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**APPENDIX D**

**FACILITY MANUAL**

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**FACILITY MANUAL**

**DUNN MINE AND C&D FACILITY**

**Prepared For:**

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209 PARTITION STREET EXTENSION  
RENSSELAER, NEW YORK 12144**

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**CEE PROJECT 182-442**

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## **APPENDICES**

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## **1.0 INTRODUCTION**

### **1.1 LOCATION AND SITE DESCRIPTION**

The Dunn Mine and C&D Facility is an existing sand and gravel mine and construction and demolition debris (C&D) disposal facility owned and operated by S.A. Dunn & Company, LLC. The facility operates under an existing New York State Department of Environmental Conservation (NYSDEC) permit (Permit ID 4-3899-00006/00006). Under the current permit, the site performs mining operations with the final stage of reclamation achieved when landfill liner is constructed.

Mining operations are currently taking place in the north pit and within the future landfill development and disposal areas. Landfill development progresses sequentially in designated phases of waste disposal. Each phase of the Dunn Mine and C&D Facility will be operated and maintained in accordance with the applicable parts of Title 6 of the New York State Codes, Rules, and Regulations (6 CRR-NY). This plan has been prepared to demonstrate the facility's compliance with the facility plan and operating requirements outlined in 6 CRR-NY Parts 363-4.6 and 360-19, respectively. Appendix B includes the Environmental Monitoring Plan and Site Analytical Plan as required by Part 363-4 (f) and (g).

In addition to this plan, other documents exist for the facility in order to demonstrate compliance with the applicable requirements outlined in 6 CRR-NY. Such documents include: the most recent version of the facility's Stormwater Pollution Prevention Plan (SWPPP), the Operational Sequencing Permit Modification Plans dated August 2021, the MSE Berm Permit Modification Plans dated January 2022 and any subsequent updates to these plans, the Engineering Report prepared for the Operational Sequencing Permit Modification dated August 2021, along with the Engineering Report prepared for the MSE Berm Permit Modification, dated January 2022, and any subsequent updates to these reports, and the Mined Land Use Plans, dated January 2022.

### **1.2 HOURS OF OPERATION**

Project operations, which include mining, reclamation, and waste disposal, are performed only within the following times:

Monday – Friday 6:30 a.m. to 5:30 p.m.

Supporting facility operations, such as landfill maintenance, as well as construction activities may be conducted outside these hours.

Project operations are not conducted on Sundays or Federal Holidays. When a federal holiday falls on a Sunday, and is observed on the following Monday, no project operations will take place on that Monday. The hours of operation listed above are the same as the existing site operations. No change is proposed.

### **1.3 SITE ACCESS**

Signs are posted at the facility entrance gate that indicate the hours of operation and the types of waste that are accepted and not accepted. Signs are also posted which designate the facility as private property in order to deter unauthorized use of the site. Unauthorized access and use of the facility during non-operating hours is prevented using a locking gate at the facility entrance.

The site is currently permitted to generate up to 100 round trips per day (200 total truck trips per day). Vehicles expected to access the site for waste disposal vary in type and size, however transfer trailers are most common. The facility has been designed to allow for the smooth flow of traffic into and through the facility, including during inclement weather and winter conditions, and the facility roadways and travel paths are able to accommodate the size and quantity of vehicles expected to access the facility.

### **1.4 FACILITIES**

The facility contains several buildings that are used by facility personnel as office space and as the maintenance garage. The buildings are adequately heated and lit and contain a potable drinking water supply, sanitary toilet facilities, and radio and/or telephone communication. Municipal water and sewer services exist on-site.

### **1.5 EQUIPMENT**

Various pieces of heavy machinery are utilized at the site to perform the routine facility operations of mining and waste management. The equipment utilized at the site are suitable in size and function for the facility operations described in this plan.

Equipment (listed make/model or similar) to be maintained on site, in good working order, includes:

- 1-Caterpillar D-8T Bulldozer
- 1-Caterpillar 836K Landfill Compactor
- 1-Case CX250 Excavator
- 1-Caterpillar 730C Articulated All-Wheel Drive Dump Truck
- 1-Water Truck

## **1.6 PROTECTION OF WATER**

C&D waste is not deposited into and is managed such that it will not enter surface water or groundwater. The facility is operated in a manner that minimizes leachate generation, and the migration of leachate into surface water is prevented as a result of the proper collection and disposal of leachate at the facility, which is conducted in accordance with regulatory requirements and as described in Section 4.1 of this plan.

Stormwater runoff generated at the facility is directed to retention ponds via stormwater conveyance structures such as channels, diversion berms, and culverts. Throughout landfill construction phases, stormwater may be managed in temporary stormwater retention ponds that will not have any off-site surficial discharge of stormwater. Runoff that comes into contact with waste or leachate is managed as leachate, as described in Section 4.1. During the later stages of cell closure, the landfill cap will effectively shed stormwater from the constructed landfill to the surrounding areas above the current mine floor into two permanent stormwater management basins. The south pond is currently constructed and operational. Construction of the north pond will coincide with the development of Phases 7B or 8. Pond grading and outlet structures are shown on the Footprint Modification Drawings. The stormwater management basins undergo regular inspections and maintenance in order to verify and maintain functionality. The stormwater inspection form is provided in Appendix A.

The maintenance and operation practices related to stormwater management that are implemented at the facility are described in greater detail in the most recent version of the facility's SWPPP.

## **1.7 SUSTAINABILITY PLAN**

To the maximum extent possible, future landfill construction will utilize soils obtained from the site mining operations as opposed to outside sources. If sufficient quantity exists and the material meets the regulatory and specification requirements, clay from mining will be used for on-site baseliner construction. On-site sand and gravel will be utilized as part of the subgrade layer, drainage layer, and for cover materials used during the placement of C&D material, as described in Section 3.4.

C&D material is visually inspected when it is disposed of on the working face to confirm that no prohibited materials are present. Recyclable materials observed during this process will be removed from the waste stream and stored for future handling, as appropriate.

Greenhouse gas emissions are reduced at the facility through the use of the active landfill gas collection and control system, as described in Section 4.2.

## **2.0 WASTE CONTROL PLAN**

The site utilizes an inbound and outbound scale to quantify the weight of waste received at the site on a daily basis and confirm that the permitted amount of daily truck trips, as described in Section 1.3, is not exceeded. Facility daily start-up consists of opening the security gate and allowing vehicle access to the facility scales and performing start-up procedures for the facility equipment.

### **2.1 INCOMING WASTE INSPECTION**

Incoming New York state waste will be accepted from municipalities that are included in a department approved comprehensive recycling analysis (CRA) or local solid waste management plan (LSWMP). The facility only accepts C&D waste. Wastes not accepted at the facility include: municipal solid waste, solid waste resulting from industrial or commercial operations, sludge from the treatment of wastewater or sewage, drilling and production wastes, friable asbestos containing wastes, or other prohibited wastes as defined in 6 CRR-NY Part 363-7.1(o).

All incoming loads are visually inspected to confirm the characterization of incoming waste materials are acceptable for disposal at the facility, and random load inspections are performed on a weekly basis. Additional inspections are conducted for suspicious loads to confirm the suitability of incoming waste. Incoming and outgoing vehicles are continuously monitored to confirm they are adequately covered when they enter and exit the site.

The quantity of incoming waste is restricted by the permitted amount of truck trips that can be made to and from the facility, as described in Section 1.3. The site typically receives around 1,000 to 2,500 tons (1,700 to 4,200 cubic yards) of waste on a daily basis; however, this quantity is subject to variability due to waste availability and various other factors, including permitting, agency review and construction timeframes. Trucks containing accepted materials for disposal are directed to the working face of the landfill, where the waste is unloaded and placed as described in Section 3.0.

Records of load inspections are kept at the facility. The waste load inspection form is provided in Appendix A.

If unauthorized waste is discovered in a load, the load will be rejected immediately. The unauthorized waste will be re-directed to an appropriate facility for disposal or management. If immediate relocation is not feasible, the unauthorized waste will be adequately segregated, secured, and contained at the facility until it can be removed. The containment of such material at

the facility will last no more than seven days without prior approval by the NYSDEC, and the relocation will be performed by a person authorized to transport the waste. The NYSDEC will be notified of such discoveries.

In the event that unauthorized solid waste is disposed of at the facility, documentation of the incident will be prepared which will include the following information: the date and time of receipt, the identity of the waste, contact and vehicle information for the waste transporter that delivered the unauthorized waste, contact information for the generator of the unauthorized waste, a description of the incident and the response measures taken, and the disposition of the waste. This information will be summarized within the annual report in accordance with 6 CRR-NY 360.19(c)(4).

## **2.2 CONFINEMENT OF C&D SOLID WASTE**

C&D solid waste disposed of at the facility is confined to a managed area and prevented from migrating outside of the managed area. C&D will only be accepted from adequately covered vehicles to control dust and blowing litter. Litter that does migrate outside of the managed area is picked up by facility personnel.

## **2.3 EDUCATION AND TRAINING**

The facility will educate users on proper methods of electronic waste management by providing written information annually, and upon request, to all potential users of the facility. Signs are posted designating that electronic waste cannot be accepted at the facility.

A similar program may be implemented to educate users that the facility is prohibited from accepting for disposal source-separated materials (such as source-separated recyclables, source-separated electronic waste, source-separated rechargeable batteries, etc.). This program would be deemed necessary if the results of incoming load inspections, as described in Section 2.1, found that these materials were commonly being transported to the site for disposal. Source-separated materials are not anticipated to be delivered to the site for disposal due to the acceptance of solely C&D debris materials for disposal at the facility.

The facility will provide training to the facility staff to ensure the waste acceptance and control plan is implemented in accordance with the requirements described above.

### **3.0 FILL PROGRESSION AND WASTE PLACEMENT PLAN**

#### **3.1 UNLOADING WASTE**

Following the inspection and documentation of waste materials, as described in Section 2.1, accepted waste materials are unloaded within the working face of the landfill. Logs are kept to document the waste received for each day of operation at the facility. The daily waste logs include the date, the quantity and type of waste received, and the location where waste was placed. The daily waste logs are kept at the facility.

The working face is maintained within the lined area, as shown on the Permit Drawings, in order to maintain acceptable waste management. The working face will be adequate in size to facilitate efficient unloading of waste and unobstructed movement of vehicles and equipment.

#### **3.2 SELECTIVE MATERIAL PLACEMENT**

The first layer of waste to be placed in a newly opened landfill phase, on top of the leachate collection layer, will be at least five feet thick and will be comprised of selective material that will not impact the operation or integrity of the composite liner system. The material will be placed using the equipment described in Section 1.5 and placement will occur in a manner to prevent damage to the liner system as a result of the material placement or equipment operation. The equipment operators will take care to maintain the 5-foot depth of material between the equipment and the top of the leachate collection layer and will minimize, to the extent practical, excessive turning of the equipment or other movements that may be unfavorable in these scenarios.

#### **3.3 C&D WASTE DENSITY MONITORING**

The facility tracks waste acceptance rates, cover soil usage, and airspace consumption. On an annual basis, the in-place density of the waste will be calculated by dividing the total tonnage of waste and estimated (truck counts) over soils placed by the total airspace consumed.

#### **3.4 C&D WASTE PLACEMENT**

Following the establishment of the first layer of selective material, C&D debris placement will proceed in layers of approximately ten feet in un-compacted thickness. Waste placement will occur solely within the designated landfill areas, as described in Section 2.2, and will progress sequentially in designated phases (refer to Permit Drawings for waste fill progression, landfill

development, landfill gas collection line locations, and final cover elevation plans. [Note: horizontal gas collection lines are not required at the facility and are thus not shown on the aforementioned plans. Refer to Section 4.2.2 for additional description of the landfill gas collection and control system.]). The C&D waste will be placed using the equipment described in Section 1.5 and will be placed in a manner that promotes rapid compaction of the waste. The working areas will be adequately drained to minimize standing water.

Low permeability and/or low shear-strength wastes are not anticipated to be received by the facility; however, in the event that these wastes are disposed of at the facility they will be visually identified and then mixed with other materials during waste placement in order to minimize waste mass instability and prevent interference to leachate movement through the waste mass.

### **3.5 LANDFILL FILL PROGRESSION AND FINAL GRADES**

The facility currently has Phases 1 through 7A constructed and operational. Phase 10A, which is currently under construction and expected to be operational in spring 2022, will be the next phase of construction, followed by Phases 10B, 10C, 9, 8A, 8B, and, 7B. The overall fill progression plans, as shown on Sheets C309 and C310 of the MSE Berm Permit Modification Plans, depict the seven remaining phases of continued cell construction, beginning with Phase 10A.

Filling of the waste disposal area will progress with side slopes of 33% (3H:1V) to an elevation of approximately 300 feet. In general, waste will be placed in lifts of approximately 10 feet in height. The working face area size encompasses an area of approximately 1 acre. Final external slopes will not exceed 3H:1V. The remaining fill will be placed at a slope of 5% across the plateau, which will encompass approximately 35 acres at full closure of the facility. Final grading of the facility is shown on Sheet C302 of the above referenced plans.

No subsequent development of the facility is proposed for at this time.

### **3.6 COVER MATERIALS MANAGEMENT PLAN**

#### **3.6.1 Operating Cover**

The operating cover material will consist of soil, clean masonry material, or approved equal that is effective in preventing and controlling vectors, fires, odors, dust, and blowing litter. The operating cover material is most commonly obtained from the mining activities at the site, which typically consists of a silty sand material with a permeability typically within the range of  $10^{-4}$  to

10<sup>-3</sup> centimeters per second. The specific material characteristics may change based on the mining operations at the site; however, the material used for operating cover will continue to meet the requirements outlined in this Section.

On a daily basis, or more frequently if nuisance conditions arise that warrant increased placement, the working face of the landfill will be covered with a minimum of 6-inches of operating cover. Cover soils are placed using the facility equipment identified in Section 1.5. The thickness of the cover material will be increased if necessary to control nuisances. On landfill surfaces where no additional waste has been placed within 30 calendar days, a minimum of 12-inches of operating cover will be placed.

Operating cover will be hauled to the active area at the end of each operating day or stockpiled throughout the day within the active area. The landfill plateau area provides additional space for operational support and materials storage. A sufficient supply of operating cover material will be generated and maintained on site; however, the exact quantity required will vary based on site operations. The supply of material will be suitable to at least cover the working face of the landfill with the depth of material described above.

Currently, the only approved alternative operating cover is tarps. Tarps are used (typically in conjunction with soil cover placement to ensure the tarps provide complete coverage of the wastes) to reduce the quantity of cover soils used. The tarps are moved into place using facility equipment and the edges of tarps are ballasted with soils, concrete blocks or large equipment tires to hold them in place. The tarps are then removed the following day to resume waste placement.

### 3.6.2 Intermediate Cover

Intermediate cover material will consist of soil proven effective at inhibiting precipitation from entering the waste mass, containing leachate outbreaks, and inhibiting the migration of gases. The material generated on-site and used as operating cover, as described in Section 3.4.1, is also used for the intermediate cover applications described in this Section. Intermediate cover will be placed and maintained on all external slopes for every 20 feet of vertical rise, and will be placed using the facility equipment identified in Section 1.5. The quantity of intermediate cover required will vary based on the progression of waste filling.

### 3.6.3 Final Cover

A final cover system has been designed in accordance with 6 CRR-NY 363-6, as shown on the Permit Drawings. Refer to the Engineering Report for material specifications related to the final cover system. Final cover installation will occur periodically as sufficient areas of finish grades are achieved. Materials required for the final cover installation will be delivered and stored on-site accordingly. The final cover system will be installed and maintained in accordance with the requirements outlined in 6 CRR-NY 363-9.

## 4.0 OPERATIONS AND MAINTENANCE

### 4.1 LEACHATE MANAGEMENT PLAN

#### 4.1.1 Leachate Collection

The design and operational objective is to keep C&D wastes accepted at the facility in a well-drained configuration above a leachate collection system. This will effectively reduce both the ponding of water within the waste mass and the creation of a potential reducing environment. The leachate collection system has been designed to reduce ponding of water within the waste mass and maintain less than 12-inches of head above the liner system, except during the seven day period following a storm event and within designated sump areas.

C&D waste will be placed on top of a sloping drainage layer with a thickness of 2 feet (the 2-foot drainage layer is underlain by a composite membrane and clay liner system). In addition, each cell will be configured with sloping surfaces pitched towards central collection systems to facilitate fluid flow within leachate collection piping. The leachate collection piping will be installed within a stone trench lined with geotextile to further facilitate the flow of fluids into the leachate collection system. These engineering design features will reduce the possibility for the C&D waste mass to become saturated.

In the event of an unexpected condition during the construction or operation of the leachate collection system, the system will be evaluated and appropriate action, such as repairs or cleaning, will be taken to provide continued system operation.

#### 4.1.2 Leachate Conveyance and Storage

Leachate collected from the leachate collection system is pumped from the landfill at designated sump locations and conveyed through dual-contained force mains to the existing above ground storage tank (AST) located near the entrance of the facility. The leachate sump locations have alarms to alert the operator in the event the leachate pumps shut off unexpectedly. The AST is capable of storing 275,000 gallons of leachate while maintaining a minimum of 2 feet of freeboard, and is equipped with a high-level alarm to prevent overfilling. The volume of leachate in the storage tank is monitored on a daily basis by recording the leachate as indicated by the level transmitter and converting this number to gallons using a conversion chart. The quantity of rainfall is also recorded on a daily basis from an on-site rain gauge. The leachate within the tank is removed once the tank reaches 75% capacity or once every two operating days. The leachate is pumped

into tanker trucks destined for authorized disposal or treatment locations. The tank components are inspected on a monthly basis and remedial measures are taken immediately in the event that any deficiencies are identified.

As described in the facility's SWPPP, stormwater within the secondary containment storage area of the existing AST is removed by opening a drain valve, provided the stormwater is observed to be free from leachate contamination. The valve is normally kept closed, and is temporarily opened after storm events in order to maintain the capacity of the storage area.

#### 4.1.3 Leachate Collection System Maintenance

The leachate collection system will be cleaned annually and properly maintained in good operating condition. The leachate collection pipes will be inspected by video at least biennially and cleaned annually unless a waiver is granted by NYSDEC.

A log will be maintained to record monthly leachate generation amounts and a maintenance log documenting completion of cleaning and video inspection as described above.

#### 4.1.4 Leachate Monitoring

Samples and measurements taken for the purpose of monitoring will be done in accordance with 6 CRR-NY Part 363-4(6)(f)(8) and the NYSDEC approved Environmental Monitoring Plan (EMP) for the site, which also includes acceptable laboratory use and data reporting format.

## **4.2 GAS MONITORING AND EMISSION CONTROL PLAN**

### 4.2.1 Landfill Gas Generation

The C&D materials accepted for disposal at this facility have the potential to generate landfill gas (LFG) within the waste mass. Several operational controls are implemented at the facility to reduce the generation of landfill gas. Waste placement for potentially gas producing C&D debris will be spread in lifts over a broad area, and not concentrated in any one area of the landfill. The use of on-site sand and gravel materials as a source of cover, as described in Section 3.4, will serve to facilitate the draining of fluids from the C&D waste and limit the creation of pockets of saturation within the waste mass. During periods of wet weather, operating cover or a tarp will be placed over exposed sheetrock or other potentially gas producing C&D debris to reduce the potential for landfill gas generation from this waste.

#### 4.2.2 Landfill Gas Collection and Control System

The facility has an active landfill gas collection and control system (GCCS) in operation. The system consists of a blower to exert vacuum on the system and a flare to combust the collected landfill gas. Several collection points are in place within the waste mass, including vertical landfill gas extraction wells and the connection of the LFG collection system to the leachate collection system cleanout pipes. Landfill gas collection components, as shown on C304 of the Permit Drawings, are installed as the waste placement progresses. Additional collection points, including vertical extraction wells and horizontal collection pipes, can be installed and connected to the LFG collection system as needed based on waste placement and gas generation at the facility, or if increased odor levels resulting from landfill gas generation are observed.

The flare is equipped with a connection for supplemental propane if it is necessary to augment the collected landfill gas to maintain combustion. A cellular modem/communications package is included with the flare system to allow for text notifications for system faults. Upon receiving notification of system faults, S.A. Dunn will initiate a response immediately regardless of time of day or day of the week. Some system faults can be reset remotely. If the fault requires a site response and occurs outside of operating hours, an S.A. Dunn representative will respond as soon as possible upon determining that a remote reset is not practical or effective to diagnose and remedy the fault.

