William Adams

Please require implementation of the TRAM Recommendations APO Best Management Practices (BMPs) As Presented to TCEQ. This will help protect our health and property for us that live in existing and future residential neighborhoods around this quarry. Just because something was approved in the past does not mean it's ok to do so today. This is why we have lessons learned and continue to update codes and standards. I am an engineer and we are always updating best practices for safety of the people and work environment. Please make sure this new quarry follows and audits the latest BMPs.

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

Overview

This document outlines APO BMPs to be considered in the TCEQ's efforts to develop APO BMPs as directed by the Texas legislature during the 2021 and 2023 sessions. We are aware of these legislative directives related to APO BMP development and offer our assistance in developing said BMPs.

Specifically, by final 88th legislative actions taken in 2023 SB 1397 (Schwertner) and companion HB 1505 (Bell, K.) with regard to Sunset Advisory Commission findings for the TCEQ, page 17:

SECTION 19. Chapter 28A, Water Code, is amended by adding Subchapter D to read as follows:

(a) "The commission (TCEQ) shall develop and make accessible on the commission's Internet website recommended best management practices for aggregate production operations that operate under the jurisdiction of the commission. The best management practices must include operational issues related to:
    1. dust control;
    2. water use; and
    3. water storage.

(b) The commission may coordinate with other agencies when developing the best management practices under this section.

(c) The best management practices developed under this section are not subject to enforcement by the commission."

Further, TCEQ was directed in 2021 SB-1, page 921 to use:

"Amounts appropriated above in Strategy C.1.1, Field Inspections and Complaint Response, to the Commission on Environmental Quality shall be used to adopt and make accessible on the commission's internet website best management practices for aggregate production operations regarding nuisance issues relating to dust, noise, and light, and to conduct aerial observations at least twice per fiscal year to ensure enforcement of existing statutes and rules relating to aggregate operations."

Our input below, in prioritized order, offers recommended BMPs for the above directed areas and includes other APO BMPs that we feel are important and should be considered. For each BMP, we have assigned a priority related to TCEQ's BMP development effort:

H - directly linked to legislative directives for the BMP effort:
M - closely linked to legislative directives for the BMP effort;
L - not directly linked to the legislative directives, but important BMP to be considered

We also assigned a rating for implementation difficulty:

1 - minor change involved, low cost
2 - some changes required, relatively easy to implement, moderate cost
3 - more complex, new processes and changes required, higher cost

We realize that most of the BMPs resulting from this effort will be discretionary, however we feel that it is important to include in this effort the dialogue among all the stakeholders involved on a range of APO BMPs to highlight potential improvements in key areas of APO operations. Many of the APOs are rapidly growing near populated areas. We see an important objective of this effort is to move toward dialogue, consensus, and equity in resolution of issues by the stakeholders involved.

Prioritized BMP listing

No	Category	BMP	Priority	Implement-ation
18.1	Dust Control	7. Oversized CBP dust collectors (8500 cfs) to ensure proper ventilation of local point and storage silos	H	1

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
1	Dust Control	The following is a list of "less involved" suggested BMPs to control dust and improve air quality: 1. Stone can be an effective dust deterrent for unpaved haul roads or groundcover in areas where vegetation cannot be established. Pave internal roads and parking areas.	H	1
2	Dust Control	2. Trucks exiting the site should be tarped to minimize dust	H	1
3	Dust Control	3. Posted speeds of 10–15 mph for unpaved haul roads to minimize dust.	H	1
4	Dust Control	4. Sprinkling (irrigation) of the ground surface with water until it is moist is an effective dust control method for unpaved haul roads and other traffic routes. This method does consume water and should be used sparingly in drought prone regions like central Texas	H	1
5	Dust Control	5. Abundant water sprays on aggregate stockpiles, hopper and conveyor feed to mixing hoppers and perimeter retaining walls	H	1
7	Dust Control	BMPs should be implemented at construction entrances and exits to reduce sediment tracked onto adjacent public roads and to reduce the generation of dust. The following is a list of suggested BMPs to reduce dust associated with adjacent roadway conditions: 1. Roads and parking areas for vehicles that will leave the site should be paved.	H	1
8	Dust Control	2. Additionally, roads leaving the site should be designed to force drivers to remain on the pavement by the use of large boulders, railings, or other obstructions along the shoulder	H	1
9	Dust Control	3. Areas used for material stockpiles do not need to be paved but should contain a system to remove mud and dirt from wheels of vehicles that have	H	1

Implementation Difficulty

1 (minor change, low cost)

2 (some change required, easier to implement, moderate cost)

3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		traveled on unpaved sections of the quarry. Vehicles traveling more than 1,000 feet on paved portions of the site before leaving the property are excepted from this recommendation.		
10	Dust Control	4. Unused job-site concrete returned to the CBP to pour blocks for retaining walls at the CBP. These can be used for stockpile enclosures and perimeter barriers to isolate areas and minimize airborne dust. Concrete blocks are placed around the yard and plant as needed, height ranges from 4 feet to 12 feet and in varying length as may be required. The block wall also helps to reduce noise	H	1
11	Dust Control	5. A rumble grate should be used to dislodge sediment from the wheels and undercarriage. This should be placed at least 100 feet from a public road.	H	1
12	Dust Control	6. Tire-wash system a. System should be located in front of some type of traffic restriction such as the quarry scale or a stop sign to encourage its proper use. b. System should be set back at least 300 feet from the public road. c. System should recycle water to minimize consumption and to prevent discharge (tire-wash water cannot be discharged to surface water) or infiltration through the quarry floor.	H	1
6	Dust Control	6. Use of commercially available, biodegradable dust suppressants appropriate for your operations and site with consideration for potential impacts on surrounding water bodies and wildlife	H	2
13	Dust Control	Dust from quarrying activities—including excavation, product processing, storage, and vehicle traffic—should be controlled by suitable management practices. Proper management practices for dust control reduce or prevent wind erosion by protecting and roughening the soil surface and reducing the surface wind velocity.	M	2

