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Draft Environmental Impact Statement

Volume 1

Eagle Harbor Sand & Gravel, Inc.

Eagle Harbor Mine

DEC #8-3422-00003/00001, MLF #80171

Town of Barre, Orleans County, New York

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3.0 INTRODUCTION

This Draft Environmental Impact Statement (DEIS) has been prepared for the Eagle Harbor Sand & Gravel, Inc. ("EHS&G" or the "Applicant") Eagle Harbor Mine expansion, pursuant to the State Environmental Quality Review Act (SEQR) regulations as provided in 6 NYCRR Part 617.9.

The primary goals of this DEIS are to describe the pertinent existing conditions, analyze the potentially significant adverse environmental impacts, identify appropriate mitigation measures and evaluate all reasonable alternatives. This DEIS addresses potential significant adverse environmental impacts that were identified in the Final Scoping Document.

The Final Scoping Document was prepared by the New York State Department of Environmental Conservation (NYSDEC) based on correspondence with NYSDEC staff and input received during the public comment period. A copy of the Final Scoping Document is included in Appendix 2.

This DEIS demonstrates that the proposed Eagle Harbor Mine modification avoids or minimizes adverse environmental impacts to the maximum extent practicable. This determination considers environmental, social, economic and other essential considerations from the proposed action and the reasonable alternatives available and incorporates to the maximum extent practicable those mitigation measures identified as practicable.

3.1 DESCRIPTION OF PROPOSED ACTION

Eagle Harbor Sand & Gravel, Inc. is a locally owned company that operates the Eagle Harbor Mine located west of County Route 5/Eagle Harbor Road and south of Maple Street approximately six (6) miles southwest of the Village of Albion in the Town of Barre, as shown on **Figure 1**.

This property was originally mined by Bennett in the 1960's and the Eagle Harbor Mine has been a supplier of high-quality sand and gravel aggregates to Orleans County and surrounding regions since the mid-1970's. EHS&G has maintained its DEC MLRL permit and Town special permit without interruption since they were originally obtained. 85.5 acres of land are currently affected by mining activities within a 250.6-acre Life of Mine area on 300+/- acres leased from A.L. Bennett & Sons.

EHS&G proposes to excavate consolidated dolostone bedrock material in a 99.7-acre area within the existing sand and gravel mine life-of-mine area. The proposed modification includes:

- Adding consolidated bedrock excavation using standard drilling and blasting techniques within a 99.7-acre area, located in the middle of the mine site.
- Increasing the permitted depth of excavation. The bedrock to be mined is overlain by sand that averages about 35-40 feet in thickness within the proposed bedrock excavation area. The depth of excavation will be increased to remove the sand to access and mine the full thickness of the dolostone bedrock. The overall depth of excavation (sand and bedrock) will be approximately 80-100 feet.
- Adding a portable crushing plant to crush the rock prior to feeding it into the existing processing plant for sizing. No changes to the existing processing plant will occur as part of this modification.

No other changes are proposed.

The existing and proposed site conditions and topography are shown on the Mining Plan Map (**Figure 3**), the Reclamation Plan Map (**Figure 4)** and Typical Cross-Sections (**Figure 5**); full-sized maps are provided in the Mined Land-Use Plan included in Appendix 3.

3.2 EXECUTIVE SUMMARY

3.2.1 Overview

EHS&G proposes to excavate consolidated dolostone bedrock material in a 99.7-acre area located within an existing 250.6-acre sand and gravel mine on 300+/- acres leased from A.L. Bennett & Sons.

Consolidated excavation will be conducted by standard drilling and blasting techniques with loaders and/or excavators feed a portable primary crushing plant prior to finish processing at the existing fixed plant. Mining will occur below the water table and the project includes dewatering of the quarry area. The project area will be reclaimed grading, replacement of topsoil and revegetating upland areas. The reclamation objective will be to create an open space pond for possible recreational use and/or wildlife habitat. The pond will be approximately 107 acres in size with an anticipated water elevation at 664.5 feet.

3.2.1.1 Location

The project site is located within the current Eagle Harbor Mine which is located west of County Route 5/Eagle Harbor Road and south of Maple Street approximately six (6) miles southwest of the Village of Albion in the Town of Barre, as shown on **Figure 1**.