In the event of unexpected conditions during the expansion or operation of the LFG collection system, the system operations will be evaluated and the system will be shut down if needed until repairs or adjustments can be made. The system operations would resume as soon as possible provided it is safe to do so.

#### 4.2.3 Landfill Gas Monitoring

During landfill operations and the post-closure care period, quarterly gas monitoring will be conducted to further verify that landfill gas is within acceptable levels. Gas monitoring will be performed for hydrogen sulfide at each of the groundwater monitoring well locations. The gas monitoring will also include field measurements of hydrogen sulfide gas at four (4) locations on and/or around the landfill mass.

The LFG collection and control system will be routinely monitored and the system operations will be adjusted as needed to control LFG generated at the facility. During normal operations of the system, excessive concentrations of explosive gas (>25% of the lower explosive limit) will be prevented from persisting on-site or beyond the property boundary.

The GCCS inspection form is provided in Appendix A. Routine operation, maintenance, and monitoring will be performed as follows:

### **Blower/Flare Operation and Maintenance**

The blower and flare will be operated in accordance with manufacturers requirements as outlined in the equipment specific Operations and Maintenance (O&M) Manual prepared by Parnell (provided upon initial start-up of the equipment). Equipment maintenance will be conducted based on service life also in accordance with the manufacturer's recommendations. A log of the performed maintenance will be prepared and kept on-site with the flare and blower O&M Manual.

### **Daily Operations, Maintenance, and Monitoring**

On a daily basis, the flare and blower system will be visually observed to verify that the system components are operating correctly. Specific activities include:

- Observe panel for system malfunctions;
- Observe and document the flare temperature (verify it is within appropriate range), inlet pressure, flow, pressure, and methane percentage;
- Observe the flame;
- Observe the liquid level in the knock-out pot and verify that it is draining properly; and
- Observe landfill surface for indications that gas venting or air intrusion is occurring.

If repairs or corrective actions are necessary, these will be noted and a schedule of repairs will be developed.

### **Monthly Operations and Maintenance**

On a monthly basis, the flare and blower system, landfill gas wellheads, and above grade piping will be visually observed to verify that the system components are operating correctly.

In addition to the above monitoring activities, each landfill gas well will be monitored monthly for the following:

- Carbon dioxide concentration;
- Oxygen concentration;
- Methane concentration;
- Balance gas concentration;
- Wellhead gas temperature (before and after adjustment);
- Wellhead vacuum (before and after adjustment); and
- Wellhead adjustment valve position (before and after adjustment).

The collected data will be used to adjust or tune the wellfield to maintain proper operation of the flare and to control odors. Adjustment at one well may impact the performance of other wells; therefore, initial readings will be made at each well before adjustments at wells are made.

### **Annual Operations, Maintenance, and Monitoring**

On an annual basis, the following activities will be performed:

- Clean electrical equipment controls and instrumentation;
- Observe condensate equipment corrosion and other maintenance needs; and
- Complete a visual check of overall system operations.

### **4.3 POST-CONSTRUCTION CARE PLAN**

Upon completion of construction of a new landfill phase and prior to placement of select material, the facility will regularly inspect the drainage soils for signs of erosion or intrusion of fines related to water-borne or wind-borne sediments. Prior to placement of select fill, any eroded areas of drainage material will be re-graded using the same drainage material used for construction. If significant migration of fines from adjacent areas migrates into the new phase drainage layer, the affected drainage material will be removed and replaced using the same drainage material used for construction.

### **4.4 MAINTENANCE OF ON-SITE ROADS**

On-site roads will be maintained as safe and passable at all times.

#### **4.5 SALVAGING**

Salvaging will not be permitted at the facility.

#### **4.6 OPEN BURNING**

Open burning at the facility is prohibited, unless a restricted burning permit is obtained from NYSDEC. Immediate measures will be taken to extinguish any non-permitted open burning, for which NYSDEC will be notified of its occurrence.

#### **4.7 WINTER AND INCLEMENT WEATHER OPERATION PLAN**

Snow removal will occur as needed during the winter months to maintain access to the site.

During the winter months, the first layer of selective waste material will be placed as quickly as possible following construction certification approval to prevent frost from penetrating the leachate collection layer and potentially impacting the liner system. The material placement will occur as described in Section 3.2.

Dunn will implement an extreme weather action plan on days when the National Weather Service forecasts the following weather notifications:

- High Wind Watch (issued when sustained winds of 40 miles per hour (mph) or higher for one hour or more or wind gust of 58 mph or higher for any duration are possible).
- High Wind Warning (issued when sustained winds of 40 mph or higher for one hour or more or wind gust of 58 mph or higher for any duration are expected).
- Wind Advisory (issued when sustained winds of 31 to 39 mph for an hour or more and/or wind gusts of 46 to 57 mph for any duration are expected).
- Severe Thunderstorm Watch (issued when thunderstorms are possible in the watch area and winds of 58 mph or higher are expected).
- Tornado Watch (issued when a tornado is possible in the watch area and winds of 58 mph or higher are expected).
- Severe Thunderstorm Warning (thunderstorms are imminent in the warning area).
- Tornado Warning (tornado is imminent in the warning area).

When a high wind watch, severe thunderstorm watch, or tornado watch is issued, Dunn will implement the following procedures:

- Evaluate condition of exposed slopes; if necessary and sufficient time exists, apply tackifier-bonded mulch to disturbed excavation or stockpile slopes. As often as necessary, apply water or calcium chloride if temperatures are below freezing.
- Evaluate condition of roadways; as often as necessary, apply water. If temperatures are below freezing, as often as necessary, apply calcium chloride.
- Monitor weather forecast updates for upgrades from watches to warnings.

If a high wind warning, wind advisory, severe thunderstorm warning, tornado watch or warning are issued, Dunn will conduct the activities mentioned above and cease both mining and waste operations one hour prior to the warning period (provided that the weather notification is issued at least one hour prior to the beginning of the effective period). In addition, cover placement activities will begin one hour prior to the effective time (or immediately if the notification is issued less than one hour in advance of the effective time) of such notifications.

If the National Weather Service issues any of the above mentioned weather watches, warnings or advisories or elevated (or greater) risk for tornados, thunderstorm wind gust, or non-thunderstorm winds (i.e., Wind Advisories, High Wind Watches or High Wind Warnings that occur without a Severe Thunderstorm Warning) for an effective period during a weekend, holiday, or on a Monday morning, Dunn will undertake the procedures mentioned above ahead of time during permitted hours of operation. This includes placement of chlorides (e.g. calcium or magnesium) or other long-lasting approved dust palliatives as approved in the facility's Dust Control Plan to roadways and other exposed sand surfaces that are not stabilized by tackifier bonded mulch and/or erosion control matting. If such watches, warnings or advisories are issued outside of permitted hours of operation, the Department will be notified and Dunn will mobilize resources as soon as possible to mitigate dust potential.

#### **4.8 DUST AND VECTOR CONTROL**

The facility will be operated and maintained such that dust and vectors are not a nuisance or health threat to the nearby residents. Neighboring residents are encouraged to contact the facility manager if they are being impacted by noise, dust or other issues related to facility operations. All complaints will be recorded and responded to, in a timely manner, by facility staff.

Facility operations will continue in accordance with the established dust control plan, dated November 2020, and any subsequent revisions. The Dust Control Plan is included in Appendix C. The access roads will be watered if dust problems appear imminent. Water will not be sprayed onto potentially gas producing C&D debris that is excessively dry, rather either operating cover or an approved dust palliative will be applied in instances where dust generation becomes a nuisance, particularly for pulverized C&D debris waste. The facility dust control measures inspection form is provided in Appendix A.

As described in Section 4.1, leachate is collected and controlled in a manner to reduce any open exposure of leachate, minimizing the potential for odors. All leachate piping and the leachate storage tank will be water tight and not vented to the surrounding environment. Similarly, leachate trucks will be water tight and not vented upon being filled.

Since no putrescible waste will be accepted, the opportunity for vector problems arising from the accepted waste is minimized. Furthermore, the waste characterization at the site, which consists solely of C&D debris materials, is not expected to change.

In the event that nuisances arise due to a change in conditions such as an increase in waste volume acceptance, or change in waste characterization, the nuisances would be controlled by increasing the amount and/or frequency of cover material. Further controls would be developed and implemented if needed.

#### **4.9 ODOR CONTROL PLAN**

The facility will be operated and maintained such that odors are not a nuisance or health threat to the nearby residents. Neighboring residents are encouraged to contact the facility manager if they believe they are being impacted by odors related to facility operations. All complaints will be recorded and responded to, in a timely manner, by facility staff. The individual responsible for implementing the odor control plan is the Assistant District Manager as identified in Section 6.0.

Potential sources of odor at the facility include uncontrolled leachate, odorous wastes, and the generation of odorous gases within the waste mass. Potential generation of odors associated with C&D debris waste and leachate management mainly includes the potential generation of hydrogen sulfide gas associated with sulfate-reducing bacteria's (SRB) reaction with sheetrock in a reducing environment.

The C&D landfill will be operated in a manner to not cause the production of any significant amounts of hydrogen sulfide or become the source of odors at or near the facility. Cover material will be placed as described in Section 3.4 and as necessary to minimize and control any nuisance conditions such as odors, fire hazards, vectors, blowing material and scavenging. Furthermore, the landfill gas collection and control system, as described in Section 4.2, is operated to collect gas generated within the landfill and prevent landfill gas from creating nuisance odor conditions.

In the event that nuisances arise due to a change in conditions such as a change in waste characterization, or increased landfill gas generation, the nuisances would be controlled by increasing the amount and/or frequency of cover material placement or expanding the landfill gas collection and control system. Further controls would be developed and implemented if needed.

#### **4.10 NOISE CONTROL**

The facility will be operated in ways to avoid any increase in noise associated with activities at the facility, and truck traffic to and from the project site. As discussed in Section 1.3, truck traffic traveling to and from the project site is currently limited to 100 round trips per day (200 total trips per day). This threshold is a baseline condition that will not be exceeded.

Noise levels from equipment and operations at the facility will be controlled to prevent transmission of sound levels beyond the property lines that exceed equivalent sound levels currently experienced in the area. All internal combustion powered equipment will have mufflers to reduce potential sound levels.

Noise best management practices (BMP's) implemented during facility operations that will serve to mitigate the potential for adverse noise impacts to off-site receptors include the following:

- Blasting is prohibited.
- Mining equipment on-site will be equipped with back-up alarms, which will activate only when infrared sensors detect personnel in the vicinity of such equipment. Facility operations will be planned such that waste disposal trucks entering into the facility will not need to back up, except under unusual circumstances.
- Mufflers will be used for all mining and waste disposal equipment on-site, and will be required for all waste delivery trucks entering into the facility. Mufflers will be maintained in good working order.

- Vehicles speeds on haul roads and City streets will be kept to practicable minimums and engines will be kept at idling speeds to the greatest extent possible.
- Portable screening operations for the mining operations will be located in the lowest portions of the active mining area surrounded by bank slopes.
- The average amount of equipment in operation at a given time will be kept to a practicable minimum. Only the equipment that is needed at a given time will be in operation at that time.
- The existing access road off of Partition Street Extension will continue to be used as the primary entry and exit point to and from the project site.

## **5.0 INSPECTIONS, RECORDKEEPING, AND REPORTING**

### **5.1 ROUTINE INSPECTION**

The facility will be monitored continuously for situations that could create a potentially harmful release to the environment or threat to human health. Daily inspections will be made by facility staff to avoid minor deficiencies that may include, but are not limited to, inappropriate slope of waste placement and insufficient depth of cover material. Proper function of leachate pumping stations will be maintained, and leachate storage tank levels will be tracked routinely.

The facility operator will record self-inspections, noting date and time of the inspection, name of inspector, the specific nature of the inspection, and a description of what was observed. Dates and details of any remedial action will also be recorded. The daily site inspection form is provided in Appendix A.

### **5.2 RECORDKEEPING AND REPORTING**

The following documents and records will be kept at the facility office building.

#### **5.2.1 Application Documents**

The operator of the facility will, during all times of operations including post-closure and custodial care periods, have a copy of all permits issued for the facility by NYSDEC, including construction certifications and closure construction certification documents.

#### **5.2.2 Operating Records**

Operating records shall include daily waste logs (as described in Section 2.1), routine inspection logs (as described in Section 5.1), applicable training programs and certifications, and applicable monitoring reports in accordance with the EMP and 6 CRR-NY Parts 360 and 363.

Records will be retained of all monitoring information for a period of at least seven years from the date of the sampling event, measurement, report or application.

### 5.2.3 Annual Report

An annual report will be submitted March 1 of each year to the central and Region 4 offices of NYSDEC. The report will include: the volume and weight of waste received, along with an estimation of the remaining approved design volume; the results of the approved environmental monitoring plan; any deviations made from the approved plans, specifications, operating requirements and permit conditions; an accounting of how much leachate was collected, and how it was disposed of; and adjustments to closure and post-closure care cost estimates and financial assurance documents.

## **6.0 PERSONNEL PLAN**

The facility staff will be appropriately trained to manage the quantity and type of waste that will be handled at the facility. It is anticipated that the facility will be staffed, at a minimum, by one attendant and one operator during hours of operation.

### **6.1 OPERATIONAL POSITIONS AND RESPONSIBILITIES**

#### **6.1.1 District Manager**

The District Manager is responsible for the overall operation of the Facility and the supervision of Facility employees. The District Manager coordinates the efforts of the Operations Supervisor, Scale Attendant, Laborers and Equipment Operators. The District Manager is responsible for making sure that workers follow the various federal, city and state laws relative to the inspection and handling of solid waste.

#### **6.1.2 Assistant District Manager**

The Assistant District Manager is jointly responsible for the overall operation of the Facility and the supervision of Facility employees. The Assistant District Manager coordinates the efforts of the Scale Attendant, Laborers and Equipment Operators. The Assistant District Manager acts as the Emergency Coordinator when present at the Facility. The Assistant District Manager is responsible for making sure that workers follow the various federal, city and state laws relative to the inspection and handling of solid waste. The operator will complete a course, approved by NYSDEC, for instruction in solid waste management procedures pertinent to operating a C&D landfill. The course will be completed within 12 months of the date of employment and renewed every five years. Proof of training will be kept on file at the facility.

#### **6.1.3 Scale Attendant**

The scale attendant at the facility is responsible for directing and recording waste and traffic flows at the facility. The scale attendant's responsibilities include operating the facility scales and communicating with the drivers of inbound and outbound vehicles.

#### 6.1.4 Equipment Operators

The facility equipment operators are responsible for operating the facility equipment described in Section 1.5. The equipment operators shall be adequately trained in the operation of the equipment to be used and in the facility's waste control plan.

#### 6.1.5 Skilled Mechanic

The Skilled Mechanic is responsible for maintaining the facility equipment in good working order to reduce the frequency of equipment breakdowns and limit equipment downtime. The skilled mechanic performs necessary routine inspections and maintenance of the equipment, as well as more extensive maintenance measures provided the site maintenance facility is suitable for the work.

### **6.2 EMPLOYEE TRAINING**

The Dunn Mine and C&D Facility is committed to protecting the health and safety of its employees. This commitment is the foundation of the company's core values and culture. These values will not be compromised under any circumstances. Dunn Mine and C&D Facility continuously builds on their resolute commitment to workplace health and safety, in order for the company to accomplish its goal of becoming the safest workplace possible their employees, customers, contractors and the general public's interest.

Dunn Mine and C&D Facility has a comprehensive and proactive safety program, which includes written safety protocols that have been established to encourage worker safety at the Facility. These protocols are integrated into the weekly and monthly safety training sessions. A copy of these safety protocols are maintained at the Facility and are available to Facility employees at all times.

The Site Manager conducts a comprehensive training session on a monthly basis to enforce Dunn Mine and C&D Facility safety policies. Topics covered typically include regulations (OSHA, New York State Department of Labor/ Public Employee Safety and Health Bureau, NYSDEC) and safe operating practices (equipment operation, safety devices, MSDS, PPE, etc.). The monthly training sessions include quizzes and each employee in attendance must sign-off indicating they understood the training that was presented. Each employee in attendance must also sign a Training Session Roster, which attests the employee understood the topics covered in the session.

Training presented is from Dunn Mine and C&D Facility training courses. Safety training courses include information such as the Facility's standard operating procedures. Initial employee training focuses on the employee's duties they will be initially performing which will ensure the Facility continues to comply with safety standards and with the NYSDEC's 6 NYCRR Part 360 and Part 363 regulations.

The Dunn Mine and C&D Facility's training focuses on the hazards associated with infectious and hazardous materials and the means to identify and correctly handle unauthorized wastes. The training also includes site-specific training in waste handling and transfer station operations. In addition to detailing the routine procedures of Facility operations, this site-specific training includes emergency topics such as emergency spill response, fire extinguisher use, and fire safety. Facility employees complete weekly and monthly safety training, which serves to re-emphasize previous training and to maintain employee safety at the Facility.

Dunn Mine and C&D Facility training courses include the following topics:

- Site Procedures and Processes; Start-up and Shutdown of Facility Operations;
- Site Safety Plan;
- Site Contingency Plan;
- Safe work practices;
- Nature of anticipated hazards;
- Handling and responding to emergencies;
- Use and care of Facility emergency equipment, communication and alarm systems;
- Handling, storage, and transportation of materials;
- Employee rights and responsibilities;
- Bloodborne Pathogens and Bio Hazards;
- Cold and Heat Stress;
- Confined Space Compliance Training;
- Ergonomics and Safe Lifting;
- Hazard Communications;
- Hazard Identification;
- Lockout/Tag out;
- Use and care of Personnel Protective Equipment (PPE);
- Three Point Contact Rule;
- Unauthorized Waste Recognition and Handling Procedures;
- Asbestos Recognition and Handling Procedures;

- Incident Reporting;
- OSHA 300 Log;
- Slip/Trip/Fall Hazards;
- Fire Protection;
- Facility Permits – NYSDEC;
- Truck Direction and Backing.

In addition, newly hired employees initially engage in actual field activities under the direct supervision of the Facility Manager or designee.

Although each employee may have a specified job title, most employees are required to assume other positions as deemed necessary by current site activities.

## **7.0 EMERGENCY RESPONSE PLAN**

The facility will respond to emergencies such as fires, explosions, natural disasters, and spills in accordance with Part 360-19(m) and as described below.

The following Plan will ensure that a coordinated course of action will be taken in the event of unanticipated emergencies that may occur during construction and operation of the facility.

Actions taken by the facility in response to spills are described in the most recent version of the facility's SWPPP, which includes the Spill Prevention Control and Countermeasures Plan (SPCC).

### **7.1 ARRANGEMENTS WITH LOCAL EMERGENCY RESPONDERS**

During the first three (3) months of operation, local emergency response agencies were provided with a tour of the facility to become familiar with the facility operations, site layout and environment, as well as the opportunity to inspect and comment, as appropriate. The agencies included the City of Rensselaer Fire Department, Police Department, and Volunteer Ambulance Service, Inc.; NYSDEC Region 4; the Rensselaer County Sheriff's Department; and the New York State Police.

### **7.2 EMERGENCY COORDINATORS**

The emergency coordinator for the facility is the following individual:

**Corey Judd**

Regional Manager

209 Partition Street Extension

Rensselaer, New York 12144

Mobile Phone: (518)431-9439

The coordinator will contact all applicable emergency response agencies in the event of an emergency. All facility employees will be instructed to contact the above coordinator should an emergency arise.

The following emergency response agencies may be contacted depending upon the specific emergency situation:

<b>EMERGENCY RESPONSE AGENCIES</b>	<b>TELEPHONE NUMBER</b>
1.0 City of Rensselaer Fire Department	(518) 462-7453
2.0 Rensselaer Volunteer Ambulance Services, Inc.	(518) 427-8515
3.0 City of Rensselaer Police Department	(518) 462-7451
4.0 Rensselaer County Sheriff's Department	(518) 270-5448
5.0 New York State Police	(518) 474-5331
6.0 Albany Memorial Hospital	(518) 471-3221
7.0 NYSDEC Region 4	(518) 357-2045
8.0 New York State Office of Fire Prevention and Control	(518) 474-6746

In addition, outside emergency response contractors may be contacted to handle situations that involve unacceptable waste requiring a prompt response, as described in Section 2.1.

