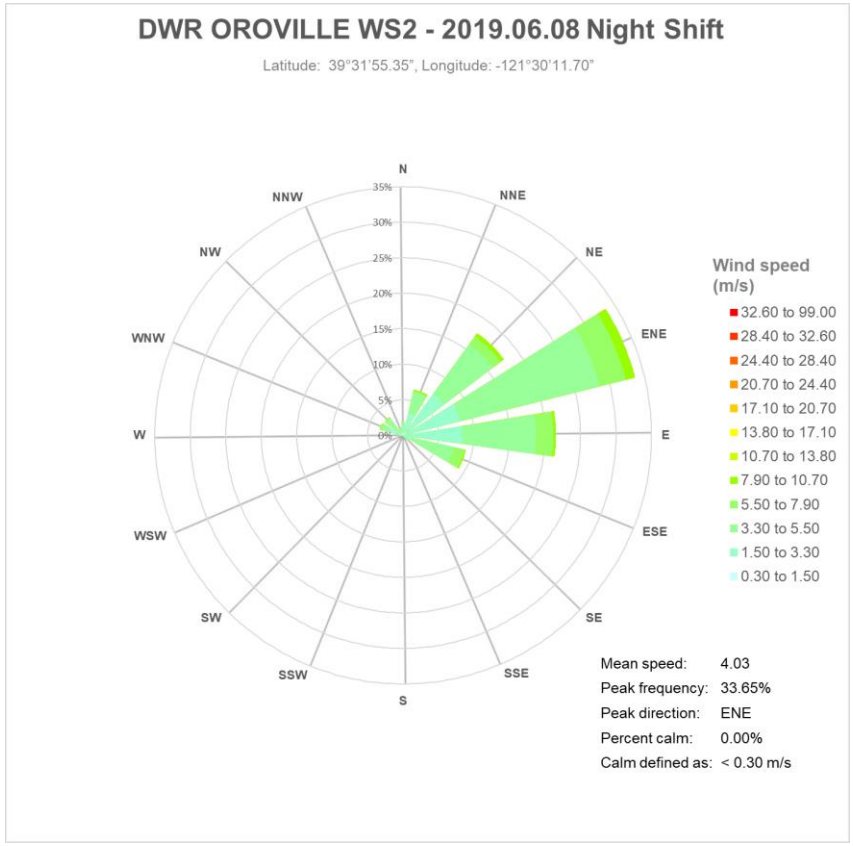

DWR OROVILLE WS2 - 2019.06.06 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.70
Peak frequency: 18.20%
Peak direction: S
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

