January 16, 2019

Client: Kiewit Infrastructure Co.
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Subject: Fugitive Dust Control Plan: Study Area near Marblemount, Skagit County, WA

Dear Sir or Madam,

Element Solutions (Element) was retained by Chuck Nylund, on behalf of Kiewit Infrastructure Co., to provide professional "Surveying and Permitting" services to support the proposed mining project at the study area, located along Rockport Cascade Road, south of Marblemount, WA 98267. The proposed project actions include site clearing, operation, and reclamation of a preexisting bedrock quarry in Skagit County.

The objective of this Fugitive Dust Control Plan is to identify engineering controls for fugitive dust emissions related to the proposed project activities at the Marblemount Quarry. These control measures should be used on an as-needed basis, throughout the duration of the project, as mitigation to prevent fugitive dust from leaving the project area.

Project Description

The Proposed Project includes boundary line adjustments, site clearing, site grading, road building, quarry operations, and reclamation of a bedrock quarry on Rockport Cascade Road approximately one mile south of Marblemount, WA (Figure 1). The Proposed Project will involve development activities on parcels P45543, P128574, P120304, P45550, and parts of P45548 and P45541 (Figure 2). A majority of the mining would take place on P45543, which has been used as a small-scale quarry (under 3 acres) over the past several decades. The overall project limit footprint at full buildout is approximately 120 acres. At full buildout, the proposed mining footprint would encompass approximately 30 acres (20 acres proposed for Phase I); quarry operations—including roads, stockpile areas, stormwater management, and operations areas—would encompass approximately 60 acres; and approximately 30 acres would be retained vegetation areas.

Currently, stands of second-growth timber cover a majority of the site and an approximately 800-foot-high rock face dominates P45543. This rock face consists of Shuksan greenschist, which is the desired quarry stone source.

The proposed project would occur in four steps:

1. Boundary Line Adjustment, Site Clearing, Preparation, and Building Access Road for Forest Practice Conversion;

2. Mining within the MRO Overlay Area;
3. Possible Quarry Expansion, Contingent on MRO Boundary Change, and;
4. Quarry Reclamation.

Step 1 – Boundary Line Adjustment, Site Clearing, Preparation and Building Access Road for Forest Practice Conversion would include acquiring and performing boundary line adjustments on P128574. The property line would be adjusted to encompass approximately 10.2 acres of P45541. Additionally, an approximately 20.2-acre portion of P45548 would also be boundary line adjusted to P128574. Step 1 also includes clearing, removing stumps, site grading, and road construction on Parcels P45543, P45550, P120304, P128574, and parts of P45548 and P45541. Marketable timber will be removed from the site. An approximately 6,700-foot gravel access road would be built to access the top and eastern portions of the project site. Wood mulch and top soil would be stockpiled on site for future reclamation. Access to the site would include building two new access driveways on Rockport Cascade Road and decommissioning the two existing access points. Grading and roadways for quarry operations and stormwater management will be constructed on the western portion of the project limits. The road providing access to the eastern portion of the site would be designed to meet or exceed Skagit County standards, Washington Department of Natural Resources (DNR) Forest Practice and Mining standards, and any other standards appropriate for its use. Following site clearing and preparation, the road would be used to access the top of the quarry and for hauling rocks to the bottom for processing.

Step 2 – Mining within the MRO Overlay Area would include establishing the quarry on P45543 within the current MRO boundary per the Mining Site Plan. Step 2 would also include the construction of mining operation areas and support facilities, including an armor stone staging area in the western portion of P45543. This step would also involve constructing portable offices/storage structures, a truck loadout scale, a heavy equipment and employee parking area, a fueling station, maintenance shops, and storage facilities for blasting equipment. An undersized rock stockpile area would be established within the existing MRO area on P128574 and a potential future phase undersized rock stockpile area has been designated if the MRO boundary is successfully expanded (see Step 3). Rock mining would be conducted using a “top down” approach, such that rock would be transported to the stockpile or staging areas by truck, instead of being cast off the cliff face. The land use to the south, east, and west is secondary and industrial forestry and the land use to the north is rural residential. A minimum 100-foot setback would be maintained along adjacent property lines or bordering quarry activities. A 50-foot vegetative buffer would be maintained on Rockport Cascade Road.

Step 3 – Possible Quarry Expansion, Contingent on MRO Boundary Change, would include quarry and undersized rock stockpile area expansions. Step 3 is dependent upon an expansion of the MRO through the Skagit County Comprehensive Plan Amendment process. Once the MRO overlay is expanded, the quarry area would expand approximately 10 acres into P45541, and the undersized rock stockpile area described in Step 2 would expand to the south (approximately 20 acres) onto P45548 to accommodate the additional undersized rocks from the expanded quarry. The mining activities of Step 3 would be the same as those in Step 2.

Step 4 – Quarry Reclamation would include full reclamation of all the affected parcels following decommissioning of the quarry, roads, and supporting mining operations. The full lifespan of the quarry would be up to 100 years or whenever the source of rock is exhausted. The Mining Reclamation Plan is consistent with DNR surface quarry reclamation regulations. The land will be restored to forestry land use following reclamation.