### **7.3 EMERGENCY EQUIPMENT**

Basic emergency equipment is available on-site. Fire extinguishers of appropriate size are located in all buildings and on all pieces of heavy equipment. Spill control and abatement equipment for isolating and preventing the migration of spilled materials is also available on-site.

Mobile phones and/or radios are accessible in all buildings, vehicles, and heavy equipment for use in communications during an emergency.

### **7.4 FIRES AND DELIVERY OF HOT LOADS**

All incoming loads are visually inspected for smoldering waste and, if found to contain smoldering waste, will remain in the trailers/roll offs outside of the working face and extinguished.

The working face will be visually inspected for smoke, emissions and/or holes and depressions on a daily basis with the findings being logged. In the event of a fire, the emergency coordinator will contact the Rensselaer Fire Department. The necessity of further assistance will be identified by the on-scene commander from the Fire Department. HazMat teams will be contacted if necessary and are available through the New York State Office of Fire Prevention and Control.

Very limited fires will be contained with fire extinguishers or smothered with cover soil, if appropriate.

## **7.5 EQUIPMENT BREAKDOWN**

Essential equipment will be maintained in good working order; however, if a necessary piece of equipment will not be available for an extended length of time (longer than normal maintenance operations), the facility will lease the appropriate replacement equipment until the original is put back into service. Failing equipment will be replaced, as necessary.

## **7.6 UNSCHEDULED FACILITY SHUTDOWN**

In the event of significant interruptions to the facility's operations, the emergency coordinator, identified in Section 7.2, will be notified. Depending on the nature of the incident, appropriate remedial actions will be determined and implemented.

If an unscheduled facility shutdown exceeds 24 hours, the facility will notify the NYSDEC immediately to describe the incident and propose temporary waste management procedures.

## **7.7 GROUNDWATER AND SURFACE WATER CONTAMINATION**

The controls listed in Section 1.6 are implemented to prevent groundwater and surface water contamination. In the event that the routine monitoring and sampling at the facility does identify potential groundwater and/or surface water contamination, the appropriate procedures as described in the EMP will be implemented.

## **7.8 UNCONTROLLED LANDFILL GAS**

In the event the landfill gas monitoring, as described in Section 4.2.3, detects explosive gas concentrations exceeding 25 percent of the lower explosive limit, immediate actions will be taken to assess and remedy the situation.

Assessment of the situation will involve inspecting the landfill gas collection and control system to verify the system is operating correctly, provided it is safe to perform such an inspection. Depending on the nature of the monitoring results, the system operations will be adjusted to increase the level of collection in order to control the excessive LFG concentrations. If the problem cannot be resolved with adjustments to the operation of the LFG collection system, alternative

short-term solutions will be pursued and the LFG collection system will be evaluated and expanded as needed.

The NYSDEC will be notified within 24 hours of the detection of the excessive explosive gas levels. Within seven days of the detection, the detected levels will be submitted to the NYSDEC along with a plan describing steps to be taken to prevent property damage and protect the health and safety of facility personnel and the public. If the excessive concentrations persist for an extended period of time, a plan will be developed that describes the nature and extent of the problem and outlines steps to take to remediate the gas release(s). The plan will be submitted to the NYSDEC within 30 days of the initial explosive gas detection.

## **7.9 EVACUATION PLAN**

In the event of an emergency at the facility that requires evacuation, an alarm will sound and personnel will report to the main entrance, as instructed during training for employment at the facility. At the entrance, the emergency coordinator will take attendance to ensure that all personnel have left the site. The emergency coordinator will notify employees when it is appropriate and safe to return to the facility.

## **7.10 NATURAL DISASTERS AND OTHER EXTREME EMERGENCIES**

In the event of a natural disaster that impacts the site, the emergency coordinator will work with other facility personnel to assess the condition of the site's facilities. The assessment will include the facility access roads and stormwater controls, the landfill gas collection and control system, the leachate collection and conveyance system, the leachate storage tank, exposed areas of baseliner or cover components, and other visible components that may be impacted by such an event. Following the assessment, it will be determined if the facility operations have been or have the potential to be disrupted, and appropriate measures will be implemented to prevent or limit such disruptions. Equipment used at the facility for day to day operations, as described in Section 1.5, could be used to assist in clean-up and material management efforts.

If a natural disaster generates a large quantity of debris in surrounding areas, the facility would have the ability to expand on its routine services (i.e. longer operating hours) or provide non-standard services for the purposes of disaster relief, provided the NYSDEC grants approval for those services. The facility would be able to coordinate with debris transporters to provide them with important information about the facility and its disaster response efforts.

## **8.0 CONCEPTUAL CLOSURE, POST-CLOSURE, CUSTODIAL CARE, AND END USE PLAN**

### **8.1 CLOSURE PLAN**

Site plans depicting the proposed final contours, property lines, water courses, roads, structures, stormwater management system, and a landfill gas collection system was presented in the drawings titled Footprint Modification Drawings prepared by CEE, dated March 2016, and approved by NYSDEC in June 2016. Subsequent plans, titled MSE Berm Permit Modification Drawings, were submitted to NYSDEC in January 2022 presenting revised final contours, roads, structures, stormwater management system, and landfill gas collection system. The stormwater management system is presented on Sheet C303 and the landfill gas collection system is presented on Sheet C304. Details of the final cover components are shown on the Footprint Modification Drawings.

A closure plan will be developed and submitted to the NYSDEC at least 180 days before the commencement of construction of final facility closure, in accordance with 6 CRR-NY 363-9.3(c).

An updated deed description will be submitted along with the closure plan in accordance with Part 363-7.1(r). The updated deed description will include/address the following items:

- Period of time during which the property has been used as a landfill;
- Description of the wastes contained within the landfill; and,
- Survey and map indicating the limits of the disposal areas within the property boundary.

### **8.2 LANDFILL CLOSURE AND POST-CLOSURE DESCRIPTION**

Complete landfill closure will consist of installing the final cover system and final cover stormwater controls, as shown in the Permit Drawings. As described in Section 3.4.3, final cover installation will occur periodically as sufficient areas of finished grades are achieved. Due to the nature of the fill progression sequencing, it is possible that all of the landfill cells may receive waste before any one individual cell is completely closed. The landfill fill progression sequencing is shown in the Permit Drawings, and the final cover sequencing will be described in greater detail in the future Closure Plan, as described in Section 8.1.

The final cover system will be installed and maintained in accordance with the requirements in Subpart 363-9. Upon final facility closure, the quantity of waste and operating cover within the

landfill will have reached the design capacity of approximately 11 million cubic yards, as described in the Engineering Report.

No conceptual end use of the facility is proposed for the site at this time.

### **8.3 CLOSURE AND POST-CLOSURE MONITORING AND MAINTENANCE**

Upon termination of use, the facility will be closed in accordance with the approved closure plan and will continue to be monitored in accordance with the approved Environmental Monitoring Plan (EMP) and in accordance with Subpart 363-9.6(a)(1)(iv). The landfill gas collection and control system will continue to be monitored as described in Section 4.2.3, and in accordance with Subpart 363-7.1(e).

### **8.4 CLOSURE AND POST-CLOSURE CUSTODIAL CARE MONITORING AND MAINTENANCE COST**

The facility maintains a financial assurance mechanism (FAM) in an amount sufficient to cover the cost of closure, post-closure care, custodial care, and corrective actions. The FAM is updated as needed as the facility develops, and includes the following items:

- Quantities and costs for each component of the final cover system;
- Construction costs for the final cover system; and,
- Post-closure operational, monitoring, maintenance, and custodial costs for the 30-year post-closure care period.

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## **APPENDIX A**

### **FACILITY INSPECTION FORMS**

- Waste Load Inspection Form
  - Daily Site Inspection Form
  - GCCS Inspection Form
  - Dust Control Measures Inspection Form
  - Stormwater Inspection Form
-



# DUNN LANDFILL



## Waste Load Inspection Form

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
 Owner: \_\_\_\_\_ Driver: \_\_\_\_\_  
 ID Code: \_\_\_\_\_ Vehicle Type: \_\_\_\_\_ Vehicle Capacity: \_\_\_\_\_  
 Waste Source: \_\_\_\_\_

1) Explosives or ammunitions		10) Rolls of carpet or fencing over twelve inches in diameter, and/or 4' in length	
2) Combustible liquid or gas containers, bottles, cylinders or cans.		11) Animal wastes or parts of animals <i>Excluding normal household garbage</i>	
3) HAZARDOUS MATERIALS Caustic acids, corrosives, chemicals or other hazardous wastes containing radioactivity or other contaminates or pollutants prohibited by mandatory and binding laws or regulations of the US and/or NYS government(s)		12) Automotive or larger sized tires	
4) Liquid or slurry wastes (<20% Solids)		13) INFECTIOUS WASTE Contaminated hypodermic needles, syringes, broken glass and scalpel blades, isolation wastes, cultures and stocks from hospitals and laboratories, human blood and blood products	
5) Unopened containers the contents of which cannot be readily visually identified, including barrels of any kind		14) Electronics (TV's, computer equip.), fluorescent bulbs, lead-acid & rechargeable batteries, newspapers or any other bulk recyclable materials	
6) Tree trunks, stumps, branches, limbs or lumber over 4 inches in diameter or over 5 feet in length. Lawn or leaf debris; grass, branches, leaves, etc		15) Telephone poles or railroad ties in bulk quantities	
7) Slag, rock, sand, brick		16) ASBESTOS WASTE	
8) Bulk Metals: Thick-walled or solid metallic objects such as castings, gas cylinders or motors, or bulk metals of any kind such as white goods (washers, dryers, refrigerators)		If "Y" (yes) was answered for any of the above items, a decision must be made by the supervisor to accept or reject the load. If the load is rejected, the waste must be segregated and enforcement actions initiated. The waste is to be removed from the site by the vehicle owner at no cost to the Dunn Landfill.	

Additional Comments on Waste Load: \_\_\_\_\_

**DISPOSITION OF WASTE LOAD**      ACCEPTED       REJECTED

Reason for Rejection: \_\_\_\_\_

INSPECTOR SIGNATURE: \_\_\_\_\_ DRIVER SIGNATURE: \_\_\_\_\_



S.A. Dunn & Company, LLC  
 209 Partition Street Extension  
 Rensselaer, New York 12144  
 (518) 650-6107

**DUNN C&D  
 LANDFILL**

## Daily Site Inspection Form

Name of Personnel Observing: \_\_\_\_\_ Time: \_\_\_\_\_ Date: \_\_\_\_\_

General Weather Conditions: \_\_\_\_\_ Temp: \_\_\_\_\_ °F General Wind Direction: N S E W  
 Wind Speed: \_\_\_\_\_  
 Rain/Snow: \_\_\_\_\_

• **LEACHATE**

- \_\_\_ 1) Leachate was observed seeping from Landfill \_\_\_\_\_
- \_\_\_ 2) Leachate was observed entering surface water \_\_\_\_\_
- \_\_\_ 3) Leachate Levels Observed in Storage Tank \_\_\_\_\_ (Ft)
- \_\_\_ 4) Liquid Level in Leachate Secondary Containment \_\_\_\_\_ (in)

• **WASTE / COVER**

- \_\_\_ 5) Evidence of Unacceptable Wastes
  - \_\_\_ 6) Waste Slopes Steeper than 3:1
  - \_\_\_ 7) Waste in the active landfill is not covered
  - \_\_\_ 8) Waste is protruding through cover
  - \_\_\_ 9) Erosion of cover observed
- If YES, location and description: \_\_\_\_\_

• **NUISANCE**

- \_\_\_ 10) Noise is a nuisance off site
  - \_\_\_ 11) Odors are detectable off site
  - \_\_\_ 12) Windblown debris observed to be blowing out of landfill
  - \_\_\_ 13) Blowing dust or dirt is a nuisance
  - \_\_\_ 14) Blowing debris fence needs repairs
  - \_\_\_ 15) Tracked Material on Paved Roadways
  - \_\_\_ 16) Required Repairs to On Site Roads
  - \_\_\_ 17) All maint. gates shut & locked
- If YES, location and description: \_\_\_\_\_

• **NOTES**

Signature of personnel conducting site observation: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of site Operations Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

# Dunn Landfill GCCS Inspection Form

Date: \_\_\_\_\_

## Daily Inspection:

Control Panel: \_\_\_\_\_  
Flare Temp: \_\_\_\_\_  
Inlet Pressure: \_\_\_\_\_  
Flow: \_\_\_\_\_  
Flame: \_\_\_\_\_  
KOP: \_\_\_\_\_  
Landfill Surface: \_\_\_\_\_

## Monthly Inspection:

Well Head Condition: \_\_\_\_\_  
Piping Condition: \_\_\_\_\_

## Annual:

Electrical / Controls: \_\_\_\_\_  
Corrosion Inspection: \_\_\_\_\_  
Overall Inspection: \_\_\_\_\_

**Dunn Mine and C&D Facility Dust Control Measures Inspection**

Date: \_\_\_\_\_

Name of Personnel Performing Inspection: \_\_\_\_\_

Weekly Inspection

Monthly Inspection

ITEM	LOCATION	REPAIRS NEEDED (Y/N)	COMMENTS
Erosion Control Matting			
Mulch surfaces			
Fences			

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Notes:

1. Weekly inspections required between March 15 to May 15. Monthly inspections are required for remainder of year.
2. Areas of damaged mulch or matting that are greater than 400 contiguous square feet must be repaired within 10 days.
3. Fences must be repaired within 10 days of observation.

DATE: \_\_\_\_\_

<b>S.A. Dunn Landfill</b>  <b>SWPPP ESC</b> <b>Inspection Form</b>	Completed by: _____ Title: _____ Weather Condition: _____ Soil Condition (e.g. dry, wet, saturated): _____
Item	Comment
Condition of runoff at discharge points	Outfall No. 1:  Outfall No. 2:
Discharges of sediment or other pollutants from the Site	
Description of natural surface water bodies located within or immediately adjacent to the property	
BMPs and Erosion and Sediment Control practices that need repair or maintenance	
BMPs and erosion and sediment control practices not installed properly or not functioning properly	
Description or sketch of area disturbed at time of inspection and areas that have been stabilized since last inspection (1)	
Corrective actions needed (1)	
SIGNATURE: _____	DATE: _____

**(1) Note: Attach photos, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions and documenting completion of corrective actions.**

---

**APPENDIX B**

**ENVIRONMENTAL MONITORING PLAN**

---

**ENVIRONMENTAL MONITORING PLAN**

**DUNN MINE AND C&D FACILITY**

**Prepared For:**

**SA DUNN & COMPANY, LLC  
209 PARTITION STREET EXTENSION  
RENSSELAER, NEW YORK 12144**

**Prepared By:**

**CIVIL & ENVIRONMENTAL ENGINEERING, LANDSCAPE  
ARCHITECTURE, AND LAND SURVEYING, PLLC  
31 BELLOWS ROAD  
RAYNHAM, MASSACHUSETTS 02767**

**CEE PROJECT 182-442**

**JANUARY 2022**

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## FIGURES

Figure 1 – Site Location Plan

Figure 2 – Monitoring Well Location Plan

## **1.0 ENVIRONMENTAL MONITORING PLAN**

### **1.1 INTRODUCTION**

Civil & Environmental Engineering, Landscape Architecture and Land Surveying, PLLC (CEE) prepared this Environmental Monitoring Plan (EMP) on behalf of S.A. Dunn & Company, LLC (S.A. Dunn). This EMP addresses the environmental monitoring plan and associated Site Analytical Plan at the Dunn Mine and C&D Facility located at Partition Street in Rensselaer, New York (the facility) and prepared in accordance with 6 CRR-NY-363-4.6 (f) and (g).

The facility began operation in January 2015 and groundwater, surface water, leachate, and gas monitoring has been conducted since that time in accordance with the EMP and Sampling and Analysis Plan (SAP), that was included as part of the Hydrologic Report for Dunn Sand & Gravel Mined Land Use Plan Modification/C&D Landfill dated October 5, 2010, revised on June 14, 2011 and prepared by C.T. Male Associates P.C.

## **2.0 FACILITY DESCRIPTION**

### **2.1 LOCATION AND DESCRIPTION**

Dunn Mine and C&D Facility is an existing sand and gravel mine and construction and demolition debris (C&D) disposal facility located in Rensselaer and North Greenbush, New York. The site is owned and operated by S.A. Dunn & Company, LLC. The facility activities include both C&D disposal and mining operations. The site is operating under a permit issued by the New York State Department of Environmental Conservation (NYSDEC) dated October 4, 2019. Figure 1 presents the site location in the region.

The topography in the vicinity of the project site, as shown on Figure 1, ranges from approximately 200 to 300 feet above mean sea level (MSL) and generally decreases to the west towards the Hudson River. Access to the project site is via Partition Street Extension through the City of Rensselaer. There is no other vehicular access to the project site.

The current C&D disposal footprint includes 8 phases of baseline construction labelled as Phases 1 through 7A, which encompass approximately 37 acres. The total permitted waste footprint is 63.3 acres.

Prior to the disposal operations commencement in January 2015, the project site had historically had an existing sand and gravel mining operation, commonly known as the “Dunn Bank.” The mining operations on the project site resulted in the excavation of two (2) large pits known as the south and north pits. Current mining operations are taking place in the north pit and within the proposed and permitted future disposal areas.

Surrounding land uses are primarily residential around the southern and eastern boundaries of the project site. Vacant land is located around the remaining perimeter of the property, and a pre-kindergarten to 12th grade school owned by the Rensselaer City School District is located to the north and northeast of the project site, and a cemetery is located to the east.

Municipal water, as well as electric power and telecommunications, currently provide service to the project site along Partition Street. Based on the most recent Hydrogeologic Report Addendum prepared in 2016 by CEE, private water supply wells have not been identified within a 1-mile radius of the site.

## **3.0 HYDROGEOLOGY**

### **3.1 REGIONAL GEOLOGY**

The site is located within the Hudson-Mohawk Lowlands physiographic province of New York, which is characterized by a general low-lying topography surrounding the Mohawk and Hudson Rivers that resulted from erosion of weak underlying bedrock formations and subsequent deposition of glacial sediments. The Taconic Mountains are located to the east of the site and the Helderberg Escarpment associated with the Catskill Mountains is located to the west of the site. Bedrock underlying the site is mapped as the Upper to Middle Ordovician Canajoharie/Normanskill Shale Formation. Glacial sediments deposited during the waning stages of deglaciation in the area are dominated by glaciolacustrine sand/silt sediments and kame deposits. The kame deposits consist of a thick sequence of ice-contact sand and gravel that have historically been mined at the site, resulting in the excavated north and south pits where the current C&D landfill has been constructed. Glaciolacustrine sand and clay deposits are mapped around the kame deposits (C.T. Male 2011).

### **3.2 SITE GEOLOGY**

The stratigraphy beneath the landfill consists of glaciolacustrine silts and sand, interbedded with deposits of finer and coarser materials underlain by shale bedrock. The glaciolacustrine clay unit identified at borings MW-4, MW-6S/6D and MW-8S extends to the boundary of the south pit. The thickness of the unconsolidated sediments ranges from approximately 130 feet (below the floor of the mine) to 170 feet (above the mine floor). Several distinct unconsolidated deposits exist within the site, several of which are discontinuous across the site. A major deposit of sand, sand and gravel, gravel and silt lie beneath the floor of the mine and are underlain by a deposit of sand, gravel and silt which represents a glacial till deposit that lacks the typical coarse sediment load embedment within a silt and clay matrix. The standard penetration values within the till were generally 80 to 90 blows per 12-inch sampling increment. The soils above the glacial till deposits represent a sequence characteristic of ice contact and lacustrine depositional environments. Shale bedrock was encountered at one boring location (MW-6D) at a depth of approximately 198 feet bgs (about 9 feet below msl). Detailed maps and cross sections of the site geology were provided in the C.T. Male report.