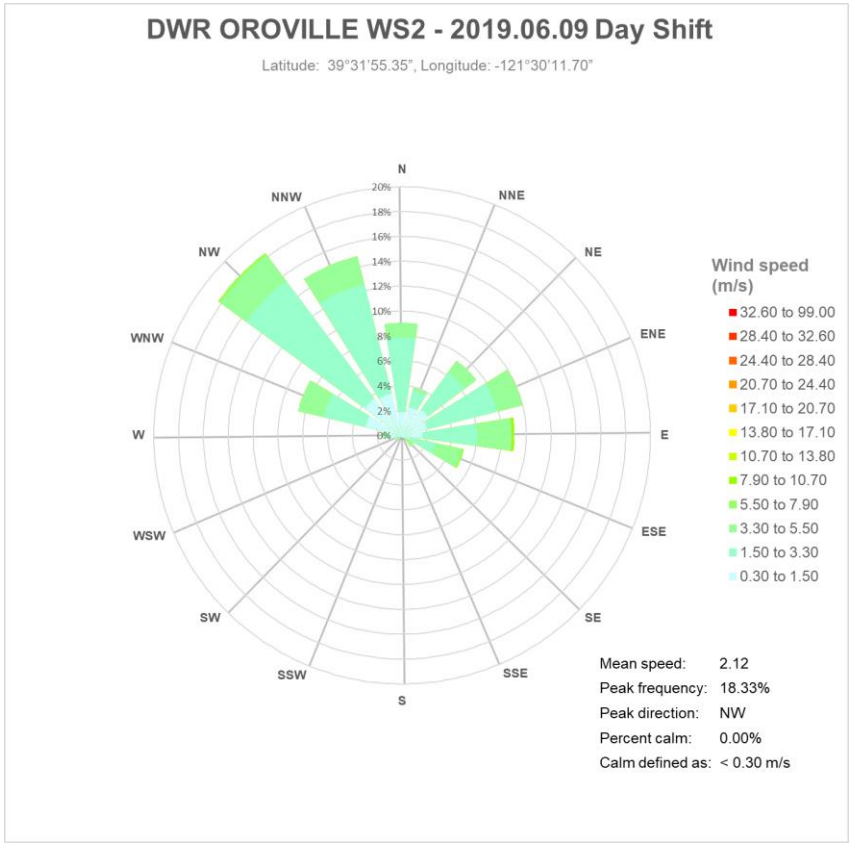

DWR OROVILLE WS2 - 2019.06.06 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.69
Peak frequency: 16.49%
Peak direction: SSE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

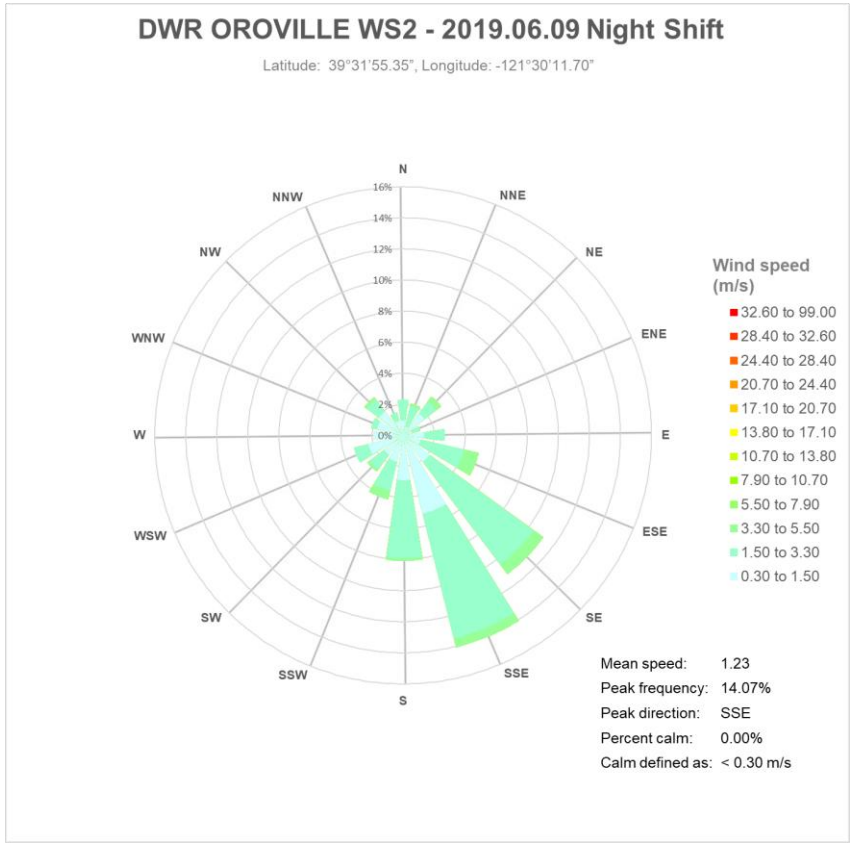

DWR OROVILLE WS2 - 2019.06.07 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.96
Peak frequency: 28.15%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