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		The following is a list of "more involved" suggested BMPs to control dust and improve air quality: 1. Wind breaks are barriers (either natural or constructed) that reduce wind velocity through a site and, therefore, reduce the possibility of suspended particles. Wind breaks can be trees or shrubs left in place during site clearing or artificial barriers such as wind fences, tarp curtains, hay bales, crate walls, or sediment walls (U.S. EPA, 1992). Barriers placed at right angles to prevailing currents at intervals of about 15 times their height are effective in controlling soil blowing.		
14	Dust Control	2. Wind fences are a technology that can be used to control dust in several areas of the APO's operation, as wind fences significantly slow the wind	M	2
15	Dust Control	3. Cover conveyor belts and drop points throughout facility.	M	2
16	Dust Control	4. Enclosed crusher with air filtered exhaust.	M	2
17	Dust Control	5. Where applicable due to topography, locate crushing facilities in bottom mine pit to reduce nose trespass and dust emissions to adjacent properties	M	2
18	Dust Control	6. Metal "barn" covering the CBP mixing hoppers to minimize dust dispersion by winds and to assist with efficiency of dust collectors system. Orient the open side of the "barn" to face prevailing winds. This minimizes dust and particulate dispersion	M	2
19	Dust Control	8. In addition to conventional side shields to minimize dust during CBP truck loading, add optional side skirts that hydraulically deploy to the sides of the cement truck to more fully enclose the loading operation to minimize dust	M	2

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
20	Dust Control	9. Place site specific air monitors upwind, downwind, and on facility perimeter with online alarms and public access to data. Establish a graduated response to severity of monitor alarms ranging from water sprays to biodegradable dust suppressants, to an air classifying system.	M	2
12.1	Dust Control	7. Add a street sweeper to sweep and water paved APO ingress and egress routes and the ingress/egress state/county roads to minimize gravel debris build up and dust	H	3
21	Dust Control	Air particulate emissions – Best Practice involves the quantification of the cumulative impact on air quality on adjacent and near-by properties, by the mining operation being considered and operated, as well as other neighboring mines and other near-by APOs (e. g., CBPs, HMAPs). Modeling, monitoring and data collection/dissemination BMPs include: 1. State of the art air modeling techniques have been developed and are used to assess the potential impacts of a mining operation, as well as model effects of economic control measures that can significantly diminish air emissions migrating beyond the mine property and ultimately impact the general public downwind of emissions sources.	H	3
22	Dust Control	2. Setting up and operating state of the art air monitoring stations, which measure air particulate emissions at the property boundary of the mine, or at locations nearby properties downwind of the operation, based on evaluations of long term meteorological data that provide baseline data documenting prevailing wind direction and velocity for the area where the mine will be located.	H	3
23	Dust Control	3. A network of air monitoring stations at the site, prior to commencing mining operations, so that "base line" data can document "background" levels of	H	3

Implementation Difficulty

1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		particulates. After operations commence, routine sampling at the same network of monitoring stations will determine, what, if any impacts the ongoing mining and processing operations are having on air quality. The data can be used by the Operator to develop additional mitigation measures, if data indicates the operation is exceeding reasonably set air emissions limits, which are typically set by law, regulations or permit conditions established at the time the mining application is approved. The data also can protect the Operator from spurious public complaints that might not be attributable to the mining operation or emissions are shown to be within acceptable limits via the routine sampling program.		
24	Dust Control	4. Real time data collection and scientific evaluation provides a well-reasoned method to resolve issues between the mining operation and its neighboring entities. Require that 24/7/365 air monitoring data is generated and made available to everyone, including the public. APOs and the Regulatory Agency (TCEQ) should routinely develop and report to the public a full accounting of all particulate monitors that they operate and / or have installed in Texas, including the current status of each monitor. Monitor operation data should be available on-line.	H	3
25	Light	Large floodlights overwhelm the night skies. In areas such as the Balcones Escarpment, it appears that each subsequent APO facility in the area is designed just like the one before it, adding more large floodlights that stay on 24/7/365. This strategy can be relatively easily revised by the APOs at minimum cost. Quarry facility and access road lighting must consider safety, security, and regulations governing lighting practices. As a result, quarry facility lighting can negatively impact night-sky viewing, nocturnal wildlife, and the neighboring	H	1