The current mining areas consist of active above and below water sand and gravel excavation areas, processing plant equipment, stockpiles of sand and gravel, a scale and scale house, a shop, and access roads. The agricultural areas on the site property consist of a rotating mix of hay fields and row crops. The remaining wooded areas on the property consist of steeper slopes and wet areas unsuitable for farming and/or mining.

The surrounding area is predominantly farmland with scattered residential homes. Drainage is poorly developed, and vegetation consists of farm crops interspersed with woods on slopes and wet areas unsuitable for farming.

3.2.1.2 Project Design and Layout

The Mined Land-Use Plan, Mining Plan Map, Reclamation Plan Map and Typical Sections are located in Appendix 3. The Mining Plan Map depicts boundaries of the proposed mining and associated operations, topography of the site and surrounding areas, starting location and direction of mining, proposed location of berms and location of nearby residences. The Reclamation Plan Map depicts the post-closure site configuration and grades, and the Typical Sections show profiles of the Mining Plan Map and Reclamation plan Map.

The consolidated excavation area totals approximately 99.7+/- acres and is located entirely within the existing 250.6-acre sand and gravel Life of Mine area. All proposed consolidated excavation activities will be more than 500 feet away from residences.

Access to the site will be via the existing mine entrance off County Route 5/Eagle Harbor Road as shown on the Mining Plan Map.

Mining within the existing sand and gravel mine and modification area will continue to the limits and depths indicated on the Reclamation Plan Map and Typical Sections. Minimum setbacks of 25 feet will be maintained from all external property boundaries in the modification area. The toes of all intermediate and final rock faces in the modification area will be at least 25 feet plus 1.25 times the face height from all property boundaries, as shown on the Reclamation Plan Map and Typical Sections.

The total depth of bedrock excavation is expected to be approximately 58+/- feet. It is anticipated that the consolidated bedrock will be worked in two 25- to 30-foot-tall lifts within the modification area. The sand overlying the rock varies from 25 to 50+/- feet in

thickness and will be mined prior to excavation of the bedrock. The overlying sand will be mined using the same techniques and equipment currently used for sand and gravel excavation.

3.2.1.3 Construction and Operation

Excavation will commence in the southeast corner and proceed in a westerly and northwesterly direction. Based on geologic mapping (see **Figure 14**), the Rochester Shale is lowest in the southeast corner and that is where the initial quarry cut and sump will be established. The proposed direction and sequence of mining activities in the modification area are indicated by arrows on the Mining Plan Map, included as **Figure 3**.

The quarry will be developed by first removing any overlying overburden within the 'Initial Quarry Excavation Area' shown on the Mining Plan Map, included as **Figure 3**. Stripping operations are a relatively minor part of the overall operation and typically occurs in the off-season for approximately one month per year to clear the area needed for the upcoming season's operation. Soil in the excavation area will be stripped back by bulldozer or equivalent and stockpiled in perimeter berms along the edges of the quarry excavation area, as shown on the Mining Plan Map, or in piles within the Life of Mine area. All soil encountered from the upper six inches of soil will be saved for reclamation. Sufficient topsoil will be saved to cover areas that will be planted to grasses and legumes to a minimum depth of six inches, as required by the NYSDEC regulations, Section 422.4.

The toes of all berms or temporary piles will remain at least 25 feet from all property boundaries. Soil piles and berms will be seeded to establish a vegetative cover within 30 days, or as soon as practicable following their construction.

Once the soil overburden has been removed, the remaining sand overlying the dolostone will be mined using the same techniques and equipment currently used for sand and gravel excavation. The gradation of the sand varies within the proposed bedrock excavation area so, depending on the quality, the sand will either be processed and sold, used for construction of the proposed mitigation perimeter berm and/or utilized for concurrent reclamation.

Once a sufficient area of the rock surface is cleared, EHS&G, the blaster and the driller will determine the exact area that will be blasted. The blaster then lays out a location, depth and diameter of holes to be drilled to achieve the desired goal. Each shot is analyzed separately by the blaster depending on influential factors including, but not limited to, the type of rock, presence of fractures in the rock, the geologic characteristics of the rock, the height of the face, the size of the primary crusher, the type of equipment

used to excavate the stone from the shot rock pile, the location of structures relative to the blast, the allowable vibration limits, the presence of seams in the rock and the shape of the face.