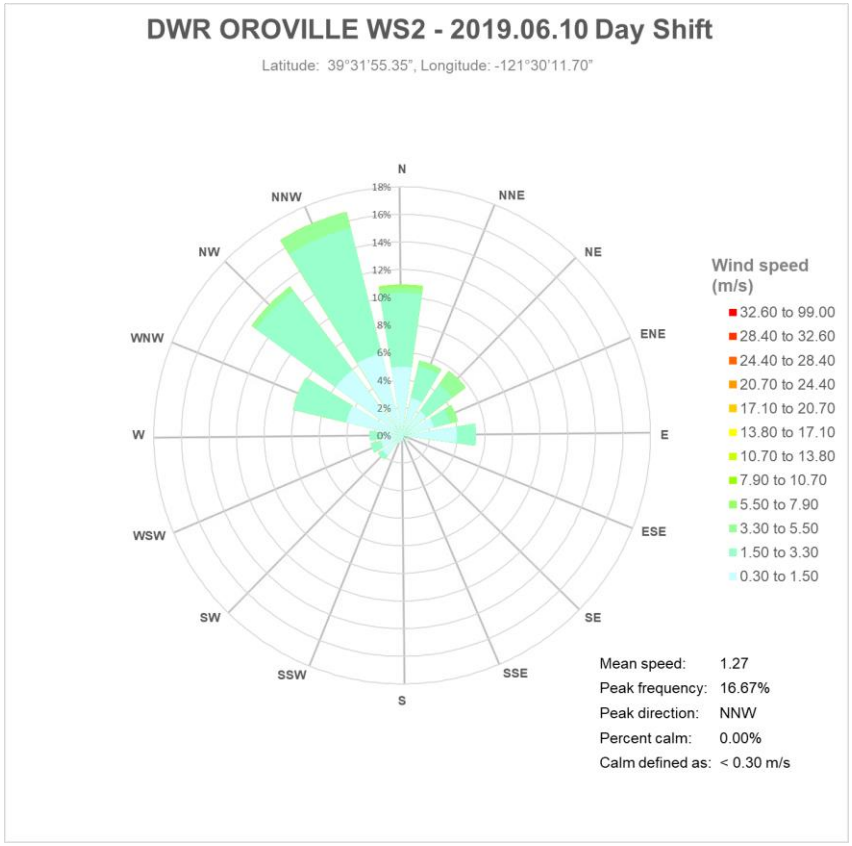

DWR OROVILLE WS2 - 2019.06.07 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
40%
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.57
Peak frequency: 35.40%
Peak direction: NE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