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		public. These impacts can be reduced through lighting solutions that can be simple, cost effective, and can improve nighttime visibility and increase worker safety. The following is a list of suggested BMPS for lighting. 1. Make a lighting plan that addresses Dark Sky Lighting technology as a BMP. a. The number of lights and lumen output of each. Minimum number of lights and the lowest luminosity consistent with safe and secure operation of the facility. b. Alternatives to lighting. Retro-reflective or luminescent markers in lieu of permanent lighting where feasible. c. Fixture design. Lights of the proper design, shielded to eliminate up-light, placed and directed to eliminate light spill and trespass to offsite locations. d. Lamp color temperature. Lights of the proper color to minimize night-sky impacts. e. Standard operating procedures. Minimization of unnecessary lighting use through alternatives to permanent lighting, such as restricting lighting usage to certain time periods. f. Any activities that may be restricted to avoid night-sky impacts.		
26	Light	2. A process to promptly address and mitigate complaints about potential lighting impacts.	H	1
27	Light	3. Use fully shielded luminaires.	H	1
28	Light	4. Use adaptative controls Devices such as night security cameras, motion sensors, timers and dimmers used in concert with outdoor lighting equipment to vary the intensity or duration of operation of lighting.	H	1

Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

<table>
<tr><th>No</th><th>Category</th><th>BMP</th><th>Priority</th><th>Implement-ation</th></tr>
<tr><td>29</td><td>Light</td><td>5. Direct light properly and use perimeter barriers to eliminate sky glow, light trespass, and glare.</td><td>H</td><td>1</td></tr>
<tr><td>31</td><td>Light</td><td>6. Use amber light instead of blueish white light (3000K CCT or less is best)</td><td>H</td><td>1</td></tr>
<tr><td>32</td><td>Light</td><td>7. Minimize duration and amount of light used during construction, operations, and non-operating periods. Limit nightlight operations to emergency situations.</td><td>H</td><td>1</td></tr>
<tr><td>33</td><td>Light</td><td>8. Route truck traffic to minimize headlight projection off property</td><td>H</td><td>1</td></tr>
<tr><td>34</td><td>Mine Management</td><td>The APO should strive to establish an Advisory Council. This Council consists of involved stakeholders, including the APO, local legislative leaders (city, county) and nearby citizen and landowner representatives that meet quarterly to:
1. discuss issues and concerns and
2. develop action steps to resolve the issues to the mutual satisfaction of all stakeholders</td><td>H</td><td>1</td></tr>
<tr><td>35</td><td>Mine Management</td><td>Quality of Life Concerns. Quarry locations are determined by the location of geologic deposits. This can result in quarry sites that are established close to human habitation, or development may occur after establishment of the quarry site. Quarry operations like blasting, cutting, and truck traffic can impact quality of life for local residents.

The following is a list of suggested BMPs to limit negative effects on quarry neighbors:
1. Were possible, minimize the industrial look of the entire operation
a. In rural areas, install large water tanks that appear to be a grain silo
b. Local limestone rock used on admin buildings, batch houses and other buildings</td><td>H</td><td>1</td></tr>
</table>

Priority For This BMP Development Effort - High (H), Medium (M), Low (L)
Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		c. Barn steel used to wrap overhead aggregate bins in CPB's to give the appearance of local farm/barn buildings d. Trees around the property perimeter and selected locations near buildings		
39	Mine Management	4. Clear roads for school buses by not loading trucks for 30 minutes before and after school bells.	H	1
40	Mine Management	5. Fund turn lanes for entrance and egress.	H	1
41	Mine Management	6. Use Smith Certified (or other comparable) CMV Drivers school to better educate APO company truck drivers	H	1
42	Mine Management	7. Improve safety with site maximum 5-10 mph (depending on location) speed limit	H	1
46	Mine Management	1. Gravel mining - Passive erosion and sediment control is used. This reduces erosion and sediment release from the mine site resulting in a “passive “erosion and sediment control program.	H	1
68	Mine Management	1. Mine Plan - Plans to minimize blasting, noise, light and odor trespass and issues	M	1
36	Mine Management	2. Limit facility operation to daylight hours, no weekend, holiday, or nighttime operation with exceptions for emergencies only. Update working hours as sunrise and sunset shift throughout the year.	H	2
43	Mine Management	BMPs <u>currently being used</u> for gravel mine reclamation near or adjacent to riparian and rivers: 2. Gravel mining - Use “fit for purpose” contemporaneous reclamation principles defined as the restoration of land back to a “trafficable” landscape that can sustain wildlife and vegetation.	H	2

Priority For This BMP Development Effort - High (H), Medium (M), Low (L)
Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
44	Mine Management	3. Gravel mining - Conduct contemporaneous reclamation on mined out areas in the riparian zones adjacent to the river and next to their ongoing gravel digging (mining) operation.	H	2
45	Mine Management	4. Gravel mining - Planning included to make these reclaimed areas wide enough to manage river, stormwater, and flood water velocities across the reclaimed area.	H	2
47	Mine Management	5. Gravel mining - Topsoil stored properly, the land mined had been reacclimated and their methodology for planting and revegetation was sound.	H	2
48	Mine Management	6. Gravel mining - Land was stabilized, but a great deal of revegetation may be weeds that require additional attention	H	2
51	Mine Management	1. APO sites - Initiate post-mining stabilization plan to prevent wind or water erosion.	L	2
52	Mine Management	2. APO sites - Stabilize slopes and create gentler slopes through careful grading and revegetation to prevent erosion.	L	2
53	Mine Management	3. APO sites - Construct diversions at top of slopes to divert runoff away from the slope to a stable outlet.	L	2
54	Mine Management	4. APO sites - Practice good soil conservation through active revegetation of all bare ground using native perennial plants.	L	2
37	Mine Management	3. Prepare a production operation plan and present to impacted stakeholders to include: a. Proposed mining method b. Mine block plan c. Mining schedule d. Mitigation practices (BMPs)	M	2

Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
38	Mine Management	8. Inform stakeholders of plan progress at regular intervals	M	2
57	Mine Management	2. Mine Plan - Include Mine Plan maps	M	2
60	Mine Management	3. Mine Plan - Identified and proven usable source of water. Requires signoff by local Water Conservation District.	M	2
62	Mine Management	4. Mine Plan - Need base level data of on surface- and ground-water quality	M	2
63	Mine Management	5. Mine Plan - Detailed maps to scale clearly identify all planned mining, material storage areas, water treatment/tailing ponds and general mine supply operational areas, including chemicals and fuel containment structures.	M	2
69	Mine Management	Mined areas are backfilled with overburden and recontoured to a stable and natural surface configuration. Topsoil is uniformly spread over recontoured surfaces. In late fall and early spring, when weather conditions are optimal, native grasses and plants are added and seed is applied with a seed drill. The incremental operating cost to comply with comprehensive environmental and socio-economic regulations applied to APO Operations have been shown to not be excessive.	M	2
49	Mine Management	Reclamation of APO sites are most effective when initiated at the beginning of operations. Reclamation will improve the aesthetic appeal of the site post mining and ability of the site to support wildlife. The following is a list of suggested BMPs to support reclamation: 5. APO sites - Develop a reclamation plan in consultation with Texas Agricultural Extension Service.	L	3

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
50	Mine Management	6. APO sites - Reclaim quarry sites in phases upon completion of each operation site.	L	3
55	Mine Management	Reclamation is defined as the restoration of land back to a "trafficable" landscape that can sustain wildlife and vegetation. The term trafficable refers to soil that has a shear strength of at least 1-2 psi (approx. 5-10 kPa), deemed high enough to sustain weight (such as people and vehicles) without sinking. Mine reclamation is the process of restoring land that has been mined to a sustainable natural or economically usable state. Although the process of mine reclamation sometimes occurs once mining is completed (in an area of the mine or the entire mine), the planning of mine reclamation activities occurs prior to a mine being permitted or started. It is desirable that reclamation be conducted contemporaneously as mining progresses to return the land to pre-mining contours, trafficability and use, or as close to this objective as practical given the specific volumes of overburden, ore and waste associated with a mine. Contemporaneous reclamation improves efficiency of handling overburden and mine waste material by minimizing transport and handling Mining is accomplished through a sequence of distinct tasks or steps. Reclamation is an integral part of the mining process and begins with the initial step of topsoil conservation. Topsoil is carefully removed and is either: 1) placed immediately on previously mined and recontoured areas, 2) or is stockpiled for future use. Stockpiled topsoil is reseeded to prevent erosion and nutrient deterioration. Tree material and other vegetation are retained with the soil to provide mulch when the soil is replaced.	L	3

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
56	Mine Management	Mine Plan includes several activities: Mine Planning, Permitting, Operational Performance Standards/ Best Practices, Reclamation, and Costs. It is developed before permits are issued and made available to regulators and to the public. The following list outlines key components of comprehensive Mine Plan: 6. Mine Plan - Development of Long Range, Life of Operation, Mine Plans that show proposed areas of annual mining	M	3
58	Mine Management	7. Mine Plan - Include complete and detailed Environmental Impact review (EIR) to be reviewed by public	M	3
59	Mine Management	8. Mine Plan - Establish in-mine air monitoring and mine perimeter air monitoring done by third party.	M	3
61	Mine Management	9. Mine Plan - Establish water well monitoring for water flow rate/well static level/chemical and biological contamination.	M	3
64	Mine Management	10. Mine Plan - Development of Long-Range Reclamation Plans that show contemporaneous, and end of operation plans to restore land use to a state that is compatible with area land uses	M	3
65	Mine Management	11. Mine Plan - Mine Surety Reclamation and Environmental Performance Bond must be in place before permit application is approved.	M	3
66	Mine Management	12. Mine Plan - Suggested plans should contain information and format similar to coal mining operations in Texas, which have done this successfully since 1977.	M	3
67	Mine Management	13. Mine Plan - Transportation plans including required upgrades to existing roads, new roads needed and estimates of ongoing maintenance costs.	M	3
70	Noise	1. Blasting should be monitored with seismographs, located on the perimeter (corners) of the APO property (and in some instances, adjacent or near-by properties in multiple directions). Seismographs typically gather the following data:	H	1

Implementation Difficulty

1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		a. Displacement b. Acceleration c. Frequency d. Time to trigger e. Air blast overpressure (measured in psi, converted and reported in decibels (dBL)		
71	Noise	2. Blasting - Where seismographs are located on adjacent or near-by landowner properties, the landowner should be briefed on the operation, objectives for the seismograph, data gathering capabilities of the seismograph and be given full access to the data captured by the seismograph (typically via access to a data collection website).	H	1
72	Noise	3. Blasting - Records are kept on explosives from its manufacture to end-use. Cross checking the records allows the regulatory authority to ensure that all explosives are accounted for, making it difficult to falsify shot reports.	H	1
74	Noise	1. Best Practices also involve providing notice to nearby residents of upcoming (both scheduled and unscheduled) blasting activities, including any temporary deviations to normal blasting schedules. Use of a 3rd-party service to: a. Develop a list of nearby residents and landowners b. Sign up near-by residents and other involved parties for blast notifications using the Quarry website c. Send out -email and / or text notices of upcoming blasts d. Maintain documentation for follow-up and analyses	H	1
75	Noise	Limit blasting on holidays.	H	1