### **3.3 GROUNDWATER ELEVATION MEASUREMENTS**

The groundwater elevation from the current monitoring wells was first measured on March 31, 2011 as part of a site-wide groundwater monitoring. The minimum separation distance between the water table and the ground surface was approximately 72 feet at monitoring well MW-1, which is similar to the data collected in January 2010. Data from the previous reports indicates the groundwater flows to the west or west-southwest across the site (C.T. Male 2011). Quarterly water level monitoring, conducted from 2015 to present has confirmed the groundwater flow direction.

### **3.4 HYDRAULIC CONDUCTIVITY**

Rising and falling head slug tests were completed at monitoring wells MW-1 and MW-3 on December 7, 2009 by C.T. Male. The data indicates that the hydraulic conductivity of monitoring well MW-1 ranges from  $1.1 \times 10^{-3}$  centimeters per second (cm/sec) to  $1.6 \times 10^{-3}$  cm/sec. Monitoring well MW-1 is screened across fine sand and till deposits. The hydraulic conductivity at monitoring well MW-3 ranges from  $7.7 \times 10^{-5}$  cm/sec to  $1.7 \times 10^{-4}$  cm/sec. This well is screened in brown silt.

## 4.0 MONITORING AND REPORTING

The monitoring program will consist of sampling five downgradient wells MW-6S, MW- 7S, MW-8S, MW-10S, and MW-12S, sampling two upgradient wells MW-9SR and WM-11S, sampling the downstream and upstream surface water in the Quackenbush Creek (SW-1 and SW-2, respectively), sampling the leachate, and sampling landfill gases. The following is the EMP and Site Analytical Plan based on 6 CRR-NY-363-4.6 (f) and (g).

### 4.1 GROUNDWATER MONITORING

Groundwater monitoring within the first water bearing formation (i.e., outwash sand and gravel) is to be conducted quarterly using monitoring wells (MW-6S, MW- 7S, MW-8S, MW-9SR, MW-10S, WM-11S and MW-12S) that were installed around the perimeter of the landfill and within 50 feet of the edge of the waste mass between 2010 and 2019. The upgradient and downgradient wells are set in the same hydrologic unit and the monitoring well screens do not exceed 20 feet in length. The current array of monitoring wells as shown on Figure 2 satisfy the 500-foot downgradient and 1,500-foot cross-gradient and upgradient spacing requirements.

The groundwater wells will be sampled on a quarterly basis and analyzed three (3) times per year for Routine Parameters, and once per year for Baseline Parameters. The Baseline Parameter sampling event must be conducted at the same time period each year. The samples will be analyzed per the Routine and Baseline Parameters specified in the Water Quality Analysis Tables presented in 6 CRR-NY-363-4.6 (h). Refer to 6 CRR-NY-363-4.6 (f) (9) (ii) (c) and (d) for the requirements to reduce the sampling events to semi-annually and to omit sampling during the winter. A one-time sampling event for expanded parameters included in Tables 3A and 3B of 6 CRR-NY-363-4.6 (h), but not previously sampled for under the superseded Part 360-2.11(d)(6) will be performed at upgradient wells. This will include the following:

- Radium-226 (EPA 903.1)
- Radium-228 (EPA 904.0)
- Total Uranium (EPA 908.0)
- Per-and polyfluoroalkyl substances
- 1,4 Dioxane

## **4.2 SURFACE WATER MONITORING**

Surface water samples will be collected from the Quackenbush Creek at the same locations as conducted since 2011 and during the same schedule as the quarterly groundwater-monitoring program; three (3) times per year for Routine Parameters, and once per year for Baseline Parameters. One downstream sample (SW-1) and one upstream sample (SW-2) will be collected from the creek. Refer to Figure 1 for the surface water sample locations.

## **4.3 LEACHATE MONITORING**

Leachate generated from the leachate collection system has been collected and analyzed for Expanded Parameters on a semi-annual basis since 2015. The leachate samples are collected within the leachate collection structure. One composite sample will be prepared for analysis for Pump Stations 1 through 3 (southern locations) and individual grab samples will be taken from Pump Stations 4 and 5 (northern locations).

Having developed a significant database of leachate quality data and observing generally consistent results, leachate sampling will continue on an annual basis, provided there are no significant changes in the analytical concentrations going forward. If significant changes in leachate quality are indicated in the future, S.A. Dunn and NYSDEC may re-institute semi-annual leachate quality sampling.

## **4.4 WATER SUPPLY WELL MONITORING**

Based on the Hydrogeologic Report Addendum dated March 2016, a Freedom of Information Law (FOIL) request was made to Rensselaer County on January 18, 2016 and the County replied that they did not have information regarding well locations. The New York State Department of Health (NYSDOH) was also contacted on January 18, 2016 and no response was received. The Geographic Information System (GIS) data from the New York State GIS Clearing House Water Wells File did not identify any data regarding private water supply wells within a 1-mile radius of the site. Based on this information, there is a low probability that private wells are located in the general surrounding area of the facility. Therefore, water supply well sampling is not required.

#### **4.5 GAS MONITORING**

Gas monitoring will be done on a quarterly basis at the same time as the groundwater monitoring. The gas monitoring will be done for hydrogen sulfide at each of the groundwater monitoring well locations and at four (4) locations on and/or directly adjacent to the C&D waste mass. Refer to Figure 2 for the monitoring well locations.

#### **4.6 QUARTERLY AND ANNUAL REPORTS**

The results of the groundwater and leachate monitoring will be summarized in Quarterly and Annual Reports and provided to the New York State Department of Environmental Conservation (NYSDEC). Reports will be provided to NYSDEC within 90 days of completing sampling and will assess whether or not there has been a significant increase in parameter concentrations above existing groundwater quality. A significant increase in concentration will be deemed to have occurred if: 1) the concentration of a parameter exceeds the existing water quality value for that parameter by three (3) standard deviations; or 2) the groundwater concentration exceeds the existing concentration for that parameter and exceeds the water quality standards for that parameter (refer to 6 CRR-NY-363-4.6 (f) (9) (i) (b) (4) (ii)). This update to the EMP will include an update to the existing water quality values currently used as a basis for comparison to future water quality data. The update will include the calculation of the mean and standard deviation for each analyzed parameter at each well location using the available analytical data collected to date. This update will result in a more statistically representative data set for comparison to future water quality results as the greater number of data points represent seasonal and year over year changes in water levels and associated natural water quality variability. The updated existing water quality values will be calculated following approval of this EMP and will then be used moving forward to identify a significant increase as stated above. Updated existing water quality values will be provided as an appendix to the first quarterly report following the update.

If elevated concentrations are identified in any of the monitoring wells during monitoring for Routine Parameters, NYSDEC will be notified within 14 days of the identification of such elevated concentrations. During the following quarterly event, the Baseline Parameters must be analyzed until at least the semi-annually elevated concentrations decrease or are determined not to be landfill-derived or NYSDEC determines that such monitoring is not needed. Alternatively, the facility can attempt to demonstrate there is an off-site source of the elevated concentrations or demonstrate that an error in sampling or the analyses was the results of the significantly increased result.

If significantly elevated concentrations persist over two consecutive events (other than field parameters), then the facility must notify the NYSDEC within 14 days of such identification. Contingency water quality monitoring will be implemented if it cannot be demonstrated that elevated concentrations are attributable to a source other than the landfill, or data collection or laboratory error. Such contingency monitoring will include:

- Within 90 days of identifying elevated concentrations of Baseline Parameters, sampling and analysis for Expanded Parameters per Water Quality Analysis Tables presented in 6 CRR-NY-363-4.6 (h) will be initiated;
- Within 14 days of receipt of the Expanded Parameters results, NYSDEC will be notified and provided with a list of Expanded Parameters that have been detected at elevated concentrations;
- Within 90 days of establishing which Expanded Parameters have elevated concentrations, quarterly sampling will be performed for all Baseline and Expanded Parameters with elevated concentrations, and annual monitoring will be conducted for Expanded Parameters. Groundwater Protection Standards for all parameters exceeding Trigger Values calculated per 6 CRR-NY-363-4.6 (f) (9) (i) (b) (4) (i) must be established;
- If the Expanded Parameter concentrations are at or below the Trigger Values for two consecutive events, the facility must notify the NYSDEC to remove the parameter; and
- If any concentrations are above the Groundwater Protection Standards, the facility must notify the NYSDEC within 24 hours of identifying the exceedance, and the appropriate local government officials within seven (7) days of the detection. Additional assessment and response actions are required to address the exceedances.

Contingency water quality monitoring will continue until NYSDEC provides written approval that this expanded sampling is no longer needed to ensure public health or protection of the environment, or until information is provided that shows the elevated parameter concentrations are not landfill derived.

#### 4.6.1 Content of Report

Per 6 CRR-NY-363-4.6 (f) (10), the data shall be submitted to the NYSDEC within 90 days of sampling collection and consists of the following:

- Summary table of results, detection limits, well locations (i.e. upgradient, downgradient, etc.), potentiometer data, water quality standards, groundwater protection standards, and chemical abstract service (CAS) numbers;
- Comparison data to existing water quality and upgradient water quality;
- Summary of results, exceedances, proposed sampling or analysis modifications, etc.; and
- QA/QC documentation.

The Annual report must also contain the following:

- Summary of changes in water quality throughout the year;
- Data quality assessment report;
- Graph of time verse concentration for exceedances; and
- Updated groundwater contour map.

## 5.0 SITE ANALYSIS PLAN

Sampling will be done in accordance with 6 CRR-NY-363-4.6 (g). The water samples will be collected in accordance with regulatory requirements by trained personnel that are knowledgeable with sampling techniques and analytical method preservation procedures. The laboratory testing methods must, at a minimum, include detection limits that are lower than the established groundwater quality standards. The data quality objective is to collect samples and data in a manner that will provide consistent and accurate field and laboratory results. The following are the sampling protocols:

- Field instruments will be calibrated prior to use in the field according to manufacturer's specifications.
- If explosive gases or organic vapors are suspected within the well, then the ambient air must be appropriately monitored/screened for potential hazards prior to entering the well.
- Static water levels will be measured to the nearest one-hundredth of a foot.
- A minimum of three (3) well volumes using the appropriate water evacuation method (i.e. submersible pump, peristaltic pumps, bailing, etc.) will be conducted.
- The water level should not decrease below the monitoring well's sand pack during purging or sampling.
- For contaminated wells, the first volume of stagnant purge water will be visually evaluated for non-aqueous phase liquids (NAPL), floaters or sinkers, etc. and tested for field parameters (temperature, pH, Eh, and specific conductance) and/or analytical methods, if necessary.
- Purge water must be properly managed.
- Sampling techniques will be performed as needed to reduce turbidity.
- Samples are not to be filtered. However, the NYSDEC may approve the filtering of samples if site/well specific conditions do not allow the turbidity to be reduced below 50 NTUs (Nephelometric turbidity units).
- VOC samples will be collected first, and field parameters will be tested again, after the VOC samples are taken.
- All sampling and purging equipment will consist of stainless steel. Non-dedicated sampling equipment will be decontaminated between sampling events.

- Field QA/QC procedures will include the use of equipment blanks and trip blanks. At a minimum, one equipment blank will be taken during each quarterly sampling event to ascertain the likelihood of the introduction of contaminants during sampling. The equipment blank will be analyzed and reported according to the same analytical methods as the other samples collected during the event. One trip blank will be taken during baseline events where VOCs are analyzed.
- Surface water sampling techniques should avoid introducing sediment from the bottom of the water body. Water bodies greater than 3 feet deep should be evaluated for stratification and sampled accordingly.
- Sample bottles will be prepared by and obtained from a laboratory certified under the NYS Department of Health Environmental Laboratory Approval Program (ELAP) program.
- Sample bottles will be prepared and preserved, as necessary, to ensure sample integrity.
- Samples will be shipped with ice packs in coolers, the same day collected, and using chain of custody documentation that specifies the required sampling parameters.
- Laboratory results will describe the test methods employed, list personnel involved and provide precision and accuracy data.

Laboratory testing will be conducted by a NYS Department of Health ELAP certified laboratory under the NYSDEC—Analytical Services Protocol (ASP) category. At a minimum, the laboratory’s standard operation procedures should consists of documenting the receipt, storage and handling of the samples, the hold times per the analytical method, reagent/standard preparation, general laboratory techniques, description of analytical methods, standard operation procedures for equipment calibration and maintenance, and narrative for any analytical discrepancies or corrective actions.

Analysis results will be compared with standards contained in 6 NYCRR Parts 700-705 and to existing water quality values as appropriate, and downgradient results will be compared with upgradient results to assess landfill-derived contamination, if any.

## 6.0 DATA QUALITY ASSESSMENT

A data quality assessment is required at the conclusion of each sampling event that validates and analyses the usability of the data.

### 6.1 DATA VALIDATION

For sampling events involving only Routine Parameters, data validation will be performed by the laboratory performing the analysis. For sampling events involving Baseline or Expanded Parameters, data validation will be performed by a person or entity other than the laboratory that performed the analyses. Data validation will be performed on at least 5 percent of the data generated for each sampling event and will include the following:

- Field records and sample analytical data will be reviewed to confirm data accuracy. Analytical QA/QC information and results will be reviewed, with due consideration to any corrective actions taken during that sampling event.
- Data summaries must clearly indicate any data that is not representative of environmental conditions or that was not generated in accordance with the Site Analytical Plan.
- Analytical QA/QC measures and laboratory procedures will be performed in accordance with Exhibit E of the NYSDEC ASP.

#### 6.1.1 Data Usability Analysis

All the data generated must be analyzed for the following requirements:

- Determine if the Data Quality Objectives were met;
- Compare data to previous sampling events for consistencies;
- Evaluate field duplicates to determine if the samples are representative;
- Compare sampling data to field blanks, trip blanks, equipment rinsate blanks, and method blanks, as required, to determine if contaminants were introduced during sampling, shipping, or analysis;
- Evaluate the laboratories matrix effects to determine if the data has a low or high bias;
- Evaluate the field and laboratory data to determine if geological, hydrogeological, and meteorological data is contributing to the extent of the contamination; and
- Review the precision, accuracy, representativeness, comparability, completeness and defensibility of the data generated.

## **7.0 POST-CLOSURE ENVIRONMENTAL MONITORING**

Upon closure of the landfill, quarterly groundwater quality monitoring will continue for Routine (3 times per year) and Baseline (one time per year) Parameters. Sampling results and annual reports will be provided to NYSDEC as required by 6 CRR-NY-363-9.6 (a) (1) (iv) (b). This quarterly sampling will continue for a minimum period of five (5) years, at which time the post-closure results will be evaluated and NYSDEC may be petitioned to reduce the monitoring requirements.

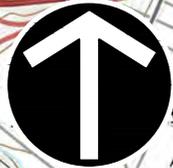
In accordance with 6 CRR-NY-363-9.6 (b) (1) (iv) (a), the post-closure monitoring must be maintained and sampled per 6 CRR-NY-363-4.6. Refer to Section 4.0 of this report.

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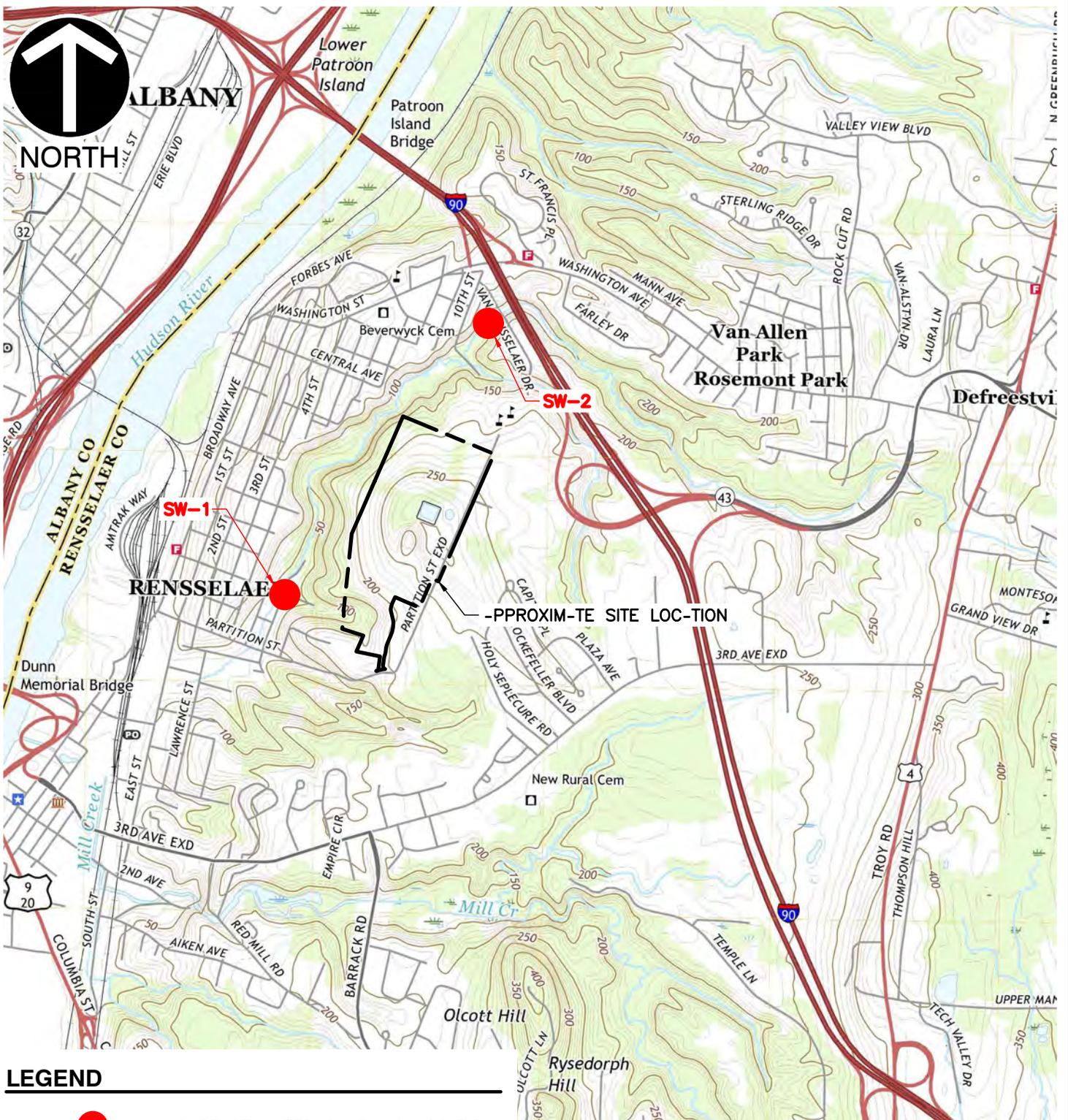
## **FIGURES**

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**ALBANY**

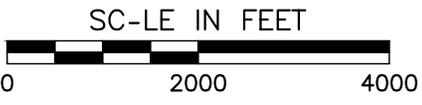


**LEGEND**

SURFACE WATER SAMPLING LOCATION

**REFERENCE**

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, TROY SOUTH QUADRANGLE, NEW YORK DISTRICT: 2019.



**Civil & Environmental Engineering,  
Landscape Architecture and Land Surveying, PLLC**

31 Bellows Road  
Raynham, MA 02767

**ENVIRONMENTAL MONITORING PLAN  
DUNN MINE AND C&D FACILITY  
S.A.DUNN & COMPANY, LLC  
RENSSELAER, NEW YORK**

**SITE LOCATION PLAN**

DRAWN BY:	EMW	CHECKED BY:	AJK	APPROVED BY:	AJK	FIGURE NO.:	<b>1</b>
DATE:	JANUARY 2022	DWG SCALE:	1"=2,000'	PROJECT NO:	182-442		



NORTH

EXISTING PROPERTY BOUNDARY

EXISTING MONITORING WELL (TYP.)