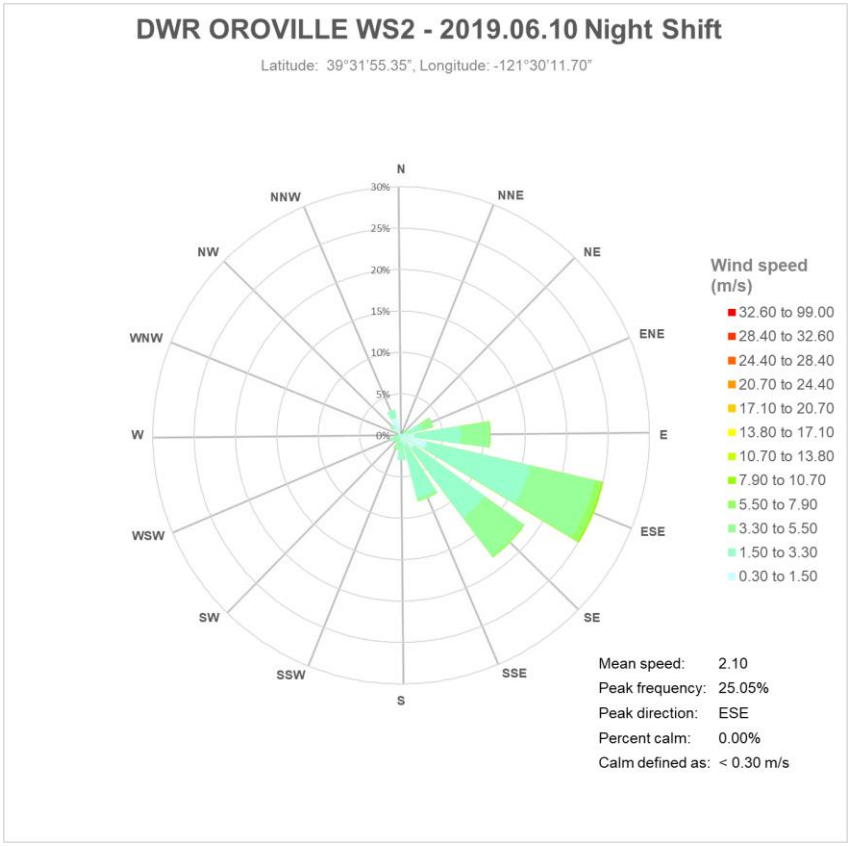

DWR OROVILLE WS2 - 2019.06.08 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.84
Peak frequency: 24.43%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

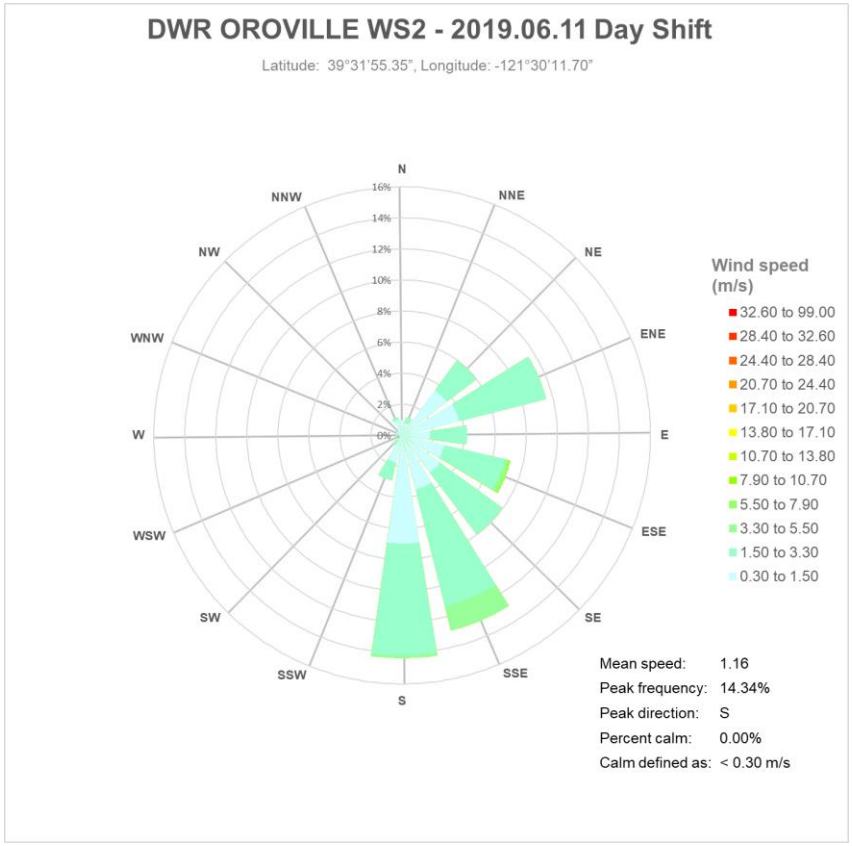

DWR OROVILLE WS2 - 2019.06.08 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
35%
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 4.03
Peak frequency: 33.65%
Peak direction: ENE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