All relevant information is assessed by the licensed blaster and incorporated into the blast design to meet the goals of:

- Preventing flyrock,
- Complying with the USBM guidelines[1],
- Properly fragmenting the rock,
- Properly displacing the rock so that it can readily excavated and
- Minimizing fracturing of the rock face immediately adjacent to the blast.

Typically, the grid pattern will have a burden (distance between rows or a row and the face) and spacing (distance between holes in the same row) ranging from about six feet by six feet for short faces to about 16 feet by 18 feet for tall faces.

The holes will then be drilled in the grid pattern to the depths specified by the blaster. The driller will keep a log of the holes and provide it to the blaster. The blaster will check to ensure the holes were drilled as directed and then schedule a date for the blast.

The frequency of blasts will be dependent on market demand for the product. Blasting will be scheduled based on short term weather forecasts to meet the applicant's market demand. The decision to blast on the scheduled day will be made early in the morning. If strong, low-level thermal inversions or thunderstorms are forecast throughout the day, the blast will be postponed to avoid such adverse weather conditions.

Once the decision to blast has been made, the holes will be cleaned out and loaded with explosives by a team of trained professionals under the direction of the licensed blaster. Each hole will be loaded with explosives and connected by millisecond delays, or equivalent. The blasting team will secure the blast area, sound a warning in a distinctive manner and then detonate the blast. Shot rock will fall down to the bottom of the mine face. Once the blast area has been checked, the blaster will provide the "all clear signal" and loadout from the shot rock pile will begin.

All blasts will be monitored using a properly calibrated seismograph in order to determine compliance with the USBM guidelines. The licensed blaster also uses the monitoring

[1] Vibration and airblast limits designed to protect cosmetic damage to the weakest building materials. See Blasting Impact Assessment, included as Appendix 10.

reports to design future blasts. These records will be maintained by the applicant and provided to the Department upon request.

EHS&G anticipates blasting will be required approximately 2 to 3 times per month during the construction season. Blasting will be done between 10 a.m. and 5 p.m. Monday through Friday. Blasting will not occur on weekends, New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving and Christmas Day.

Shot rock will be loaded by a front-end loader or equivalent into waiting trucks that will haul the stone to the portable processing plant. Occasionally, shot rock (e.g., for slope stabilization) may be loaded directly into on-road trucks and hauled from the site. The portable processing plant will be located on the east side of the proposed quarry area as shown on the Mining Plan Map. The crushed stone will be hauled to the existing fixed plant for sizing, stockpiling and sales. No changes to the existing fixed plant are proposed.

During operation of the quarry, groundwater and precipitation will accumulate in the quarry sump, which will be excavated and maintained near the southeastern corner of the mine, see **Figure 3**. The collected water will be pumped out of the sump via pipe to a proposed ditch that will convey the stormwater to the north. The ditch will lead to the proposed sediment basin to allow suspended sediment to settle out. The water will exit the sediment basin and flow northward in a ditch. The water will then pass through two serially located, existing, ponded areas just as much of the runoff within this drainage area does today. The stormwater will flow from the northern pond approximately 200 feet to a culvert running under Maple Street (Outfall 001) along the same route as exists today. Outfall 001 discharges to a ditch north of Maple Street. The ditch is an unnamed tributary of Otter Creek, which is approximately 1.8 miles north-northeast of Outfall 001. Otter Creek is not an impaired waterway on the Clean Water Act, Section 303(d) list of impaired waters. Berms around the proposed sediment basin will keep runoff from Drainage Area 3 from entering the sediment basin.

The water that will be pumped out of the quarry and discharged off-site will be done pursuant to a State Pollutant Discharge Elimination System Permit (SPDES), a copy of which is included in Appendix 6. The impact of the quarry dewatering and off-site discharge are evaluated in the SPDES paperwork and Hydrogeologic Assessment Paperwork included in Appendix 6 and Appendix 5, respectively and discussed in Section 0.

No changes to the existing operating hours of the mine are proposed. Mining and processing will continue to occur mainly from April to November, depending on the weather conditions and construction projects.