MW-8S MW-6D MW-6S MW-7S MW-10S MW-12S

PHASE 1

PHASE 6A

PHASE 2

PHASE 7A

PHASE 7B

PHASE 6B

PHASE 4

PHASE 6C

PROPOSED PHASE 10C

PROPOSED PHASE 8A

PHASE 3

PHASE 5

PROPOSED PHASE 9

PROPOSED PHASE 8B

EXISTING LEACHATE TANK

EXISTING SCALES

EXISTING SCALE HOUSE

PAVED ENTRANCE ROAD

**LEGEND**

- EXISTING PROPERTY LINE
- - - 200 - - - EXISTING MAJOR CONTOUR
- - - EXISTING MINOR CONTOUR
- ⊕ MW-8S EXISTING MONITORING WELL

EXISTING PHASE 10A (UNDER CONSTRUCTION)  
PROPOSED PHASE 10B

PROPOSED LIMIT OF C&D DISPOSAL

PERMITTED LIMIT OF C&D DISPOSAL

EXISTING MAINTENANCE GARAGE



**REFERENCE**

1. UNLESS NOTED OTHERWISE, EXISTING TOPOGRAPHY WAS COMPILED BY SOUTHERN RESOURCES MAPPING CORPORATION USING PHOTOGRAMMETRIC METHODS FROM PHOTOGRAPHY DATED MARCH 16, 2021, AND SUPPLEMENTED WITH TOPOGRAPHY FROM OCTOBER 7, 2020 AND NOVEMBER 4, 2020. SURVEY CONTROL DATA WAS PROVIDED BY WASTE CONNECTIONS, INC.
2. PROPERTY LINE INFORMATION WAS TAKEN FROM A PLAN TITLED "ALTA/ASCM LAND TITLE BOUNDARY SURVEY, LANDS OF KELLY AND DUNN TO BE CONVEYED TO S.A. DUNN & COMPANY, LLC," PREPARED AND SEALED BY WILLIAM N. CURRAN, AND UPDATED AS NECESSARY BASED ON AVAILABLE TITLE INFORMATION.
3. THE LOCATION OF EXISTING MONITORING WELLS WERE PROVIDED ELECTRONICALLY TO CEC BY TETRA TECH. CEE HAS NOT VERIFIED THE ACCURACY OF THE INFORMATION.

<b>Civil &amp; Environmental Engineering, Landscape Architecture and Land Surveying, PLLC</b>  31 Bellows Road Raynham, MA 02767		<b>ENVIRONMENTAL MONITORING PLAN DUNN MINE AND C&amp;D FACILITY S.A. DUNN &amp; COMPANY, LLC RENSSELAER, NEW YORK</b>					
		<b>MONITORING PLAN LOCATION PLAN</b>					
DRAWN BY:	EMW	CHECKED BY:	AJK	APPROVED BY:	AJK	FIGURE NO.:	<b>2</b>
DATE:	JANUARY 2022	DWG SCALE:	1"=200'	PROJECT NO:	182-442		

P:\2018\182-442\CADD\DWG\SW16-EMP\SW16-EMP-Figures\182442-SW16-EMP-MW Figure.dwg\FIGURE 2\LS(1/11/2022 - ewilson) - LP: 1/11/2022 2:30 PM

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**APPENDIX C**

**DUST CONTROL PLAN**

---

**REVISED DUST CONTROL PLAN**

**DUNN MINE AND C&D FACILITY**

**Prepared For:**

**S.A. DUNN & COMPANY, LLC**

**Prepared By:**

**CIVIL & ENVIRONMENTAL ENGINEERING,  
LANDSCAPE ARCHITECTURE AND LAND SURVEYING, PLLC**

**CEE PROJECT 182-442**

**SEPTEMBER 2018**

**REVISED JULY 2019**

**REVISED OCTOBER 2019**

**REVISED AUGUST 2020**

**REVISED NOVEMBER 2020**

**REVISED SEPTEMBER 2021**

**REVISED NOVEMBER 2021**

**REVISED JANUARY 2022**

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**TABLE**

Table 1 – Dust Palliatives Approved for NYDOT Projects

**APPENDICES**

Appendix A – Snow Fence Location

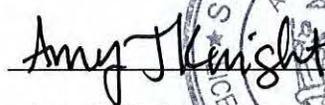
Appendix B – SACI, LLC Technical Memoranda/NYSDEC Conditional Approval

- NYSDEC Conditional Approval dated August 26, 2021
- SACI, LLC Technical Memorandum dated July 26, 2021

**DUST CONTROL PLAN  
DUNN MINE AND C&D FACILITY  
RENSSELAER, NEW YORK**

The material and data in this report were prepared under the supervision and direction of the undersigned.

**Civil and Environmental Engineering,  
Landscape Architecture and Land Surveying, PLLC**

  
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## **1.0 INTRODUCTION**

### **1.1 PURPOSE**

Dunn Mine and C&D Facility is an existing sand and gravel mine and construction and demolition debris (C&D) disposal facility owned and operated by S.A. Dunn & Company, LLC (Dunn), and located in Rensselaer and North Greenbush, New York. The facility activities include both C&D disposal and mining operations. The purpose of this report is to describe the mitigation and control measures to be implemented by the facility to prevent dust from migrating off-site. The report has been revised to incorporate recommendations for additional dust control measures provided by SACI, LLC in a technical memorandum dated July 26, 2021, as approved by the New York State Department of Environmental Conservation (the Department) in correspondence dated August 26, 2021. Recommendations were prepared based on a site inspection by SACI on April 22, 2021 and a review of the existing Dust Control Plan.

## 2.0 DUST SOURCES

### 2.1 FACILITY DUST SOURCES

Dust at the facility has the potential to be generated by both the C&D landfill and the active mining operations. The various sources associated with each activity are detailed in the following sections.

#### 2.1.1 Construction and Demolition Debris Landfill

Potential dust sources from the landfill activities include:

- Waste Operations
  - Commercial waste truck traffic on paved and unpaved roads
  - Tipping, pushing, and compacting C&D waste
- Site Development

##### 2.1.1.1 *Waste Operations*

During operation of the landfill, transfer trailer trucks travel along a paved entrance roadway to the unpaved landfill perimeter road. Travel distance along internal paved roadways is approximately 1,120 linear feet (LF), while travel distance along internal unpaved roads will vary based on which phase of the landfill is operational. In general, this distance will range from 1,500 LF to 3,000 LF.

Potential dust from paved roads includes soil material tracked from unpaved surfaces onto paved roads by vehicles, while potential dust from unpaved roads includes soil material disturbed by truck traffic or tracked by the truck to other areas of the site. Factors leading to dust generation include dry road conditions, high winds, and vehicle traffic.

After traveling internal roads to the working face, the waste material is unloaded from the truck. The facility is equipped with a tipper, which elevates the trailer at an angle, allowing waste to slide from the trailer onto the landfill active area. In addition, dump trailers are also used to similarly tipping loads at the landfill area. Potential dust generation from tipping includes impact of the material as it hits the existing ground.

After waste is placed in the active area (tipped as described above or discharged from walking floor trailers), a bulldozer is utilized to push and grade the waste and a compactor is used to break up the waste and compact it. Each of these activities could potentially result in dust generation as the material is moved and compacted.

#### 2.1.1.2 *Site Development*

Over the course of the landfill life, construction activities at the facility will generally include baseliner and final cover construction. These construction activities may include:

- Mass excavation of soil/excavation of soil from stockpiles
- Soil transport in off-road trucks
- Soil placement

The physical movement of soil from mass excavation or from stockpiles, along with placement in the construction area and transport over unpaved surfaces will contribute to the potential for dust. Factors leading to dust generation include dry road conditions, high winds, and vehicle traffic.

#### 2.1.2 Mining Operations

Potential dust sources from mining operations include:

- Sand excavation
- Sand loading
- Off-road truck traffic/sand hauling
- Sand stockpiles/windborne erosion

Mining operations include the use of heavy equipment to excavate material from the existing ground or stockpiles, which is then either stockpiled on site or placed in trucks for offsite uses. The physical movement of this material, vehicles traveling over unpaved surfaces and heavy equipment operation all contribute to the potential for dust. Dust can also result from stockpile areas or excavated side slopes because of wind erosion, as well as from unloading of materials from trucks into the stockpile or loading of materials into haul trucks.

### 3.0 MITIGATION MEASURES

Site personnel will coordinate C&D placement and mining operations and assess the need for dust control on a continual basis. The following sections detail mitigation measures that will be implemented, as needed, to control dust.

#### 3.1 DUST MITIGATION MEASURES

The primary mitigation methods for dust control at the site include proper housekeeping and maintenance, and application of water, as described below.

##### 3.1.1 Seasonal Mining Operational Limitations

Between March 1 and May 15 of each year, site operations will be conducted such that:

- Exposed mining areas which are not stabilized with hydro mulch or erosion control matting and that are subject to potential wind erosion will be limited to 1 acre or less. Travel routes are excluded from the 1-acre limitation if these routes are stabilized with crushed stone as described in Section 4.1.8.
- The height of the mine face will be no higher than 15 feet.
- All stockpiles above elevation 200 feet mean sea level on the northern and eastern side of the site will be stabilized or removed. Concrete barriers or other large size (greater than ¼-inch particle size) aggregate material may be utilized to provide traffic direction.
- Unstabilized sand stockpiles located on the west side of the site will be constructed in oval shapes with the long axis oriented east-west and the stockpile will not exceed 15 feet in height.

##### 3.1.2 Water Truck

A water truck is used to apply water to internal paved and unpaved roads as well as along a portion of Partition Street. A hydrant has been installed on the west side of the facility to facilitate and expedite filling of the water trucks. The water truck will apply water to the roadways as needed to minimize dust generation based on activities being performed and actual site and weather conditions. Water application will not occur when the ambient air temperature is below freezing or ice is present.

### 3.1.3 Chloride Application

When temperatures are below freezing or if water cannot be applied for another reason, chlorides (e.g. calcium or magnesium) will be utilized, if needed based on weather conditions, for dust control. These chlorides are available in liquid or solid forms; for freezing conditions, they will be initially applied as a liquid followed by application of either pellet or liquid solution form for maintenance. Chloride usage is required when temperatures prevent the use of water; however, chlorides may be applied year-round, regardless of temperature.

### 3.1.4 Truck Tipper Sprayer/Misting Cannon

During C&D disposal, the use of the tipper creates the potential for dust generation. A spray system has been installed on the tipper to control dust resulting from the off-loading of material. This equipment is mounted on the tipper and is automated to spray water when the tipper is activated. A dust suppression misting cannon has been purchased and found to be more effective than the tipper sprayer at controlling dust. At this time, the misting cannon has replaced the use of the tipper sprayer but the facility is working with different vendors to improve the tipper sprayer system. This equipment (tipper sprayer and/or misting cannon) will be utilized when waste disposal activities occur at elevations higher than the perimeter berm or as needed based on weather conditions and operational activities. As the sprayers utilize an aqueous solution, its use will be suspended during freezing temperatures.

### 3.1.5 Litter Fence

Dunn has installed litter control fences around the perimeter of the facility. In addition to containing litter, the fence provides a windbreak that can provide additional control of dust.

### 3.1.6 Snow/Sand Fence

Snow fence or sand dune fence will be maintained at the crest of the west-facing mine slope west of the eastern perimeter access road where it parallels Partition Street Extension north of landfill Phase 5 (subsequently north of Phase 10 when it is completed). Refer to Appendix A for approximate location of the fence; actual location may vary based on site operations and actual conditions at the site.

As recommended by SACI, LLC in the July 26, 2021 technical memorandum (included in Appendix B), a hybrid fencing system will be installed where woven/welded wire fencing is installed. Woven/welded wire fence will be installed with two layers of plastic fence material staggered on the windward side of the wire fence to achieve a porosity of approximately 50 percent. Dunn may also use wooden snow fence and/or heavier T-posts to reduce maintenance intervals on the fence.

### 3.1.7 Stabilization of Exposed Slopes

Excavation areas on wind sided (i.e., western facing) slopes that will be exposed for more than 30 days will receive erosion control mat to reduce the potential for wind borne erosion within 14 days after excavation in these areas is completed. Hydro mulch also may be used on exposed sand surfaces that will be exposed less than 30 days. Exposed sand slopes along the northern boundary adjacent to the school will receive erosion control mat or mulch, as appropriate. The slopes will be monitored by site personnel for erosion and additional matting or hydro mulch will be re-applied as necessary.

### 3.1.8 Internal Haul Roads

A 6-inch thick stone layer will be applied to the existing landfill perimeter road, where it currently exists at the final location and grades as shown on the *Proposed Stormwater Management Plan* (Sheet C302) of the permit drawings titled “*Footprint Modification Permit Drawings*”, dated March 2016. Stone will also be applied to the primary internal haul road that is used to transport sand and gravel from the active excavation either to stockpile areas or for off-site transport. The road surface will be wide enough to allow two-way traffic to remain on crushed stone surface.

Dunn will maintain a stockpile of stone on-site to apply additional stone to roadway areas that have been filled with sand and/or silt where the crushed stone’s ability to mitigate airborne dust has been diminished.

In addition to the application of stone on the primary internal haul road, Dunn may spread coarse, loose rock over the trafficked portions of the mining area (i.e., secondary maneuvering areas) in order to comply with the seasonal 1-acre limitation specified in Section 3.1.1, or to provide additional dust control based on site-specific weather conditions.

### 3.1.9 Tire Wash

Dunn has installed a tire washing device for outbound vehicles to utilize prior to exiting the site. In general, the tire wash will allow the truck tires to be washed to remove soil and will reduce the potential for off-site tracking of material during inclement weather. Mining export and waste trucks will be required to utilize the tire wash before leaving the site during inclement weather unless the unit is closed for maintenance or repair (such period not to exceed two consecutive operating days without prior Department notice and approval).

### 3.1.10 Street Sweeping

Dunn has retained a contractor to run a street sweeper on Partition Street. In general, the road will be swept in the morning between 10:30 AM and 12 PM and again in the afternoon between 3 PM and 4 PM; however, the contractor will be brought in more often for additional sweeping as needed to remove any tracked material from the site on Partition Street. When ambient temperatures support the use of water, the sweeper will be operated with sufficient water to adequately suppress dust. The street sweeper will also be utilized on the internal paved roadways of the site.

### 3.1.11 Vegetative Buffer

Vegetation can be utilized to provide a windbreak that can aid in reducing the potential for dust generation. Dunn has installed additional evergreen trees along the southern perimeter of the landfill to provide additional dust control. Evergreens were planted along the property line to the south of the landfill footprint. Typically, the additional plantings consisted of two rows of trees that are approximately 6 feet high and 10 feet wide.

Additionally, Dunn has submitted a permit modification application incorporating a proposed mechanically stabilized earthen (MSE) berm (and corresponding changes to the subgrade) to the Department for approval. The proposed MSE berm, if approved, will be as much as 30 to 50 feet higher in elevation than the existing features, which will provide additional visual and dust control. The construction of the berm will incorporate vegetative cover as defined in the application documents, following Department approval.

### 3.1.12 Internal Truck Routes

Operations at the site require internal truck traffic for both waste placement and mining activities. Site personnel will review operations continually to select the most efficient routes for trucks to travel accomplish operations and to minimize dust generation and will coordinate with drivers and operators using the site to ensure that the proper traffic flow pattern is followed. Highly trafficked roads will be maintained with 6 inches of stone.

### 3.1.13 High Winds

High winds have the potential to generate dust. Facility personnel will monitor wind speed visually as well as through the on-site weather station and will halt or reduce operations during high wind conditions. In general, high wind conditions are considered to be sustained winds in excess of 25 miles per hour. Refer to Section 5.6 for contingencies for high wind conditions.

### 3.1.14 Speed Limit

The road speed limit at the landfill will be 10 miles per hour. A speed limit sign is posted at the entrance and will be strictly enforced by facility personnel. Additional speed limit signs will be posted prominently throughout the site. Vehicular traffic may be advised to lower their speed on unpaved roads based on road conditions due to weather, to speeds that minimize dust. Drivers and operators identified by site personnel that have exceeded the speed limit will receive a warning for the first incident; if a second incident occurs, the contractor will be denied access to the site.

### 3.1.15 Meteorological Monitoring Station

Dunn maintains a meteorological monitoring station at a relative high point on the Dunn facility property generally away from interfering obstructions. The first 12 months of collected data will be analyzed by SACI, LLC or other qualified firm to determine the following:

- Wind speeds and directions of interest
- Threshold velocity of different on-site surfaces
- Additional recommendations for further dust control based upon an analysis of the meteorological data.

The data analysis and additional recommendations, if any, will be completed and submitted to the Department of Environmental Conservation (Department) for approval. Any recommendations resulting from the meteorological data analysis that are approved by the Department will be incorporated into a subsequent revision to the dust control plan and be enforceable under the permit.

Compiled raw data will be made available to the Department upon request.

### 3.1.16 Inspection of Matting, Mulch Surfaces and Fences

Matting, mulch surfaces, and fences shall be inspected on a monthly basis; provided that inspections shall be increased to weekly from March 1 to May 15 during each calendar year. Any areas where the matting or mulch are damaged or covered by deposits of sand over a contiguous 400 square foot area will be “patched” or repaired within 10 calendar days of observation. Fences shall be repaired within 10 calendar days of observation. Logs of the inspections will be recorded and stored in the office. The logs will be made available to the Department upon request.

## 4.0 EVALUATION OF OTHER MITIGATION MEASURES

Typically, the mitigation measures described in Section 3 are adequate to sufficiently control dust. However, there are other control measures that could be implemented in the unlikely event that they are necessary. Additional control measures may include applying palliatives or dust suppression agents, installation of perimeter berms and/or vegetation, and installation of erosion control mat, hydroseed, or tackifier. A discussion of each of these is provided in the sections below.

### 4.1 PALLIATIVES EVALUATION

In addition to good construction and maintenance practices, chemical dust suppressants (palliatives) can be considered as an add-on when high dust generation persists. Palliatives are commercially available for use on most types of dust sources and are generally classified into the categories described in the following sections<sup>1</sup>.

#### 4.1.1 Water-Attracting Chemicals

*e.g., Chlorides, Salts, and Brine Solutions*

Water attracting chemicals are easy to apply and suppress dust by attracting moisture from the atmosphere, thereby keeping the trafficked surface moist and the soil particles agglomerated. Due to this mechanism, these products are most effective where relative humidity is higher. The most commonly used salts are calcium chloride (CaCl) and Magnesium chloride (MgCl).

*Limitations:* Water attracting chemicals are highly soluble, release heat when mixed with water, and will leach away from the trafficked surface with precipitation. Solubility limits their durability/effectiveness and may require reapplication at controlled rates. Repeated applications and long-term use may harm existing vegetation in the vicinity. This product category is also highly corrosive to metals and therefore construction equipment exposure should be monitored with frequent washing and maintenance.

*Note:* State of New York prohibits the use of salts within 100 ft. of regulated wetlands and limits yearly application rates for non-wetland areas, and is controlled by *Section 652 – Furnishing and*

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<sup>1</sup> Environmental Considerations for Selecting Cost-Effective Dust Control Technologies, Army Corps of Engineers, Public Works Technical Bulletin 200-1-133, October 2013.

*Applying Salts* of the New York State Department of Transportation, Standard Specifications, May 2006.

#### 4.1.2 Organic Non-Bituminous Chemicals

*e.g., Lignosulfonates, Sulphite Liquors, Tall Oil Pitch, Pine Tar, Vegetable Oils, Molasses, and Synthetic Oils*

These chemicals perform best under arid and semi-arid conditions by increasing the dry strength of soil particles through binding soil particles together, thereby preventing them from becoming entrained by wind or vehicle traffic. These chemicals after curing have low solubility; thereby minimize leaching and providing plasticity to road surfaces. These chemicals exhibit high bonding strength and are non-corrosive. Commonly used organic non-bituminous chemicals are:

- Lignosulfonates are waste products derived from the wood pulping industry.
- Oils, pine tar and molasses are also derivatives of food and wood processing technologies and are often readily available locally, depending on location.
- Synthetic oils are composed of isoalkanes and other proprietary compounds.

*Limitations:* These chemicals require proper weather conditions and time to cure. Heavy precipitation before curing will result in leaching, making the chemical corrosive to aluminum alloys due to acidity. Some of the products in this category may be visually unappealing, odorous, or very sticky upon application. Products can also become slippery when wet and brittle when dry; therefore require careful consideration for site-specific conditions. Lignin products have a high biological oxygen demand (BOD) in aquatic systems. Spills or runoff into surface or groundwater may create low dissolved oxygen conditions and affect aquatic life.

#### 4.1.3 Petroleum Based Binders and Waste Oils

*e.g., Bitumin Emulsions, Asphalt Emulsions, and Waste Oils*

These chemicals are effective in a variety of climatic conditions. They control dust by binding particles together, are effective on many soil types, and are generally more resistant to leaching even in relatively wet conditions.