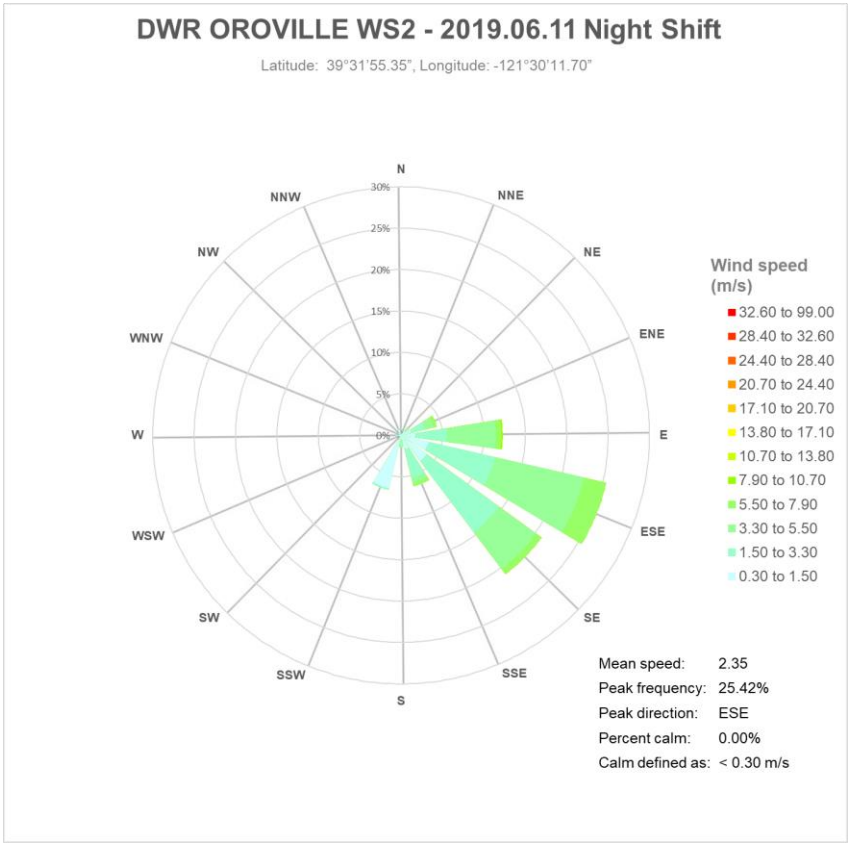

DWR OROVILLE WS2 - 2019.06.09 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.12
Peak frequency: 18.33%
Peak direction: NW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

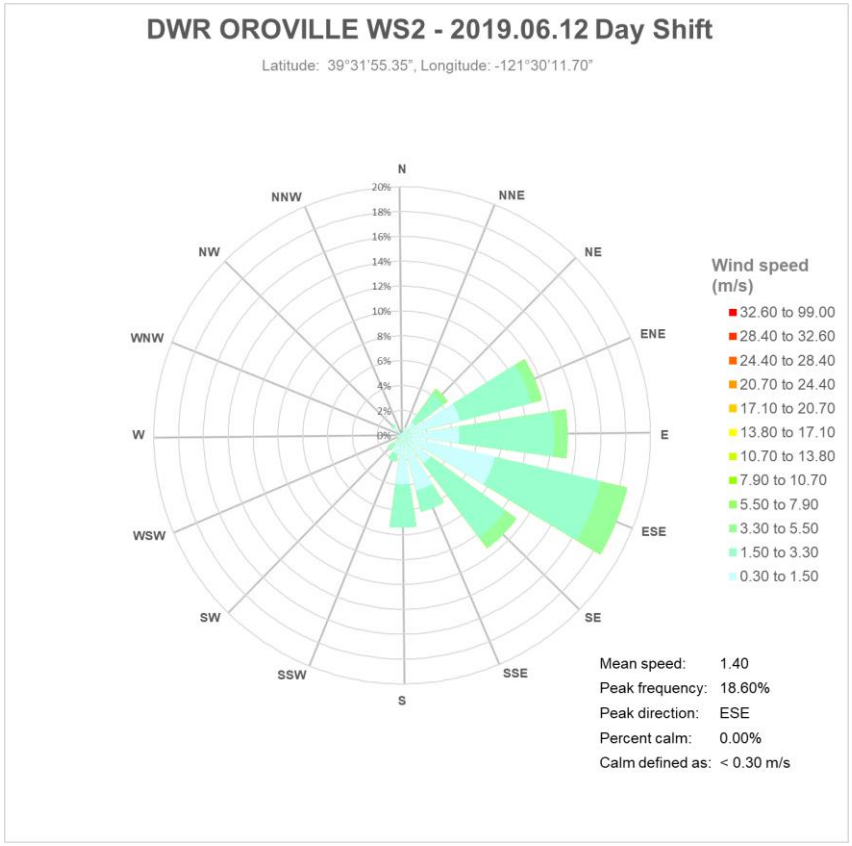

DWR OROVILLE WS2 - 2019.06.09 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.23
Peak frequency: 14.07%
Peak direction: SSE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