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
76	Noise	Limit rock breaking for drilling to reasonable alternative time if neighbors are nearby to minimize excessive noise. This also applies to jack hammer operational time where limits should be imposed to minimize impacts on neighbors.	H	1
77	Noise	Quarry and other APO facility locations are determined by the location of geologic deposits. This can result in quarry sites that are established close to existing or future residential or commercial areas. Material processing and truck traffic contribute to noise, vibration, and dust that may impact local residents. The following is a list of suggested BMPs to reduce noise: 1. Noise reduction - Implement white noise alarms over traditional beepers when applicable.	H	1
78	Noise	2. Noise reduction - To the extent possible set up plant alarm warnings/alerts with lights and not audible alarms (portly loud outdoor alarm horns)	H	1
80	Noise	Utilize berms and native vegetation to create noise abatement buffers.	H	1
81	Noise	Blast monitoring and reporting (generally by a third-party) is a BMP. For example, this BMP is a component of the City of Garden Ridge Blasting Ordinance 34. Monthly reports of PPV and air blast (overpressure) are prepared for the City of Garden Ridge Texas.	M	1
73	Noise	A Blasting Optimization Team (BOT) process should be employed to improve the effectiveness of the computer-controlled blasting process. The BOT meets monthly to discuss blasting process and procedures. The BOT Involves three main support groups: a. Drilling company b. Blasting contractor c. Seismic assessment consultant	H	2

Priority For This BMP Development Effort - High (H), Medium (M), Low (L)
Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

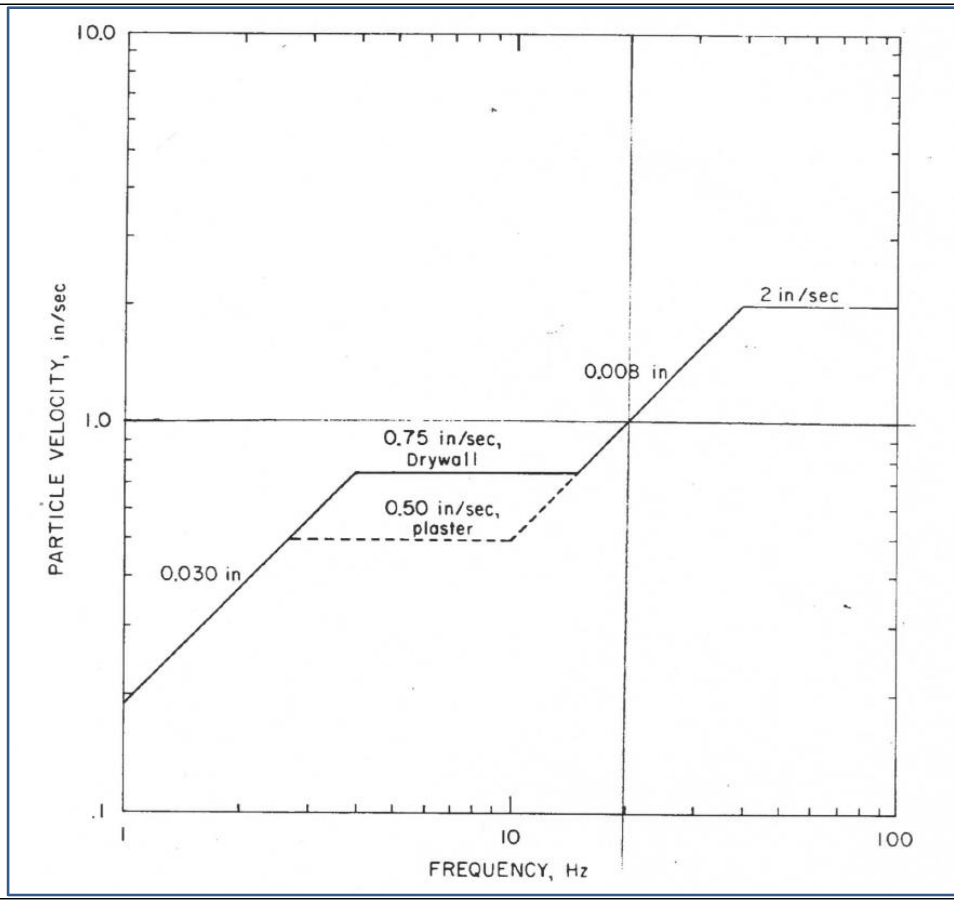
No	Category	BMP	Priority	Implement-ation
		The BOT considers key parameters of the blast procedure to maximize the effectiveness of the blast and at the same time minimize air blast and ground vibration impacts on surrounding/nearby properties. Key parameters include: a. Design of blast drill holes (varies by site) b. Target tonnage per blast. This varies by site c. Multiple (at least 4) seismographs are located at the quarry boundary to monitor varies blast parameters and effectiveness of blasting forces attenuation d. These seismographs generate real-time data that is analyzed during/after each blast to improve the next blast		
79	Noise	3. Noise reduction - Cover conveyors and drop points.	H	2
82	Noise	The four major categories of noise sources associated with facilities are (1) ore blasting and handling (2) fixed equipment or process operations such as ore crushers and ore loading; (3) mobile equipment or process operations; and (4) transport movements of products, raw material or waste. The following are suggested BMPs to reduce noise: 1. APOs should monitor the noise exposure at their property line, keeping the noise level at their property line below 65 dB if the property line is within 880 yards of a residential area, school, or house of worship, and 70 dB if not. 2. Set criteria using guidance and experience with noise level limits from the municipalities above	H	2
83	Noise	Blasting criteria – Blasting can be extremely noisy, even at long distances from the quarry property line. Computer-controlled blasting in quarries reduces blasting	H	2

Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

No	Category	BMP	Priority	Implement-ation
		noise and seismic energy transmitted to near-by properties. Several APOs are using computer-controlled blasting to minimize seismic forces leaving their property. This system works well. The technology (or its equivalent) should be a required BMP in all APO mines. 1. This Recommended BMP includes the following criteria: a. BMPs for aggregate mine blasting should be upgraded using well-established blasting BMPs for coal mines in Texas, United States Bureau of Mines (USMB, now Office of Surface Mining, OSM) blasting BMPs and blasting BMPs used in other states. The Texas Railroad Commission only regulates blasting at surface coal mines. Currently, there are no statewide regulations for aggregate blasting operations in Texas. Use of the TRRC blasting requirements provides an effective and efficient starting point for APO blasting BMPs b. A further basis for blasting BMPs can be seen in USMB and OSM report recommendations from other research studies and current regulations in some states. These studies point out that long-established values of 2.0 in/sec Peak Particle Velocity (PPV) and 0.5 psi (164.7 dBL) air blast overpressure do not adequately and fully address near-by landowner concerns and damage potential due to blasting. Lower blasting limits are needed to minimize complaints. c. *Air Blast Overpressure* - The OSM recommendation of maximum 134 decibels for air blasts equates to approximately a 28 mile per hour gust of wind.		

No	Category	BMP	Priority	Implement-ation
		d. *Ground Vibration* - RI 8507 used both measured structure amplifications and damage summaries to develop criteria having more severe measuring requirements, involving both displacement and velocity (Figure below). Safe levels of ground vibration from blasting range from 0.5 to 2.0 in/sec PPV for residential-type structures. The damage threshold values are functions of the frequencies of the vibration transmitted into the residences and the types of construction. Particularly serious are the low-frequency vibrations that exist in soft foundation materials and/or result from long blast-to-residence distances. These vibrations may produce not only structure resonances (4 to 12 Hz for whole structures and 10 to 25 Hz for midwalls) but also excessive levels of displacement and strain		

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
				

<table>
<tr><th><u>No</u></th><th><u>Category</u></th><th><u>BMP</u></th><th><u>Priority</u></th><th><u>Implement-ation</u></th></tr>
<tr><td></td><td></td><td>Figure – Safe Levels of Blasting Vibration for Houses Using a Combination of Velocity and Displacement[1]</td><td></td><td></td></tr>
<tr><td>85</td><td>Noise</td><td>A Blasting Risk Assessment should be prepared both during mine development planning and periodically during mining pre-blast operations (by the BOT discussed above). Consequences and probability should be reviewed and vetted against monitoring data and nearby stakeholder inputs.</td><td>L</td><td>2</td></tr>
<tr><td>84</td><td>Noise</td><td>Alternate blasting BMP criteria:
a. If the blaster does not monitor the blast with a seismograph, the earlier USBM regulations requires that the scale distance formula be used to calculate a maximin pound of explosives detonated to be used based on the distance to the protected structure. The amount of explosives determined by the regulatory formula is very conservative and limits the PPV below 2.0 PPV.
b. The scaled distance formula, in lbs. per 8ms, = $(D/50)^2$,as shown in the table below:
c. Table – Blasting Ground Movement Limits
<table><tr><th><u>Feet from Blast</u></th><th><u>PPV (in./sec.)</u></th><th><u>Scale Distance Equation</u></th></tr><tr><td>0 to 300</td><td>1.25</td><td>Wt = (D/50)2</td></tr><tr><td>301 to 5000</td><td>1.00</td><td>Wt = (D/55)2</td></tr><tr><td>5001 and beyond</td><td>0.75</td><td>Wt = (D/65)2</td></tr></table></td><td>M</td><td>2</td></tr>
<tr><td>86</td><td>Noise</td><td>For blasting within boundaries or Exterritorial Jurisdiction (ETJ) of a municipality, blasting ordinances should be developed, approved and enforced. In areas</td><td>M</td><td>3</td></tr>
</table>

[1] Taken from USBM RI 8507, Appendix B, Figure B-1. —Safe levels of blasting vibration for houses using a combination of velocity and displacement.

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		outside of municipalities, APOs should work with the County leadership and local residents to develop blasting guidelines, criteria and reporting requirements.		
87	Water Quality	Sand and gravel mining operations disturb land and soil when preparing the site for operation as well as once the operations are fully functional. Soil that is not stabilized can wash into adjacent waterways during rainfall. Establishing and maintaining BMPs can minimize soil exposure and erosion and water degradation, manage runoff, and conserve water. Sand and gravel mining activities in Texas are regulated statewide by the Texas Pollutant Discharge Elimination System (TPDES) program. Various rules prevent or minimize water pollution from stormwater runoff including the requirements of the statewide TPDES stormwater Construction General Permit (TXR150000) and Multi-Sector General Permit (TXR050000), as applicable. Appropriate BMPs facilitate implementation of these requirements	H	1
89	Water Quality	Vegetation is an inexpensive and effective way to protect soil from erosion. It also decreases erosion from flowing water by reducing its velocity. Roots hold soil and increase infiltration. Vegetative controls should consist of native plants appropriate for the Texas ecoregion where the site is located and must not include any noxious or invasive species. As a resource, refer to the Texas Parks and Wildlife Department website for more information about the appropriate plant species to be used in the site's ecoregion. Noxious and invasive species are identified by the Texas Department of Agriculture.	H	1