*Limitations:* Waste oils can cause significant adverse environmental effects due to toxic materials and are not environmentally acceptable unless they have been processed to remove these materials. Asphalt emulsions, although relatively expensive compared to other product types, are considered effective under a broad range of soil types and climates. Similar to the organic non-bituminous product category, some of these commercial products may also be visually unappealing, odorous, or very sticky upon application.

#### 4.1.4 Electro-Chemical Stabilizers

*e.g., Sulphonated Petroleum, Ionic Stabilizers, and Bentonite*

These products also work in a wide range of climatic conditions, are resistant to leaching and are particularly effective on clayey or sandy surface materials. The dust control efficiency is dependent on the clay mineralogy.

*Limitations:* These products may only be effective on very specific sites and have no standard laboratory tests for predicting performance under field conditions and need to be evaluated in small-scale trials prior to large-scale applications.

#### 4.1.5 Polymers

*e.g., Polyvinyl Acrylics and Acetates*

These products bind soil particles together by forming a polymerizing matrix, similar to adhesive, thus forming a crust that is resistant to disintegration. Most of the polymer products are supplied in concentrated form and require dilution with water before application. With variations in dilution and final application rates, polymers are generally suitable for use under a wide range of soil and climatic conditions. Most polymer-based products are considered non-toxic and environmentally friendly when used according to manufacturer's recommendations. Some products allow seeded vegetation to grow through the polymer matrix.

*Limitations:* Polymer products do need proper weather conditions and time to cure and they may be subject to UV degradation. Application equipment requires timely cleaning.

#### 4.1.6 Microbiological Binders

*e.g., Cryptogams, Blue-Green Algae Inoculants, Enzyme Slurries, and Microbial By-Products*

This product is mostly important in arid climates, as cryptogams bind soil particles together, resulting in a reduction in the movement of dust particles. Many enzymes are adsorbed by clay particles, resulting in a compression of the pore space, which aids in compaction and consequently reduces dust generation.

*Limitations:* Similar to electro-chemical stabilizer products, these products have shown great performance in highly specific surface conditions. Since standard testing procedures to predict their performance under field conditions are not available, small-scale trials are required to evaluate their efficiency.

#### 4.1.7 Recommendations for Alternative Palliatives

As described previously, water-attracting chemicals result in potentially adverse environmental conditions and are not recommended for use at the site. Organic non-bituminous chemicals and microbiological binders work best in arid or semi-arid climates and as such are not suitable for the climate at this site. The effectiveness of electro-chemical stabilizers is not currently well defined, and they are also not recommended. Therefore, if additional control measures are needed, polymer or petroleum based binders that have been accepted as non-toxic, are suitable for use at the site.

NYSDEC has currently approved the dust palliatives shown in Table 1 for use in the New York State Department of Transportation (NYDOT) projects. If needed for additional mitigation, and if approved by the Department for use at this facility, a product in Table 1, or the most recently approved list, will be utilized on-site. While not specifically included in the table, calcium chloride is also accepted by the Department as a dust palliative<sup>2</sup> and therefore may be utilized as well. For clarity, calcium or magnesium chloride have been approved for use as an alternative dust control palliative in any temperatures as noted in Section 3.1.3.

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<sup>2</sup> NYSDOT website. (<https://www.dot.ny.gov/divisions/engineering/technical-services/technical-services-repository/alme/pages/580-1.html>)

## **4.2 BERMS AND/OR VEGETATIVE BUFFERS**

As noted in Section 3, Dunn intends to modify the existing perimeter berm layout on the northern side of the site to be approximately 30 to 50 feet higher to provide additional visual screening from the neighbors as well as to provide additional dust control. The construction of the berm will incorporate vegetative cover as defined in the application documents, following Department approval.

## **4.3 EROSION CONTROL MAT AND SEEDING**

Erosion control mats are preformed protective blankets that can be constructed of plastic, straw, or other natural material, designed to protect disturbed slopes from the impact of water and wind erosion. The use of mats can stabilize soil and allow germination of seed mixes and planting. When used in conjunction with application of hydroseed, erosion control mats can be an effective measure to reduce wind erosion and thus provide effective long-term dust control. Erosion control matting will be applied to all exposed sand surfaces exposed for longer than one month.

## **4.4 TACKIFIER BONDED MULCH**

Mulch used as ground cover over disturbed slopes will help to conserve soil moisture thereby reducing wind and waterborne erosion. Tackifiers can be added to mulch as a “glue” to bind and immobilize mulch and further stabilize the soils and reducing airborne particulates from wind erosion. Spray mulch may only be used on exposed sand surfaces that will be exposed for less than 30 days.

## **4.5 PROPOSED MINE SITE MITIGATION MEASURES**

Based on the evaluation of mitigation measures described, the facility will implement the following procedures at the site in addition to the measures specified in Section 4:

- Temporary exposed interior slopes in mine: Temporary excavation or fill slopes that will be exposed more than 14 days will have tackifier-bonded mulch applied in accordance with manufacturers’ recommendations. These slopes will receive treatment no more than 7 days after construction activity has ceased on that surface. To the extent possible, such applications will occur late in the week to avoid dust issues occurring over weekend periods.

- Permanent exposed exterior slopes in mine: Erosion control mat and hydroseed will be applied to western-facing mine slopes above the elevation of the western site perimeter road that will be exposed for longer than 30 days. These slopes will receive treatment no more than 14 days after excavation activity has ceased.
- Temperatures below freezing – During winter when temperatures are below freezing and water cannot be applied to roadways, chlorides (e.g. calcium or magnesium) will be applied once (on December 1<sup>st</sup> of each year) to provide dust control on the perimeter access roads, and applied further as needed in accordance with Section 3.1.3. Chloride usage is required when temperatures are below freezing; however, it's usage is not limited to winter and it may be utilized year-round, regardless of temperature.

#### **4.6 EXTREME WEATHER ACTION PLAN**

Dunn will implement an extreme weather action plan on days when the National Weather Service forecasts the following weather notifications:

- High Wind Watch (issued when sustained winds of 40 miles per hour (mph) or higher for one hour or more or wind gust of 58 mph or higher for any duration are possible).
- High Wind Warning (issued when sustained winds of 40 mph or higher for one hour or more or wind gust of 58 mph or higher for any duration are expected).
- Wind Advisory (issued when sustained winds of 31 to 39 mph for an hour or more and/or wind gusts of 46 to 57 mph for any duration are expected).
- Severe Thunderstorm Watch (issued when thunderstorms are possible in the watch area and winds of 58 mph or higher are expected).
- Tornado Watch (issued when a tornado is possible in the watch area and winds of 58 mph or higher are expected).
- Severe Thunderstorm Warning (thunderstorms are imminent in the warning area).
- Tornado Warning (tornado is imminent in the warning area).

When a high wind watch, severe thunderstorm watch, or tornado watch is issued, Dunn will implement the following procedures:

- Evaluate condition of exposed slopes; if necessary and sufficient time exists, apply tackifier-bonded mulch to disturbed excavation or stockpile slopes. As often as necessary, apply water or calcium chloride if temperatures are below freezing.

- Evaluate condition of roadways; as often as necessary, apply water. If temperatures are below freezing, as often as necessary, apply calcium chloride. As noted previously, chlorides must be used to control dust when temperatures are below freezing; however, their usage is not limited to winter, and they can be applied year-round, regardless of temperature.
- Monitor weather forecast updates for upgrades from watches to warnings.

If a high wind warning, wind advisory, severe thunderstorm warning, tornado watch or warning are issued, Dunn will conduct the activities mentioned above and cease both mining and waste operations one hour prior to the warning period (provided that the weather notification is issued at least one hour prior to the beginning of the effective period). In addition, cover placement activities will begin one hour prior to the effective time (or immediately if the notification is issued less than one hour in advance of the effective time) of such notifications.

If the National Weather Service issues any of the above mentioned weather watches, warnings or advisories or elevated (or greater) risk for tornados, thunderstorm wind gust, or non-thunderstorm winds (i.e., Wind Advisories, High Wind Watches or High Wind Warnings that occur without a Severe Thunderstorm Warning) for an effective period during a weekend, holiday, or on a Monday morning, Dunn will undertake the procedures mentioned above ahead of time during permitted hours of operation. This includes placement of chlorides (e.g. calcium or magnesium) or other long-lasting approved dust palliatives listed in Table 1 to roadways and other exposed sand surfaces that are not stabilized by tackifier bonded mulch and/or erosion control matting. If such watches, warnings or advisories are issued outside of permitted hours of operation, the Department will be notified and Dunn will mobilize resources as soon as possible to mitigate dust potential.

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**TABLE 1**  
**DUST PALLIATIVES APPROVED FOR NYDOT PROJECTS**

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**Table 1: Dust Palliatives Approved for NYDOT Projects<sup>3</sup>**

<b>Product</b>	<b>Company &amp; Address</b>	<b>Date Approved</b>	<b>Category</b>
DirtGlue™	DirtGlue Enterprises PO Box 1647 Wakefield, NY 01880	April 27, 2004	Polymers
Earthbind 100	EnviRoad LLC 2606 N. Newark Street Portland, OR, 97217	May 27, 2004	Polymers
Silt Stop <sup>R</sup> 700 Series	Applied Polymer Systems, Inc. 519 Industrial Supply, Inc. Woodstock, GA 30189	May 13, 2004	Polymers
Soil Sement	Midwest Industrial Supply, Inc. PO Box 8431 Canton, OH 44711	June 1, 1990	Polymers
EcoRoads-DS	TerraFusion, Inc. 1145 2 <sup>nd</sup> Street #A331 Brentwood, CA 94513	March 13, 2009	Organic Non-Bituminous Chemicals
PennzSuppress D	PennzSuppress Corp. PO Box 4339 Lago Vista, TX 78645	June 4, 1999	Petroleum Based Binders

<sup>3</sup> <https://www.dot.ny.gov/divisions/engineering/technical-services/geotechnical-engineering-bureau/dust-palliatives>

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**APPENDIX A**  
**SNOW FENCE LOCATION**

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PARTITION STREET EXTENSION

Appendix A  
Snow Fence Location

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**APPENDIX B**  
**SACI, LLC TECHNICAL MEMORANDA/NYSDEC CONDITIONAL**  
**APPROVAL**

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# NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Mineral Resources, Region 4

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August 26, 2021

Curt Taylor  
SA Dunn & Company, LLC  
1319 New Loudon Rd  
Cohoes, NY 12047

Re: Order On Consent  
R4-2021-0316-18  
Dunn Facility  
SACI LLC Technical Memorandum

Dear Mr. Taylor:

Department staff have conferred with the Office of General Counsel (OGC) concerning your proposal to not revise the Technical Memorandum of SACI, which contains recommendations for changes in the dust control plan or operational practices to minimize the potential for dust dispersion. You have proposed to proceed with Item 5 of the Order, submit to the Department for review and approval, a revised dust control plan, incorporating the requirements of Paragraph 2 [of the Schedule of Compliance] and all the **approved** [emphasis added] recommendations of the consultant (i.e. any unapproved recommendations will not be included).

The Department finds this proposal acceptable, and Dunn may proceed with revising the dust control plans, with the following stipulations:

- Recommendation 2 – Clarifying Observation Methods. This recommendation is not approved by the Department. It is not appropriate for Dunn to dictate to the Department the methods of observation utilized during inspections. This recommendation may not be included in the dust control plan.
- Recommendation 4 – Use of chlorides for dust control. More specificity is required. Rather than a recommendation that Dunn "consider [emphasis added] use of calcium or magnesium chloride to control dust on roads and open areas when temperatures are below freezing", the document should make a clear provision for the use chlorides (i.e. to not just consider), both when temperatures are below freezing and year-round.
- Recommendation 5 – Additional Control/Stabilization Measures (1<sup>st</sup> paragraph). Department review and written approval is required prior to application of any alternative palliatives (i.e. asphalt emulsions, petroleum resins, and polymers).
- Recommendation 5 – Additional Control/Stabilization Measures (2<sup>nd</sup> paragraph) Section 3.1.6 already requires a 6" thick layer of stone to be applied to the existing landfill perimeter road and primary internal haul roads used to transport sand and gravel from the active excavation to either the stockpile area or for off-site



Department of  
Environmental  
Conservation

transport. The road is to be wide enough to allow two-way traffic to remain on the crushed stone surface. Dunn is to maintain a stockpile of stone to apply additional stone to the areas that have been filled with sand or silt where the crushed stone's ability to mitigate airborne dust has been diminished. Please provide more specificity concerning application of loose rock over the trafficked portion of the mining area (i.e. not to just consider).

Pursuant to Item 5 of the Schedule of Compliance attached to the above referenced Order, within fifteen (15) calendar days of this letter, Dunn is required to submit to the Department for review and approval, a Revised Dust Control Plan. The plan shall incorporate the requirements contained in the SACI Technical Memorandum, with the above detailed stipulations (see the above referenced order for details).

If you have any questions or comments, please contact me a 518-357-2254.

Sincerely,

A handwritten signature in black ink that reads "Psalm Wyckoff". The signature is written in a cursive style with a large, prominent 'P' and 'W'.

Psalm Wyckoff  
Mined Land Reclamation Specialist II

c: MLF file 40346  
Brian Maglienti, Materials Management  
Karen Lavery, Assistant Regional Attorney  
Kate Kornak, Regional Permit Administrator



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## **T E C H N I C A L   M E M O R A N D U M**

July 26, 2021

**To:** Curt Taylor, S.A. Dunn & Company, LLC  
**From:** Greg Muleski, SACI LLC  
**Subject:** Site Assessment, April 22, 2021

This memorandum presents results from an April 22, 2021 visit to the Dunn Facility located on Partition Street Extension in Rensselaer, NY. The purpose of the visit was to assess current conditions at the site and factors that might contribute to visible fugitive dust leaving the property.

### **Background**

On March 19, 2021, the New York Department of Environmental Conservation (DEC) notified the Dunn Facility of alleged violations of a permit condition prohibiting visible dust leaving the property. DEC indicated that the incident occurred at approximately 2:48 pm on March 4 and between 3:10 and 4:15 pm on March 5.

The DEC provided an 8-page pdf file containing photos and still shots from videos taken on those two dates. For ease in this discussion, a separate Appendix labels each photo/still using the page number (1 through 8) followed by a letter (A or B) indicating the order in which it appears on the page. Figures 1 and 2<sup>1</sup> show the northern portion of the Dunn Facility and indicate areas to which the DEC photos/stills refer.

Figures 8.A and 8.B in the Appendix are stills from a security video taken on March 4, 2021 from the neighboring school. These figures appear to form the basis for the alleged 2:48 pm violation on that date cited by the DEC. At that time, Dunn's on-site meteorological station recorded a wind of 26.84 mph from 310.7° from north. While it is impossible to locate where visible dust crossed the property line, for purposes of this report, it is reasonable to assume that there may have been a contribution from the sand mining area shown in Figure 1.

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<sup>1</sup>Figures mentioned are included at the end of this memorandum.

On the morning of March 5, 2021 DEC personnel visited the sand mining area and obtained Appendix Figures 1.A and 1.B which show a level of wind erosion of the sand mining travel area.<sup>2</sup> However, no visible dust was observed by either Dunn or DEC personnel at the compliance point along Partition Street Extension. DEC personnel returned to Partition Street Extension later on March 5 to obtain Appendix Figures 3.A through 7.B. These stills appear to form the basis for DEC's alleged violation between 3:10 and 4:15 pm on that date.<sup>3</sup>

According to DEC, mobilization of dust from the mine floor, bank face, and the east side (leeward side) of sand stockpiles was caused by high wind. In addition to the visible dust violation, DEC also cited the Dunn Facility's failure to have a sand fence in place in the location above the mine face on March 5, 2021.<sup>4</sup> It was subsequently confirmed that this was limited to an area where the Dunn Facility had been undertaking grading activities requiring the fence's removal.

SACI also reviewed video clips of the March 5 incident that were provided by DEC.

The Dunn Facility and DEC ultimately executed an Order on Consent, dated June 21, 2021, (Order) concerning the above incidents. The Order attached a "Schedule of Compliance" (shown on page A-9 in the Appendix) for the Dunn Facility to follow. Main points of the Schedule of Compliance are summarized below:

1. Install a sand fence above crest of the active mine face.
2. Incorporate the following restrictions in the dust control plan for the months of March through mid-May:
  - a. Reduce the area affected by mining exposed to potential wind erosion (i.e. not stabilized by hydromulch or erosion control matting) to no more than one acre (1.0 acre). Travel routes for vehicles can be excluded from the 1.0-acre limitation provided that they are stabilized with crushed stone as required by the dust control plan.
  - b. Reduce the exposed mine face to a height no higher than 15 ft.
  - c. Remove all unstabilized sand piles on the northern and eastern side of the mine above elevation 200 ft. amsl. Those unstabilized sand piles used for the purpose of traffic direction shall be replaced by jersey or concrete barriers, or other large size aggregate (i.e., particles larger than ¼"). Unstabilized sand stockpiles located

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<sup>2</sup>The Dunn Facility had closed at approximately 9 am because freezing temperatures prevented watering for dust control. Meteorological conditions between 10:00 and 10:30 am on March 5, 2021 (roughly the time Figures 1.A and 1.B were taken) were 19 F and a northwesterly wind at 22 mph.

<sup>3</sup> SACI found it difficult to discern visible dust in several of the stills (in particular, Appendix Figures 3.A, 6.A and 6.B).

<sup>4</sup>See Appendix Figures 2.A and 2.B

on the west side of the mine must be constructed in oval shapes with the long axis oriented east-west and the pile may not exceed 15 feet in height.

The Order also indicates that permit conditions overrode the dust control plan's limitation on the use of alternative dust control palliatives during high wind conditions in the event water could not be used to suppress dust, for example during freezing temperature conditions.

Finally, the Order required the Dunn Facility to hire a consultant to undertake an assessment and develop recommendations relating to the following:

- a. An assessment of prevailing conditions on March 4, 2021 and March 5, 2021;
- b. An assessment of current site conditions and factors that potentially contribute to dust creation;
- c. Recommendations for changes to the dust control plan or operational practices to minimize the potential for dust dispersion, including without limitation, other potential mitigation measures to further minimize the potential for dust creation.

This report is intended to address these items.

#### **Observations from Site Visit and Discussion**

SACI visited the Dunn Facility on April 22, 2021 and found it reasonable to assume there could have been a contribution to the visible dust incidents observed on March 4 and 5 from the sand mining area. Appendix Figures 1.A and 1.B indicate wind erosion of the mine floor. This area is dried and pulverized by loader and truck traffic, thus regularly regenerating the erosion potential.<sup>5</sup>

SACI does not believe significant dust can be generally attributed<sup>6</sup> to the mine face because it is compacted and retains moisture much better than the trafficked area. No sand stockpiles were seen during the April 22 visit, but SACI did observe a series of small heaps used to designate the traffic patterns (Figure 3). SACI does not believe that appreciable dust could arise from these "safety piles."

Sand fences were present throughout the mining area during SACI's April 22 visit. Dunn Facility personnel stated that the portion of the fence had been removed to bulldoze down a slope. Figure 4 (based on Appendix Figure 1.B). Recommendations for fences are presented in the following section.

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<sup>5</sup>See the general discussion about wind erosion in SACI's June 25, 2020 technical memorandum.

<sup>6</sup> Appendix Figures 1.A and 1.B show the recently bulldozed material. Although this material would be more erodible than a typical mine face, it is not nearly as erodible as the mine floor. Note that none of the DEC photos shows that surface eroding in this area while there is dusting in the mine floor.

## Summary and Recommendations

The following summarizes the site visit and assessment; in addition, recommendations are presented for Dunn's consideration.

1. STATUS OF MARCH 4-5, 2021 EVENTS. It is important to recognize how effective Dunn's response to the prior 2020<sup>7</sup> dust event has been. While there was clear visible evidence of the 2020 event, it is difficult to discern visible dust in several of the Appendix figures from the 2021 observation period. In fact, taken as a whole, visible dust was not present during the vast majority of the 2021 observation period when reviewing the entire video footage. Figure 5 provides a side-by-side comparison of the March 4 events of 2020 and 2021. It is clear that Dunn's actions over the past year have proved highly effective in controlling fugitive dust.