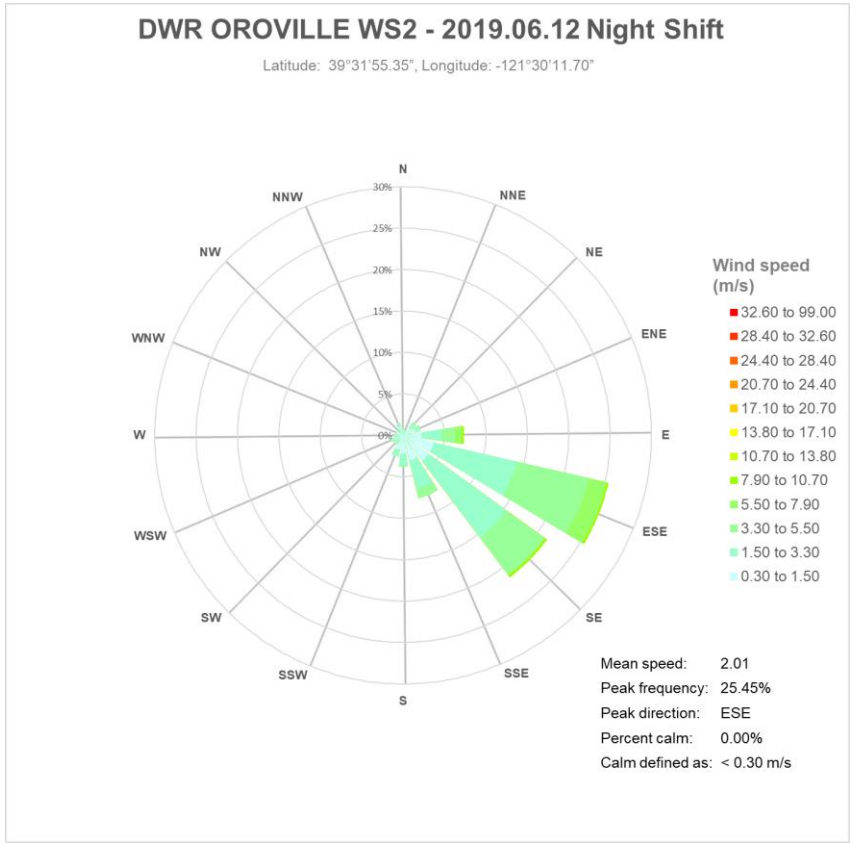

DWR OROVILLE WS2 - 2019.06.10 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.27
Peak frequency: 16.67%
Peak direction: NNW
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