Weather and Climate

Local weather is an influencing factor when considering project specific control measures for fugitive dust. Marblemount has a moderate climate with average high temperatures in the 70s during the summer months and average low temperatures in the 30s during the winter. Marblemount receives an average annual precipitation of 76 inches, with November as the wettest month of the year. The average wind direction at the Marblemount Remote Sensing Remote Automatic Weather Station (RS RAWS) is from the north during the period of October through March, from the south-southwest during the period of May through September, and has dominant components from both the north and south-southwest during the month of April.

Climate data was collected from the Marblemount RS RAWS station (Station ID: MBMW1). Monthly averages for temperature, precipitation, and wind speed are shown below in Table 1:

Table 1: Climate data for Marblemount, WA [Station ID: MBMW1]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. High [°F]	43	47	52	58	65	70	76	77	71	58	47	41
Avg. Low [°F]	32	32	35	39	44	49	52	52	48	42	36	32
Avg Precipitation [in]	11.69	6.61	6.89	4.76	4.09	3.11	1.65	1.77	3.7	8.43	13.78	9.53
Avg. Wind Speed [mph]	1.9	2.4	2.1	2.2	2.2	1.9	2.0	1.9	1.6	1.5	1.7	1.9

Regulatory Requirements and Standards

Fugitive dust is separated into two categories based on the size of the particulate matter. PM_{10} is defined by the EPA as *inhalable coarse particles* and has a diameter between 2.5 and 10 [micrometers (µm)]. $PM_{2.5}$ is defined as *fine particles* by the EPA and has a diameter less than 2.5 [µm]. The standards governing particulate matter in Skagit County are defined in Sections 401-403 of Regulation of the Northwest Clean Air Agency (October 12, 2018).

- Ambient air standards for PM_{10} shall not exceed:
    - 150 [$\mu g/m^3$] as a 24 hour average more than once a year;
    - 50 [$\mu g/m^3$] as an annual arithmetic mean.
- Ambient air standards for $PM_{2.5}$ shall not exceed:
    - 65 [$\mu g/m^3$] as a 24 hour average based on the 3-year average of the 98^{th} percentile of 24-hour $PM_{2.5}$ concentrations;

  - 15 [$\mu g/m^3$] as an annual arithmetic mean based on the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations.
- The particulate fallout rate shall not exceed:
  - 10 [g/m^2] per month in an industrial area;
  - 5 [g/m^2] per month in an industrial area if visual observations show a presence of wood waste and the volatile fraction of sample exceeds seventy percent;
  - 5 [g/m^2] per month in residential and commercial areas.

Control Measures

All on-site personnel will be trained to recognize and respond to incidents for which dust generation is at a higher than acceptable level. Fugitive dust is most often controlled by the frequent application of water. Water is available from a publically allocated source. Mitigation of fugitive dust should be accomplished as follows:

- Clearing limits should be demarcated with high visibility material, and clearing should be limited to areas where immediate project activity is expected to take place.
- Use mulch to cover final excavation surfaces to minimize sources of windblown dust.
- Maintain vegetation buffer along the project perimeter to reduce the likelihood of windblown dust leaving the site.
- Remove fine grained rock drill spoils from work areas and cap with rock debris to avoid wind disturbance.
- Maintain speed limits of 10-15 mph for all gravel surface haul roads in the project area.
- Use a water truck to spray the ground surface of gravel surface roads in the project area regularly to prevent dust from becoming airborne. The surface should be wetted until moist, while controlling excessive water application to avoid concentrated discharge.
- Pre-wet fill materials during placement to avoid wind induced drift.
- Observe operation conditions during periods of high wind and curtail dust generating activities as needed.

Closure

Thank you for the opportunity to contribute our expertise to your project. Please feel free to contact us at (360) 671-9172 or by email at info@elementsolutions.org if you have any questions or comments regarding this communication.

Sincerely,

Exp. 05/21/18

Ryan Cooper
Field Scientist

Paul Pittman, LEG
Earth Sciences Manager – Principal

Statement of Limitations

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References

1) *AP-42, Compilation of Air Pollutant Emissions Factors, Volume I: Stationary Point and Area Sources (5th edition)*. United States Environmental Protection Agency, January 1995.

2) Bakotich III, Pasco, *Temporary Erosion and Sediment Control Manual (M 3109.01)*. Washington State Department of Transportation, Engineering and Regional Operations, Development Division, Design Office. March 2014.

3) Barrett, E. Michael, Eck, J. Bradley, *BMPs for Quarry Operations (Complying with the Edwards Aquifer Rules) RG-500*. Texas Commission of Environmental Quality, Field Operations Support Division. Center for Research in Water Resources, Bureau of Engineering Research, University of Texas at Austin. January 2012.

4) Eastern Research Group, Inc., *EIIP Technical Report Series, Volume 2: Point Sources, Chapter 13 – Technical Assessment Paper: Available Information for Estimating Air Emissions from Stone Mining and Quarrying Operations*. United States Environmental Protection Agency, Air Emissions Inventory Improvement Program, May 1998.

5) Kissel, N. Fred, *Handbook for Dust Control in Mining, IC 9465*. U.S. Department of Health and Human Services. June 2003.