After comparing the 2020 and 2021 events, and considering the mitigation measures in place, SACI believes that the sand mining area is the only open area<sup>8</sup> left at the facility that has the potential to produce off-site visible dust during high winds. Effective dust control during freezing temperatures still poses a problem and SACI offers recommendations below.

2. CLARIFYING OBSERVATION METHODS. As noted above, SACI found it difficult to discern visible dust in some of the videos and believes that optical effects could be mistaken for visible dust. In particular, sunshine filtering through trees and/or shadows cast on chain link fence might be mistaken for dust. For example, review of the two screengrabs (Figure 6) from the file named "2021.3.5 3:14 Dunn offsite dust.MOV" which might be construed as showing visible dust at the fenceline. However, dust is clearly not being transported by the wind because the two views (34 seconds apart) are essentially identical. In other words, no dust cloud moves from right to left to obscure different portions of the view. It is easier to see this phenomenon in the "3:14" video than in the other three videos because this video provides more of a "head-on" view of the fence line. The view down the fenceline in the other videos would be more vulnerable to mistaking chain link shadows as dust.

SACI recommends that Dunn propose guidelines (such as restricting attention to above the chain link fence top, requiring a more heads-on view in video angles, limits on sun angles, etc.) to the DEC that would safeguard against misconstruing the phenomenon as dust.

3. USE OF MEASURES SPECIFIED IN DEC ORDER. As described above, the Order

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<sup>7</sup>The date of the 2020 dust event was also March 4.

<sup>8</sup>Dusting of roadways during high winds is possible but emissions would be more dispersed and less likely to lead to an off-site violation.

specifies a number of measures that are to be implemented during the months of March to mid-May, and the Dunn Facility has agreed to these measures. For completeness, these measures should be incorporated into the dust control plan.

4. **USE OF CHLORIDES FOR DUST CONTROL.** The Dunn Facility should consider use of calcium or magnesium chloride to control dust on roads and open areas when temperatures are below freezing. Both materials are available in liquid or solid (flakes or pellets) forms. For freezing conditions, SACI recommends liquid application followed by pellets. Year-round use of salt materials might prove cost-effective because of their hygroscopic nature. In other words, by drawing moisture from the air, the salts could reduce the frequency of using water for dust control. The current dust control plan permits the use of alternative palliatives but only under limited conditions. SACI recommends that the plan be updated to provide more flexibility to the facility when use of water is not feasible. Based on the Order, DEC appears to be amenable to allowing more flexibility in alternative palliatives use.
5. **ADDITIONAL CONTROL/STABILIZATION MEASURES.** Although chlorides are believed to be Dunn's most cost-effective control option for freezing conditions, Dunn may wish to consider other chemical dust controls if the expanded use of chlorides is not adequately effective. There is a wide variety, including asphalt emulsions, petroleum resins, and polymers. Because the mine floor is subject to spillage from loading trucks and high shear stresses as vehicles maneuver into place, the surface may require frequent retreatment.

Dunn might also consider the feasibility of spreading coarse, loose rock over the trafficked portion of the mining area. Inclusion of these “non-erodible elements” on the surface increases the threshold velocity at which wind erosion of the surface begins.<sup>9</sup> However, the rock will be subject to frequent covering by sand spillage from active loading operations making its effectiveness short-term between applications.

6. **IMPROVED “SAFETY PILE” MATERIAL.** Although the small sand heaps that delineate traffic routes do not represent a significant dust source, SACI recommends that Dunn replace them with concrete bunker blocks, water-filled plastic barricades, used equipment tires, or other suitable materials.
7. **SAND FENCE IMPROVEMENTS.** Although SACI found that the required fences were present as required by the dust control plan, it appears that Dunn has not yet found a completely satisfactory fence system. Figure 7 shows some of the fences in the mining area. High wind events have torn the plastic fence material (Figure 7a) from its anchors. The welded wire material (Figure 8b) has proven more durable but the material is too

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<sup>9</sup>See Figures A-1 through A-3 of Reference 1.

porous<sup>10</sup> to be very effective. Combining the two materials (Figure 7a) improved retention of the plastic but SACI recommends (1) placing the plastic material on the other side of the wire fence and (2) staggering two layers of the plastic material to achieve a porosity of 50%. Dunn may also wish to experiment with wooden snow fence and/or heavier T-posts to reduce maintenance intervals.

## References

1. U.S. Environmental Protection Agency, "Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites," EPA/600/8-85/002 (February 1985).
2. U.S. Environmental Protection Agency, "*Control of Open Fugitive Dust Sources*," EPA-450/3-88-008 (September 1988).

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<sup>10</sup>A porosity of 50% is generally recommended for dune fences. The green plastic material is approximately 75% porous.

## Figures



**Figure 1.** Northern portion of the Dunn Facility.



**Figure 2.** “Mine floor” in the sand mining area.



**Figure 3.** “Safety piles” used to direct traffic.



**Figure 4.** DEC Figure 1.B showing recently bulldozed material



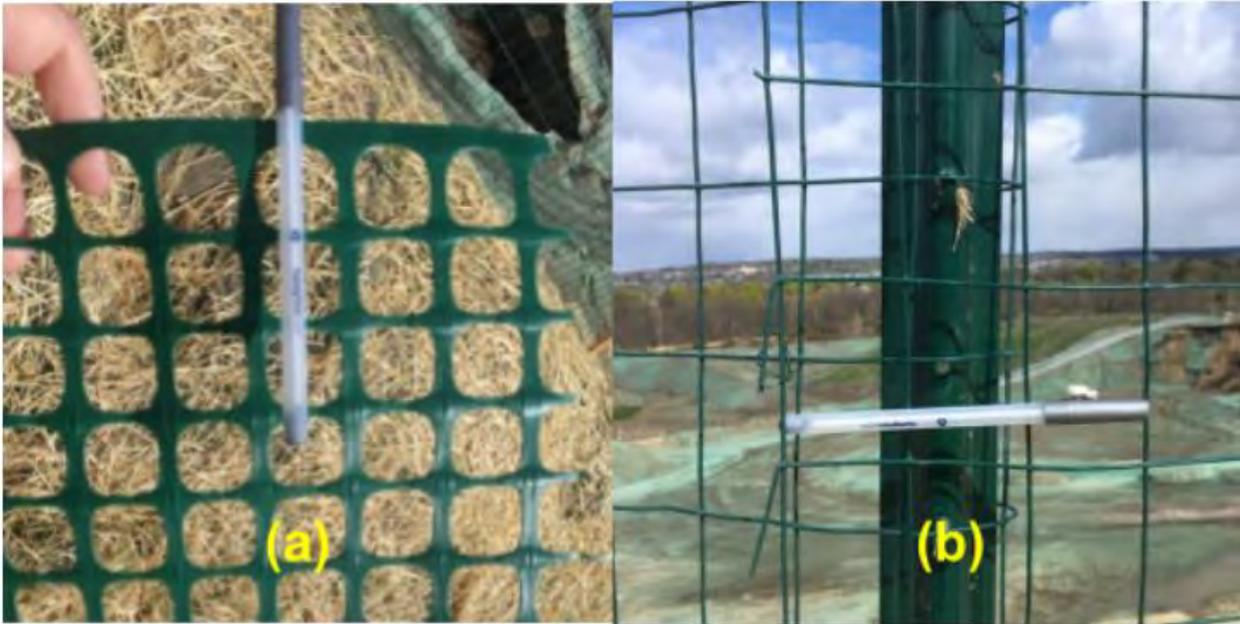
**Figure 5.** Comparison of the 2020 and 2021 events.



**Figure 6.** Comparison of "3:14" video screenshots 34 seconds apart.



**Figure 7.** Fences in the sand mining area.



**Figure 8.** Plastic and welded wire fence materials



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## **T E C H N I C A L   M E M O R A N D U M**

June 25, 2020

**To:** Curt Taylor, S.A. Dunn & Company, LLC  
**From:** Greg Muleski, SACI LLC  
**Subject:** Site Assessment, June 2-4, 2020

This memorandum presents the results of a site inspection that SACI, LLC (“SACI”) conducted on June 2-4, 2020 at the Dunn Facility located on Partition Street Extension in Rensselaer, NY. The purpose of the visit was to assess current conditions at the site and factors that might contribute to fugitive dust leaving the property. I also reviewed the Dunn Facility’s dust control plan, as last revised in October 2019. This memorandum provides a summary of the visit and assessment and provides recommendations for future dust control measures.

### **Background – Purpose for Assessment**

The New York Department of Environmental Conservation (DEC) notified the Dunn Facility of a March 4, 2020 incident which it stated constituted a violation of a permit condition banning “visible dust ... leaving the property.” The Dunn Facility and DEC subsequently entered into a consent order (R4-2020-0312-41) that called for an expert report to assess:

i) “the current site conditions and contributing factors that result in fugitive dust leaving the facility, including an assessment of the location, condition, orientation, and geometry of the sand piles on the eastern and northeastern sides of the facility and an assessment of the potential benefits, if any, of sand pile relocation (e.g., to the west side of the mine) and/or reconfiguration (e.g., limiting height and/or pile axis orientation)”

and

ii) the “mitigation measures intended to reduce erosion of sand from both the mine face and any sand stockpiles”

This memorandum represents the required expert report.

It is generally recognized that the March 4 event resulted from high winds and wind erosion of exposed surfaces. Before addressing site-specific conditions, the following material describes the wind erosion process in general terms. Clearly, two basic requirements for wind erosion are that the surface be dry and exposed to the action of the wind.

## Background – Basics of Airborne Dust Creation

There has been ongoing research into wind erosion and/or “aeolian processes” since at least the 1940s. Different sized particles are transported by different means (known as **suspension**, **saltation**, and **creep**) as illustrated in Figure 1.<sup>1</sup> It is important to note that movement of relatively large (~ 100 μm and larger) particles is necessary to initiate and to sustain wind erosion.

“Creep” occurs when loose particles roll along the bed surface but never become airborne. Slightly smaller particles undergo “saltation” (a word whose Latin root means leaping or dancing). Saltation occurs when particles become airborne (up to a height of roughly 1 meter) and are carried a short distance before falling back to the surface. When the particles fall back, they dislodge smaller particles which can remain suspended in the air. Particles that are sufficiently small are transported by suspension and can travel a considerable distance away from their source.

The threshold velocity is the lowest wind speed at which erosion is initiated. Wind erosion threshold is best defined in terms of the threshold friction velocity  $u_t^*$ . Friction velocity ( $u^*$ ) is a measure of the shear stress at the surface and arises from a logarithmic wind profile

$$u(z) = (u^*/k) \ln(z/z_0) \quad (1)$$

where:  $u(z)$  = wind speed at height  $z$   
 $z_0$  = roughness height  
 $u^*$  = friction velocity  
 $k$  = von Karman’s constant (approximately 0.4)

A value of 75 cm/s represents a rough demarcation between “limited” and “unlimited” erosion surfaces, as described in Reference [1]. Unlimited surfaces will continue to emit dust at an approximately steady rate as long as the threshold speed is exceeded. At higher threshold velocities, surfaces tend to have a “limited reservoir” in which erodible particles are mixed with larger, non-erodible elements. Crusted areas with small amounts of fine material lying on the surface also represent limited reservoirs. Limited reservoirs emit dust at a decreasing rate as

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<sup>1</sup> Figures are presented at the end of the memorandum.

erodible particles are depleted. In that way, even if the wind stays constant, the erosion rate goes to zero.

## Observations from June 2020 Site Visit and Analysis

As noted earlier, SACI inspected the Dunn Facility on June 2-4, 2020. Based on observations during the site visit, SACI believes that some freshly exposed sand surfaces<sup>2</sup> would have represented unlimited reservoirs when the March 4 incident occurred; however, almost the entire facility has now been treated with long-term (emulsified mulch) or semi-permanent (matting to promote vegetation) treatments which limit the reservoir of erodible material.

Between the March 4 event and the latter part of April 2020, Dunn effectively doubled the area covered with erosion matting. Figures 2a and 2b show aerial views from March 9 and April 24, respectively, with the red dashes outlining the newly matted areas. Since April, additional areas have been matted to effectively cover essentially all inactive areas at the facility. In addition, the unpaved road shown with yellow dots has been upgraded with 6 inches of (non-erodible) rock armoring. These improvements lie “upwind” of where the March 4 incident was observed. Quotes are used because only anecdotal wind information is available. Dunn Facility personnel stated that high winds were from the west to west-southwest on March 4.

SACI compared March 4, 2020 wind data from four stations in the area (Figure 3).<sup>3</sup> Although some differences are to be expected,<sup>4</sup> the four stations show substantial differences in speeds and directions. For example, the highest gusts recorded for that day span the range of 12.6 to 42.6 mph (Figure 3). The three contemporaneous wind direction records in Figure 4 for the period between 1:30 and 2:30 pm<sup>5</sup> generally agree on the westerly component but vary on whether there is a northerly or a southerly component to the wind.

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<sup>2</sup> This would be the case for fine sand. Fresh faces where sand and gravel are highly mixed would be naturally “limited” in terms of erosion because non-erodible elements would be present.

<sup>3</sup> Three stations were available from <https://mesowest.utah.edu/> and the fourth was taken from <https://www.wunderground.com/wundermap> .

<sup>4</sup> These differences could be due to monitoring equipment used; scan rate and averaging periods; calibration and maintenance practices; and siting (such as sensor height, elevation, surrounding obstructions, etc.).

<sup>5</sup> This time period was chosen because all four stations recorded high gust values at the time and it is understood to roughly correspond with when visible dust was observed. Note the different number of values reported for a 1-hr period.

Taken as a whole, it is safe to say that there is no definitive (quantitative) information about exactly what the wind speed(s) and wind direction(s) were at those time(s) at the time visible dust was reported.

Assuming (i) facility conditions as shown in the March 9 aerial photo (Figure 2a) and (ii) a strong westerly wind component of wind on March 4, SACI believes that visible dust at the property line originated from the yellow cross-hatched area in Figure 5 and, to a lesser extent,<sup>6</sup> the road shown in blue. At that time, open areas in sectors C3 and D3 had been treated with emulsified mulch and would have had a limited erosion reservoir. Furthermore, any saltation particles coming from the cross-hatched area would be slowed when they reached the recirculation zone at the crest.

Finally, the northeast corner lies below the rest of sector D3 and is partially shielded by trees, and therefore would not be expected to be a source of visible dust during higher wind conditions. In addition, the clay pile in that area is not considered erodible and the topsoil pile is vegetated.

Since March 4, Dunn has treated the two sources believed responsible for that day's visible dust event. Other areas have been matted as well (see Figure 2b).

## **Conclusions and Recommendations**

The following summarizes the site visit and assessment and presents recommendations for Dunn's consideration. The facility's dust control plan should be updated to incorporate the measures already implemented by the Dunn Facility since the March 4 incident and the recommendations provided below once they have been reviewed by Dunn and DEC.

### **1. STATUS OF MARCH 4, 2020 VISIBLE OFF-SITE DUST EVENT.**

SACI believes that Dunn has already addressed the immediate source areas of the visible dust on March 4, 2020. Recent matting upgrades will also control erosion due to winds with strong northerly or southerly components.

### **2. ON-SITE QUALITY METEOROLOGICAL DATA.**

As mentioned earlier, winds (especially high winds) are not well characterized for the Dunn Facility. It is strongly recommended that Dunn establish on-site meteorological monitoring capable of providing high quality meteorological data. Four stations between 2 and 7 miles away show substantial differences in terms of speed and direction.

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<sup>6</sup> Besides having greater spatial extent than the road, the cross-hatched area was more likely to have exhibited "unlimited" erosion.

Collection and analysis<sup>7</sup> of high-quality on-site meteorological data would be far more useful than either anecdotal observations or distant monitoring.

### 3. STOCKPILE RELOCATION.

The consent order asks for an assessment of “potential benefits, if any, of sand pile relocation (e.g., to the west side of the mine) and/or reconfiguration (e.g., limiting height and/or pile axis orientation).” Contemplation of any change based on modeling (e.g., computational fluid dynamics) is at best premature without better definition of (i) what wind speeds and directions might be of interest and (ii) the threshold velocity of different surfaces. At any rate, elimination of the erosion potential (because of the matting upgrades) should render the idea of reconfiguration moot. Furthermore, the facts that (i) massive material transport and handling activities would result in far higher dust creation and (ii) the process would create temporary erodible surfaces (i.e., before they can be matted) do not support further consideration of stockpile relocation.

### 4. ASSESSMENT OF EXISTING MITIGATION MEASURES.

The consent order also asked that “mitigation measures intended to reduce erosion” be assessed. As noted above, SACI had reviewed Dunn’s October 2019 dust control plan before the site visit and noted that two additional controls<sup>8</sup> (“erosion control mat and seeding” and “tackifier bonded mulch”) had already been implemented. SACI found that the mitigation measures undertaken by Dunn to be highly effective, as discussed below.

4.a Control Matting and Spray-Applied Mulch – SACI took photos of different surfaces at the facility (Figure 6). Figures 6 a through 6c show a crust removed (and ultimately crushed) from a recently matted surface. The crust’s presence ensures that erosion would be of the “limited” variety. Figures 6d and 6e are photos of matted and mulched surfaces, respectively; both surfaces show “limited reservoirs” for erosion.<sup>9</sup> Furthermore, as vegetation becomes more widespread, the surface shown in Figure 6d would become essentially non-erodible. Although both methods were observed to be highly effective, the spray-applied mulch appears to have a much shorter effective lifespan because of weathering. Surfaces that will remain exposed longer (a month or more) should be treated with the erosion control matting instead of the spray-applied mulch.

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<sup>7</sup> SACI recommends that Dunn utilize the meteorological station data to calculate running 30- or 60-second averages of on-site wind measurements. “Vector averaging” (i.e., tail-to-head addition) should be used.

<sup>8</sup> These are sections 4.3 and 4.4 of the dust control plan.

<sup>9</sup> The presence of non-erodible elements in Figure 6e would approximately double the threshold velocity (see Figure A-2 in Reference [1]). Also, the erosion matting provides immediate control (i.e., even before a crust can form or vegetation take root) because the netting/straw matrix lowers the wind speed at the (erodible) surface.