Anticipated annual production at the mine site is not anticipated to change. While there are substantial medium to fine sand reserves remaining in the mine floor, the coarse sand and gravel reserves are almost depleted. EHS&G anticipates that the modification area sand and crushed stone sales will completely replace the existing sand and gravel sales. Once this proposal is granted, EHS&G will start development[2] of the initial quarry area, and it is anticipated that it will take 1-2 years to reach regular production levels. During this development phase there will be a progressive transition from gravel to crushed stone production.

Once implemented, the quarry will ultimately operate with a smaller excavation footprint[3] with no net change in production or sales, resulting in no net change in truck traffic volume or truck routes used. Overall production and sales at EHS&G are physically limited by the processing plant, stockpile loadout and the scalehouse.

The overall production at EHS&G is limited by temperature and the overall plant processing capacity. The wash system limits EHS&G from operating the processing plant to when temperatures are above freezing, which is typically April 15th to November 1st. The overall throughput capacity of the plant also limits production. Over the past 17 years the EHS&G plant has averaged 146,538 tons/year operating at 76.4% uptime, which is close to capacity when you factor in downtime for maintenance and repairs. No changes to the wash system or plant capacity are proposed as part of this proposal.

The theoretical maximum number of trucks that could exit the mine site is 24 trucks/hour based on physical limitations with loadout and the scalehouse. Based on past construction season sales EHS&G anticipates actual truck traffic will be closer to 5 trucks/hour. EHS&G does not own or operate any trucks and all truck traffic is, and will continue to be, driven by local construction supply and demand forces.

3.2.1.4 Closure and Post Closure Reclamation Plan

After consolidated bedrock excavation is complete, the excavation area will be reclaimed as a 107+/- acre pond. The final water elevation and overall size of the pond will fluctuate several feet over the course of the year in response to changes to the water table but will have an average water elevation of around 664.5’ AMSL.

[2] Stripping, removing the overlying sand, construction of the sump and stormwater infrastructure, ramping into the quarry, etc...

[3] 99.7-acre quarry area vs. 250.6-acre total Life of Mine.

The mine faces will be stabilized by pre-splitting, controlled blasting, scaling or equivalent as each section of the quarry reaches final grade. Excess unsaleable fine sand and silt will be placed to create shallow shoaling areas within the reclamation lake area. These shoaling areas will provide habitat and shallow safety access points. Within five feet of the ponds edge the shoaling areas will be graded to a slope no steeper than approximately one vertical on three horizontal five feet to allow ingress and egress from the water. The below water shoaling areas will be graded to no steeper than one vertical on three horizontal to a depth of six feet and to no steeper than one vertical on two horizontal below that. In addition, an access ramp to the quarry floor will remain as part of final reclamation to allow for water access as the quarry fills with water.

The anticipated extent of the shoaling areas as well as their slopes are depicted on the Reclamation Plan Map and Typical Cross-Sections.

The exposed quarry faces will be stabilized by pre-splitting, controlled blasting, scaling or equivalent. Excess unsaleable fine sand and silt will be placed in the mined-out areas of the quarry to create shallow shoaling areas within the reclamation lake area. These shoaling areas will provide habitat as well as shallow safety access points.

Once the pumps are turned off, the floor of the quarry will flood and the water level in the quarry will rise over time. As the water level rises in the quarry, the rate of water level rise will decrease, leaving the upper sand stripping slope exposed for an extended period of time. To address this, as part of the pre-final reclamation all exposed unconsolidated surfaces, including the stripping slope down to the bedrock surface will be:

1. Graded to a stable slope,
2. Have topsoil replaced and
3. Be seeded and mulched per the Mined Land-Use Plan and summarized below.

The uppermost six inches of cover materials used for above-water reclamation will be soil capable of supporting and sustaining vegetation.

Revegetation of the unconsolidated sand and gravel excavation area will continue to be agricultural fields using farm crops including corn, wheat and alfalfa.

Grass seed for revegetation of the consolidated excavation slope area will consist of commercial grades of[4]:

[4] Warm season grass seed mixture recommendation from NYSDEC's New York State Revegetation Procedures Manual.