Priority For This BMP Development Effort - High (H), Medium (M), Low (L)
Implementation Difficulty
1 (minor change, low cost)
2 (some change required, easier to implement, moderate cost)
3 (more complex, new processes and changes, higher cost)

No	Category	BMP	Priority	Implement-ation
		In areas that are outside the active mining operation and not expected to handle vehicle traffic, vegetative stabilization of disturbed soil can be achieved by using the BMPs described below, Vegetation is often not established until one year from planting and may require irrigation during this time. Types of vegetative controls include the following: a. Vegetative buffer zones b. Sod stabilization c. Seeding d. Mulching e. Erosion and sediment control blankets f. Promote revegetation in mined out areas		
90	Water Quality	Pollutants like petroleum products, paints, solvents, litter, debris, sanitary waste, and sediment from un-stabilized areas may enter stormwater from mining sites because of poor housekeeping practices. The following is a list of suggested good housekeeping practices: a. Designate areas for equipment maintenance and repair. b. Promptly address leaks of petroleum and other liquids from equipment. c. Waste receptacles at convenient locations. d. Regular collection of waste. e. Protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic or hazardous materials. f. Adequately maintained sanitary facilities. g. Frequently inspect all control measures (BMPs) for effectiveness and necessary maintenance.	M	1

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
88	Water Quality	Structural controls divert flows away from disturbed areas, reduce runoff velocities, filter sediment, and remove sediment by ponding. Berms are an example of a structural control that can help achieve pollution prevention goals. Berms prevent runoff of surface drainage into a quarry pit by routing flow around it. Berms are also useful for creating a visual and physical buffer between the quarry pit and adjacent property. Drainage areas are those locations of the site where runoff will flow in one preferential direction or towards particular discharge points. Understanding the flow of water on your site will greatly enhance the selection, design, and placement of appropriate structural controls like berms and the other BMPs discussed below. To increase the effectiveness of structural controls, operators should routinely inspect the areas where the controls are being used to ensure they are installed properly and functioning to reduce runoff. Additional inspections should be made before and after significant rain events. Types of structural controls include the following. a. Diversion ridges, berms, or channels of stabilized soil b. Silt fences - rock baskets on low-water quarry roads crossing c. Straw bale barriers d. Sediment basins e. Riprap outlet protection f. Check dams g. Retention ponds	H	2

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
92	Water Quality	Water Quality- Ground water monitoring wells around holding ponds to identify seepage and potential contamination of groundwater	L	2
91	Water Quality	Riparian areas are found where the land and water meet and are the site of many vital interactions between the waterway and the riverbank. This part of the floodplain contains distinct soil and diverse native vegetation that form a network of roots and ground cover. Riparian areas act like a buffer and provide a variety of functions. These functions include capturing rushing flood waters and slowing them down so contaminants can be filtered out and water can be absorbed into the soil. These areas also reduce erosion, dissipate flood energy, provide wildlife habitat, increase baseflows to the river, and create shade to control water temperature. Understanding the components of a healthy, functioning riparian area is important to maintaining the health of these systems. Learn more about riparian areas through resources included in the Upper Guadalupe River Authority's Education Center webpage Sand and gravel mining activities often occur in or near riparian areas because of the abundance of material that can be found in these locations. Mining activities have the potential to degrade riparian areas, but operators also have an opportunity to preserve and enhance these areas through their management practices. The following is a list of suggested BMPs for riparian areas. Incorporating these practices into your operations will demonstrate stewardship of riparian areas and preserve the quality of the land and water:	M	2

Implementation Difficulty
- 1 (minor change, low cost)
- 2 (some change required, easier to implement, moderate cost)
- 3 (more complex, new processes and changes, higher cost)

No	Category	BMP	Priority	Implement-ation
		a. Maintain undisturbed setback from at least 50 feet from the water's edge and preferably 200 feet. b. Create a buffer between mining activities and the waterway. c. Leave large woody debris in the floodplain. d. Mine above the water table only. e. Minimize use of heavy equipment in riparian areas to protect vegetation and reduce soil compaction.		
93	Water Storage	Reduce amount of fine tailings settling ponds with tailings thickener system and/or flocculant and thickener, providing additional recycled water to reduce overall APO water use and reduce land use, water loss Process equipment called thickeners and chemicals such as flocculants are often used to aid in separating fine tailings from process water. Thickening facilities (or clarifiers) for fine tailing treating "dirty water", depending on the application, can be used to recover reusable process water, as well as extract fines and other materials.	M	3
94	Water Use	Capturing and retaining stormwater: a. Will reduce runoff and create a water source for future use. b. It is necessary to understand the locations of the site where runoff will flow in one preferential direction or towards a particular discharge point to maximize the effectiveness of retention structures. c. Contour the processing and product storage areas of the mine to direct rain and stormwater to holding ponds that are separate from the fine tailing's retention ponds. d. Contouring also included consideration for diverting rain and stormwater back into their property to minimize potential for releases onto adjacent	H	1