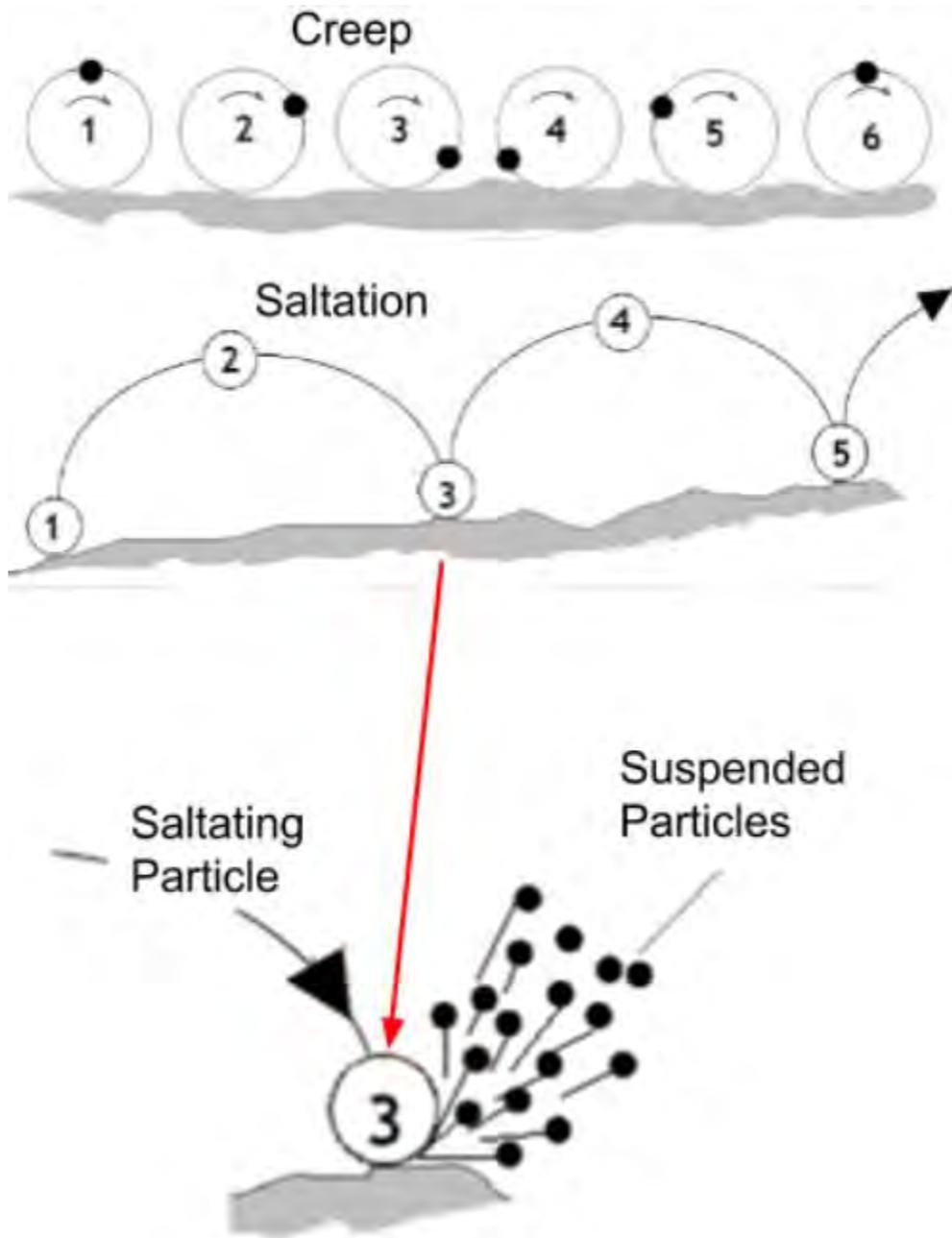
4.b Roadways and Landfill Operations – In addition to the erosion controls, SACI assessed other dust control measures at the site. In-place speed limits, gravel application, and watering (calcium chloride application for freezing conditions where water cannot be effectively used) combine to effectively control unpaved road dust emissions by 90%. The estimates are based on what SACI observed during the visit and its 39 years of experience field testing controlled and uncontrolled roads. The spray cannon (fogger) was observed to operate in the active cells and was effective in controlling the small amount of dust emitted as the “walking floor” trailers were unloaded and the wastes spread and compacted. The existing practice of ceasing landfill operations prior to high-wind events will prevent that activity from contributing to any visible off-site dust. The supplemental measures described above (e.g., gravel application/maintenance, watering, etc.) should be encouraged and authorized under the dust control plan and the facility’s permit on an as-needed basis in advance of forecasted high wind conditions, regardless of whether the facility is in operation at the time or not.

5. MINOR MODIFICATIONS TO EXISTING MEASURES.

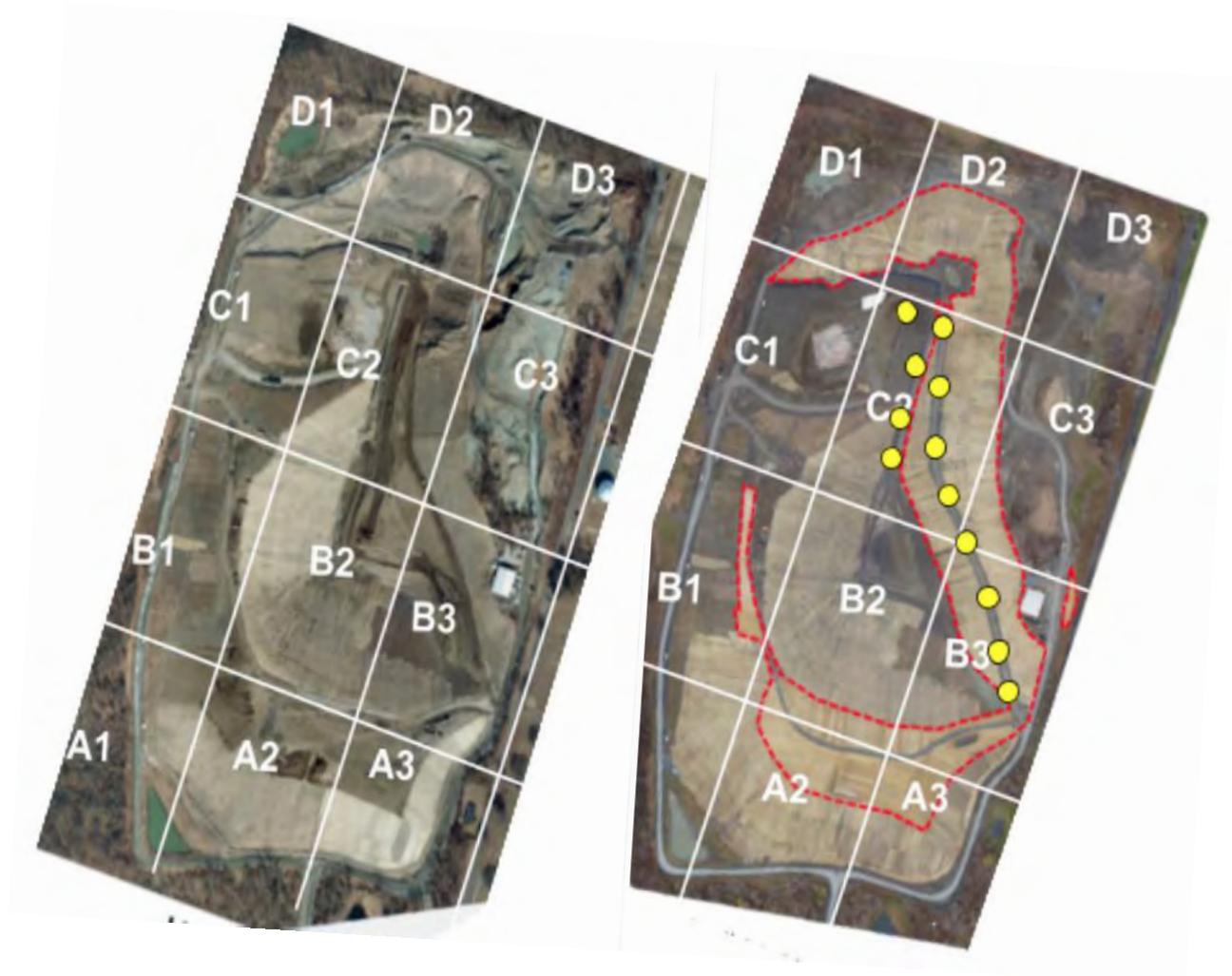
SACI suggests that the Dunn Facility consider minor additional controls, such as mulch or matting far corners in sector D3 (to accomplish nearly complete coverage of the facility) or snow fence along the crest of slopes (to further slow any saltating particles). Small (less than 100 square feet each), isolated areas along the eastern portions of the site appear to have some sand deposited on top of the matting. SACI recommends that these be “patch” matted to prevent further sand movement and that Dunn conduct monthly inspections of matted areas to determine if patching is warranted.

## Reference

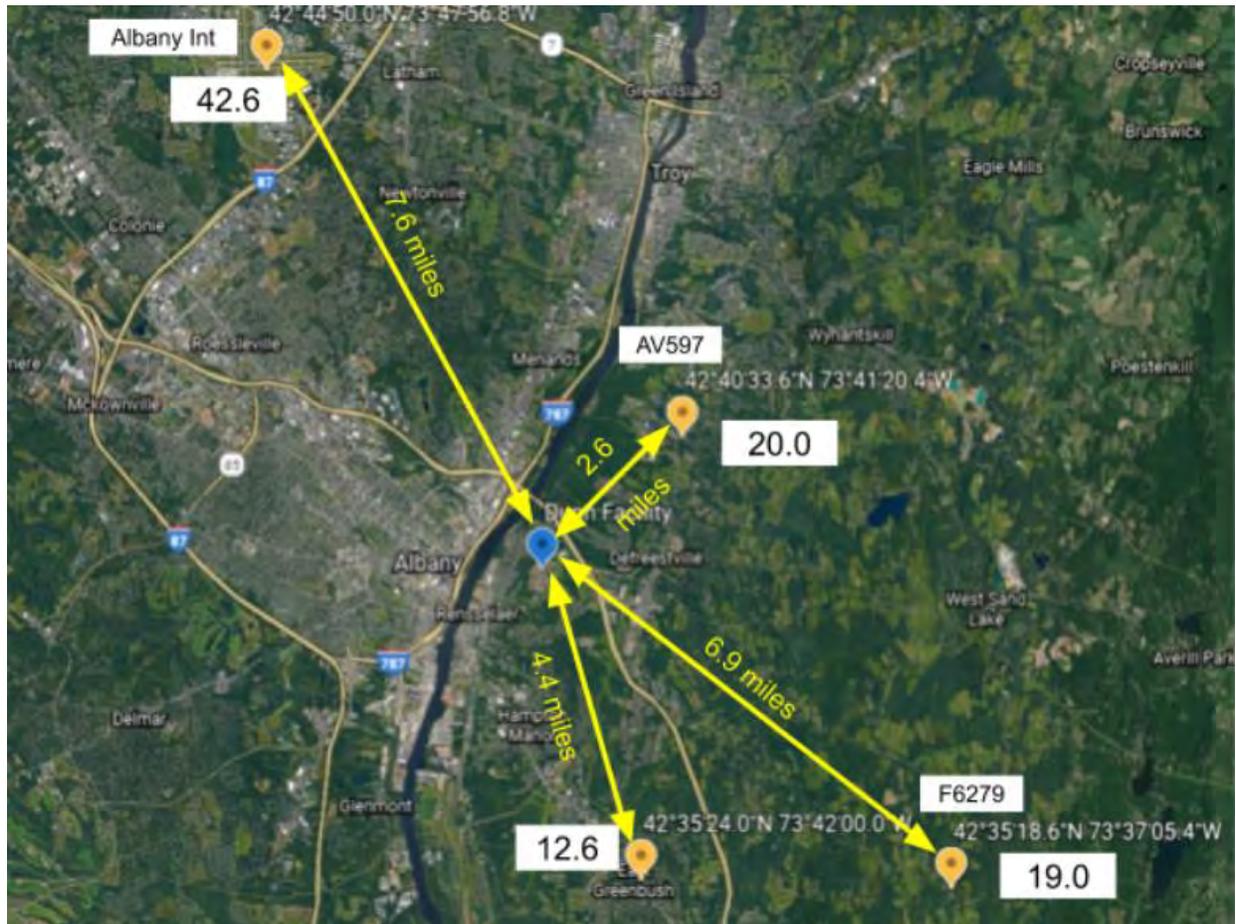
1. U.S. Environmental Protection Agency. “Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Site.” Office of Health and Environmental Assessment, Washington, DC 20460. EPA/600/8-85/002.



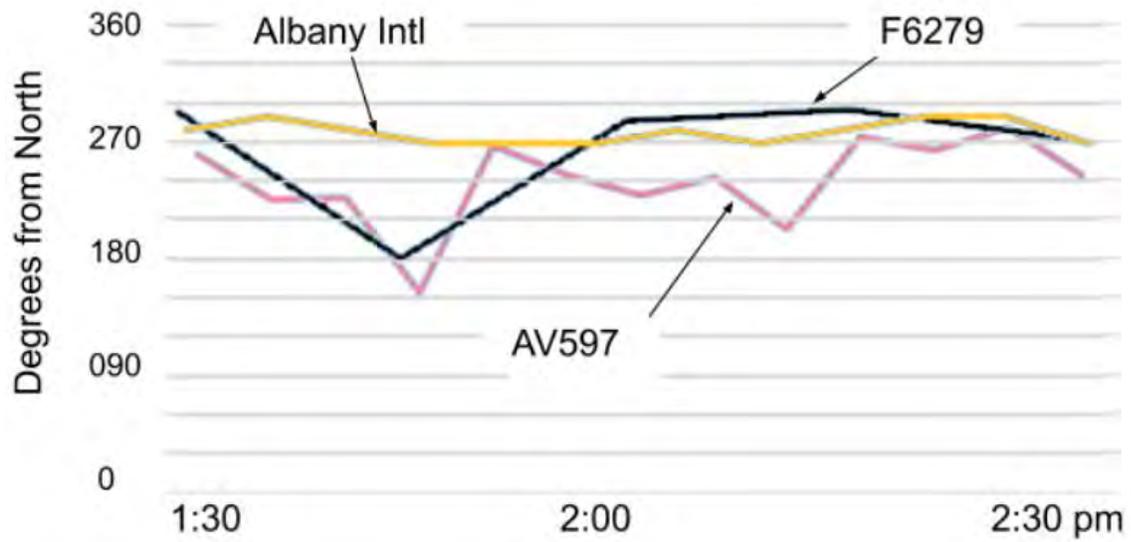
**Figure 1.** Illustration of the wind erosion process



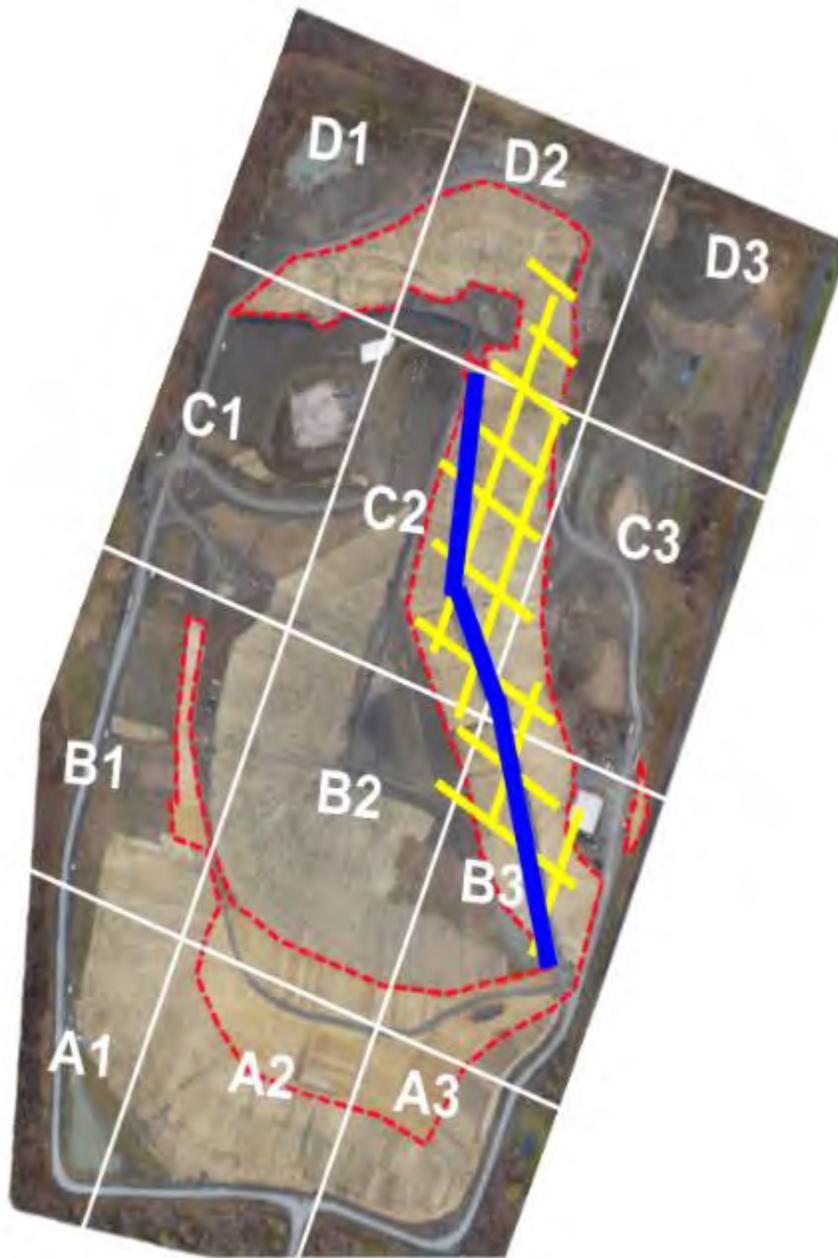
**Figure 2.** Aerial photos of the Dunn facility from (a) March 9 and (b) April 24, 2020



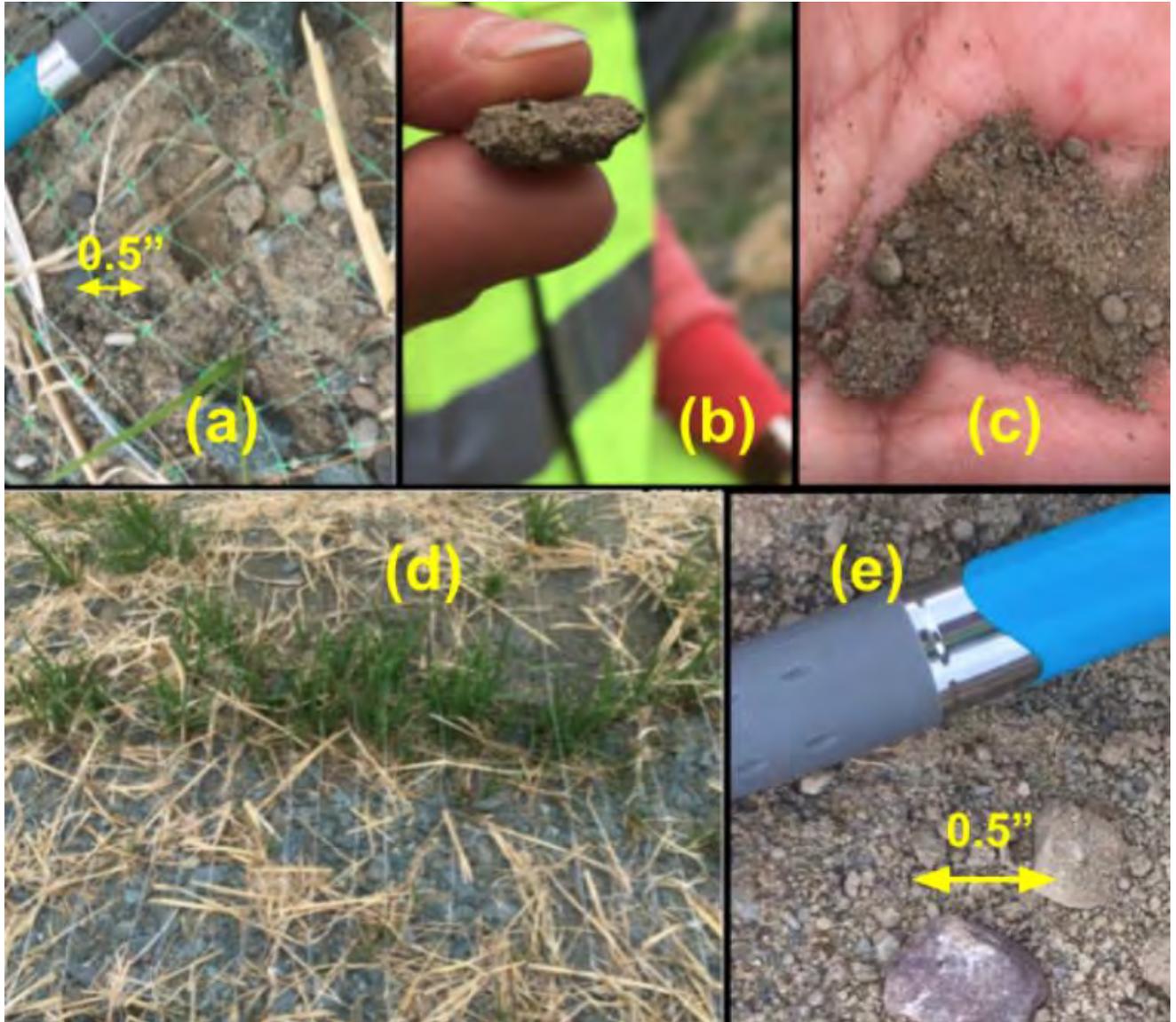
**Figure 3.** Locations where the four meteorological records were obtained. Number next to each location is the maximum wind gust (in mph) recorded for March 4, 2020.



**Figure 4.** Comparison of wind directions at three wind stations recorded between 1:30 and 2:30 pm on March 4, 2020. The fourth station reported WNW (292.5°) throughout the 1-hr period.



**Figure 5.** Areas most responsible for March 4 wind erosion



**Figure 6.** Photos taken of surfaces at the Dunn Facility