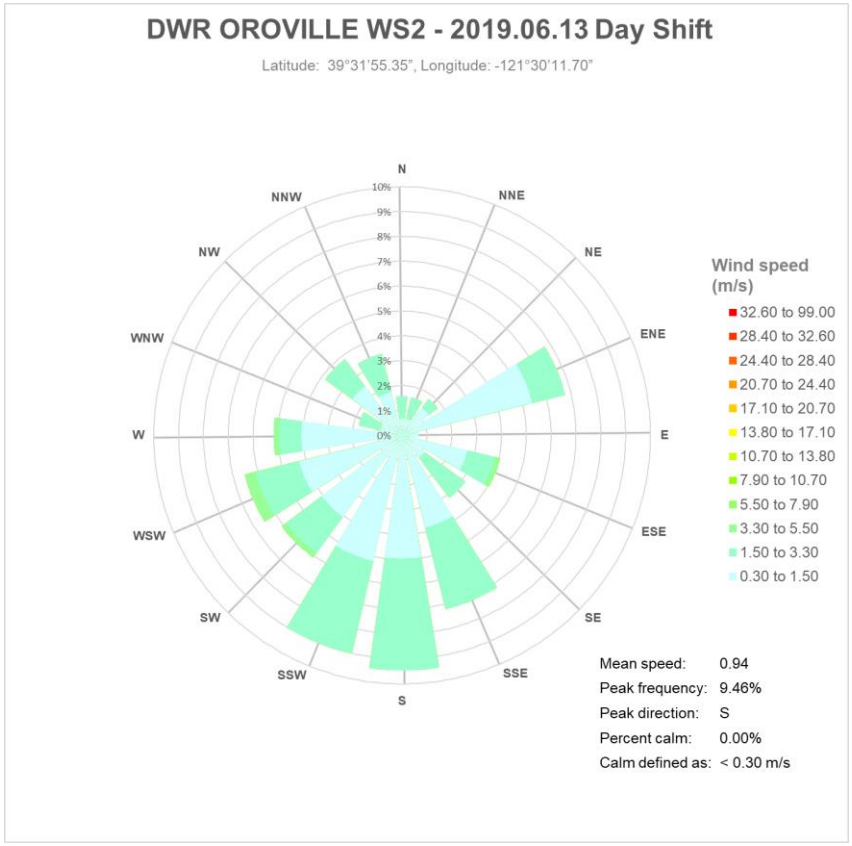

DWR OROVILLE WS2 - 2019.06.10 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.10
Peak frequency: 25.05%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

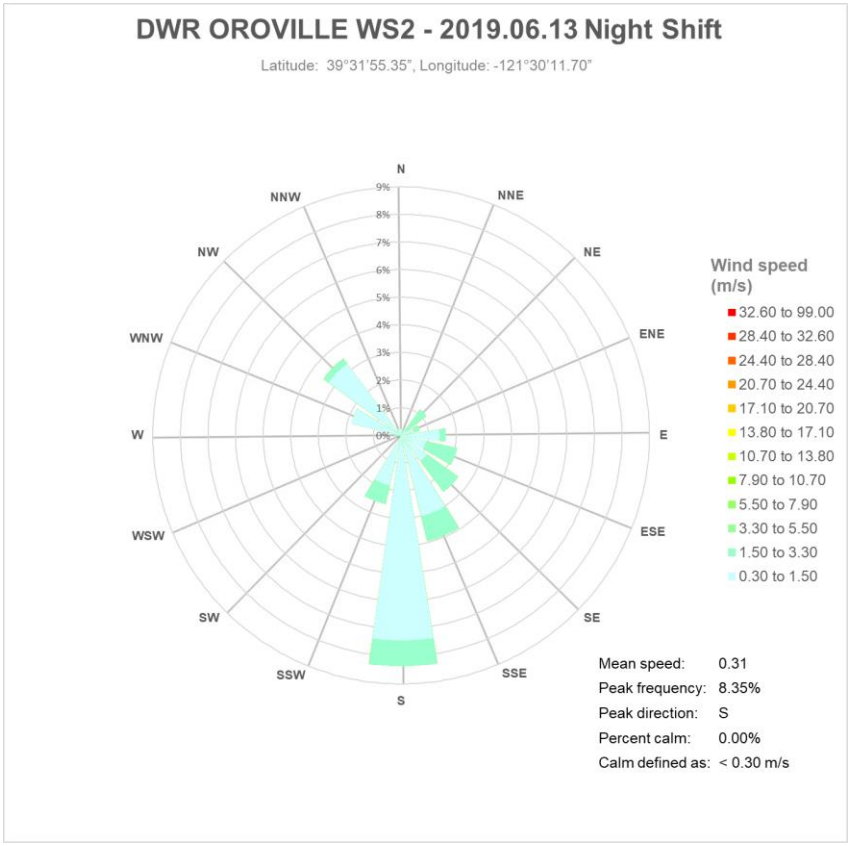

DWR OROVILLE WS2 - 2019.06.11 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.16
Peak frequency: 14.34%
Peak direction: S
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS2 - 2019.06.11 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.35
Peak frequency: 25.42%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS2 - 2019.06.12 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 1.40
Peak frequency: 18.60%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS2 - 2019.06.12 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
30%
25%
20%
15%
10%
5%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.01
Peak frequency: 25.45%
Peak direction: ESE
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS2 - 2019.06.13 Day Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.94
Peak frequency: 9.46%
Peak direction: S
Percent calm: 0.00%
Calm defined as: < 0.30 m/s