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		landowner's properties and roads. These "clean water" ponds are used for process water		
95	Water Use	Maximizing use of process wastewater: a. Can not be discharged without treatment but can be reused in site operations.	H	1
96	Water Use	The operator should develop a comprehensive technical knowledge of their mining process, water needs, and chemistry for treating fine tailings. Fine tailings tend to be generally charged clay particles of <50-150 microns and respond well to chemical coagulants and flocculant treating. In most operations, this could result in cost-effective, fit for purpose water recovery and recycle processes that improve ponds settling efficiency, decrease water use, and recycle more water back to the process.	H	1
100	Water Use	1. Conservation/Reuse - Recycle	H	1
101	Water Use	2. Conservation/Reuse - Design the entire CBP yard with grades that move the runoff/wash water, along with any spilled materials or product, and track out materials, from inbound supply trucks to the truck wash area. Mixers and trucks are cleaned here, all water from runoff or equipment wash are gravity filtered and a large recycling, two pond system clarifies the water for reuse	H	1
97	Water Use	Rainwater harvesting system: 1. Can achieve both water conservation and stormwater retention goals.	L	1
98	Water Use	Control runoff from stockpiles: 1. Route this water to retention areas for future use. 2. Do not allow this water to become runoff during rain events.	M	1
99	Water Use	Sand and gravel mining operations use water to clean, sort, and process the extracted materials. In drought prone regions, like central Texas, water	M	1

No	Category	BMP	Priority	Implement-ation
		consumption should be limited where possible. This can be accomplished through conservative use and reuse. Identify water needs including source and sustainability. Develop a water conservation/protection plan for each source 3. Conservation/Reuse - Drainage and collection systems to capture plant process water		
106	Water Use	BMPs include identifying all potential sources and determining availability of regional water supplies to support large APO water use. Best Practice activity begins prior to the commencement of operations by identifying water needs and assessing surface and groundwater resource alternatives as potential water sources to sustain operations. Comprehensive, state of the art, hydrologic models should be developed (often in collaboration with local, regional, and state governmental agencies and academia) to predict the impact, if any, that the consumption of water in mining and processing operations will have on long term viability of groundwater resources to support all competing uses, across all sectors of business and society.	H	2
103	Water Use	Include BMPs that focus on: 1. Increased review, assessment and management of aquifers potentially impacted by APOs	M	2
104	Water Use	2. Empowerment of the local Groundwater Conservation District (GCDs) [or areas where there is no GCD, or where there are overlapping ground water management authorities, require the TCEQ to establish or expand Priority Groundwater Management Areas (PGMA)], to work with TCEQ to regulate APOs utilizing the same rules TCEQ uses to approve subdivisions which utilize ground water as their source of water supply.	M	2
105	Water Use	3. A comprehensive set of BMPs that should be adopted by APOs are outlined in Chapter 230 of the Texas Administrative Code, Rules 230.7	M	2

TRAM Recommendations
APO Best Management Practices (BMPs)
As Presented to TCEQ

No	Category	BMP	Priority	Implement-ation
		through 230.11. Currently, subdivisions utilizing groundwater as the source of water supply are required to comply with these rules. Overall, these rules should address APOs as well: a. Requirement for prospective APOs which exceed certain operational thresholds. to perform comprehensive studies of their proposed operations on local and regional water supplies. *Note: this could be 'regionalized' to concentrate on specific areas within the State of Texas.* b. Requirement for GCDs to include APOs in the study of cumulative impacts on regional hydrologic systems resulting from all existing and planned ground water users in the area.		
107	Water Use	Assess the dry crushing process for applicability to reduce water use (as compared to wet crushing used by almost all APOs in Texas)	L	3
102	Water Use	Reduce amount of fine tailings settling ponds with tailings thickener system and/or flocculant and thickener, providing additional recycled water to reduce overall APO water use and reduce land use, water loss Process equipment called thickeners and chemicals such as flocculants are often used to aid in separating fine tailings from process water. Thickening facilities (or clarifiers) for fine tailing treating "dirty water", depending on the application, can be used to recover reusable process water, as well as extract fines and other materials.	M	3

References

1. McDonald Observatory. (2018). *Recommended Lighting Practices.* https://mcdonaldobservatory.org/oil-gas-lighting
2. Texas Commission on Environmental Quality. (2005). *Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices.* RG-348.
3. Texas Commission on Environmental Quality. (2023). *Best Management Practices for Quarry Operations*. RG-500
4. Texas Commission on Environmental Quality. (2021). *Best Management Practices (BMPs) for Sand Mining Operations in the San Jacinto River Watershed.* RG-555.
5. Texas Department of Agriculture. (May, 2023). *Noxious and Invasive Plants.* https://www.texasagriculture.gov/Regulatory-Programs/Plant-Quality/Noxious-and- Invasive-Plants
6. Texas Parks and Wildlife Department. (May, 2023). *Wildscapes: Plant Guidance by Ecoregion.* https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/wildscapes/ecoregions/
7. Upper Guadalupe River Authority. (October, 2022). Education Center. www. ugra.org/public-information/education
8. U.S. EPA. (1992). *Stormwater Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.* EPA 832-R-92-005.
9. Kerr County Voluntary Guidance Document for Aggregate Production Operations, COURT ORDER #39892 – March 2023 (initial approval), May 2023 (revision 1)
10. Surface Mining and Related Best Management Practices For Aggregate Production Operations in Texas, By Texans for Responsible Aggregate Mining Technical Team, Revision 24, Master Draft, February 2024
11. TRAM trip Reports to RA Aggregates, Lauren Concrete and Ruby Ranch Quarry. Trip Reports available on request from Mark Friesenhahn, mark@comalpecanfarm.com.