DWR OROVILLE WS2 - 2019.06.13 Night Shift
Latitude: 39°31'55.35", Longitude: -121°30'11.70"
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 0.31
Peak frequency: 8.35%
Peak direction: S
Percent calm: 0.00%
Calm defined as: < 0.30 m/s

10.0 Weather Pattern Events

Table 22 Weather Pattern Events May 17, 2019 – May 30, 2019

2019	Temp. (°F)			Dew Point (°F)			Humidity (%)			Station Bar Press. (in)			Visibility (mi)			Wind (mph)			Precipitation			Events
May	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Sum	Min	Type
31	87	73.8	58	61	56.7	53	87	58.3	32	29.68	29.63	29.55	10	10.0	9	10	5.0	0	0	0.0	0	
June																						
1	91	80.2	66	62	56.4	51	73	46.7	26	29.6	29.54	29.46	10	10.0	10	14	6.8	0	0	0.0	0	
2	87	76.3	65	64	59.9	56	78	58.5	39	29.64	29.59	29.55	10	9.9	8	11	5.2	0	0.01	0.0	0	Trace
3	89	77.9	64	66	62.6	56	84	60.5	45	29.69	29.64	29.58	10	10.0	10	9	4.5	0	0	0.0	0	
4	94	82.5	69	67	64.1	62	87	56.0	35	29.7	29.65	29.59	10	10.0	10	8	3.5	0	0	0.0	0	
5	97	84.0	72	65	61.3	55	76	49.5	24	29.66	29.60	29.53	10	10.0	10	11	6.3	0	0	0.0	0	
6	87	76.0	64	63	51.7	38	73	46.3	19	29.68	29.62	29.57	10	10.0	10	17	10.9	5	0	0.0	0	
7	78	68.2	56	49	39.1	32	70	37.8	20	29.82	29.76	29.69	10	10.0	10	18	8.5	0	0	0.0	0	
8	85	72.6	56	43	37.5	26	47	30.1	15	29.86	29.81	29.76	10	10.0	10	21	12.7	6	0	0.0	0	
9	91	82.6	69	58	50.6	45	57	35.4	23	29.84	29.80	29.76	10	10.0	10	14	6.4	0	0	0.0	0	
10	98	82.1	65	58	50.5	38	68	37.4	12	29.83	29.79	29.74	10	10.0	10	8	3.5	0	0	0.0	0	
11	100	86.4	68	61	55.0	50	66	36.5	21	29.81	29.75	29.69	10	10.0	10	10	4.8	0	0	0.0	0	
12	100	86.4	72	66	57.3	48	73	40.0	17	29.7	29.65	29.58	10	10.0	10	10	5.3	0	0	0.0	0	
13	94	82.1	69	64	59.9	56	70	48.7	32	29.64	29.60	29.55	10	10.0	10	10	6.2	0	0	0.0	0	

NCDC/NOAA data requests #1778687; Location - Oroville, CA Municipal Airport Weather Station, 93210. Note: 6/8/19 Missing 10 hours of data from NCDC/NOAA for averages

11.0 Potential Offsite Air Contaminant Events

06.04.19 AM Shift: WP 249 Canyon Drive - A backhoe, not associated with Spillway operations, was excavating soil at a private residence near the Canyon Drive Station.

12.0 Changes to Proposed Sampling Locations or Methodology

No changes were made during this time period.

Appendix A – Laboratory Reports

Appendix B – Perimeter Dust Monitoring