Switchgrass @ 4 lbs./acre

Big Bluestem @ 4 lbs./acre

Little Bluestem @ 2 lbs./acre

Indiangrass @ 1.5 lbs./acre

Total: 11.5 lbs./acre

Small grain straw mulch will be applied at 1.5 tons/acre. The soils will be tested for pH and fertility at the time of reclamation and limed to achieve a pH of 5.5 or higher.

Eagle Harbor may substitute an equivalent seeding mixture and application rate recommended by the local U.S. Department of Agriculture Soil and Conservation Service if they so desire.

3.2.2 Potential Significant Beneficial and Adverse Impacts

In the Final Scoping Outline, included in Appendix 2, NYSDEC identified the following areas of concern and resources that may be impacted by the implementation of the project:

- A potential for significant impact on Land Resources, as there is a proposed permanent change of use for the lands at the site with the proposed bedrock mining.
- A potential adverse impact to Agricultural Resources, as there is a permanent conversion of land in a certified agricultural district.
- A potential for adverse impacts to Surface Waters, specifically neighboring wetlands and on-site and adjoining Class A streams due to the mining below the water table, and discharges related to dewatering the site.
- A potential for impact to area Groundwater Resources, due to the mining and dewatering below the water table.
- A potential adverse impact due to Noise and Vibrations, related to the proposed drilling, blasting and crushing operations related to the mining of consolidated dolostone bedrock.
- A potential for adverse impacts to Traffic related to extended use of the mine, along with debris and dust on the area roadways.
- A potential for adverse impacts due to Air Resources, due to potential new air and dust emissions sources within the mine operations.

The following additional concerns that were raised by the Town of Barre and Orleans County during the SEQR scoping process were also included in the DEIS:

- The potential for adverse impacts to Open Space and Recreation.

- Consistency with Community Character.
- Potential for direct impacts on the integrity of Eagle Harbor Road (included in Section 4.5).

Potentially significant beneficial impacts include:

- Continued supply of high-quality aggregate to meet local and regional needs.
- Maintaining and adding jobs.
- Revenue generation.
- Eventual creation of additional open space with the possibility of recreational uses and/or wildlife habitat.

3.2.2.1 Potentially Adverse Impacts

3.2.2.1.1 Earth and Natural Resources

The proposal will convert a 99.7-acre portion of the 250.6-acre Life of Mine area from sand and gravel mining to consolidated bedrock excavation by mining deeper within previously mined areas. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the permanent conversion of land that has previously been used for mining and agriculture into open space/water reclamation.

The proposal will result in the extraction, processing and sale of aggregate, a non-renewable resource. This is an unavoidable impact. The change in land use from mining and agricultural to open space represents a reduction in overall agricultural land-use of approximately one half of one percent in the Town of Barre and less than eight one-hundredths of one percent in Orleans County.

3.2.2.1.2 Agricultural Resources

The proposal will convert a 99.7-acre portion of the 250.6-acre Life of Mine area from sand and gravel mining to consolidated bedrock excavation. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the permanent conversion of 20.7 acres of land that is actively being mined, as well as 79.0 acres of land that has previously been mined and reclaimed, into open space/water reclamation.

The 79 acres that are reclaimed consists of soil containing a higher than original percentage of sand gravel and lower organic content due the mixing of the soil horizons during soil stockpiling and replacement. Crop yields are typically lower than with virgin soil due to this issue.

The change in land use from mining and agricultural to open space represents a reduction in overall agricultural land-use of approximately one half of one percent in the Town of Barre and less than eight one-hundredths of a percent in Orleans County.

3.2.2.1.3 Surface Water and Wetlands

3.2.2.1.3.1 Surface Water

The prosed quarry will need to be dewatered to maintain dry working conditions and the pumpout will be conveyed and discharged off-site through an existing drainage to the north. The proposal will not alter the established surface drainage patterns of the site.

Using a HydroCAD model analysis it was determined that during full-buildout the contribution of the mine discharge to the 25-yr or greater storm event would be approximately 4%, or less, which is negligible compared to the natural runoff already occurring during the 25-yr storm event.

The HydroCAD model analysis also determined that the farmers field culvert north of the quarry is undersized and stormwater currently overtops the farm access road along the edge of the field during a 25-year or greater storm event. The undersized culvert can easily be addressed by upgrading the upstream culvert at the edge of the farmer's field.

3.2.2.1.3.2 Wetlands

There are no wetlands within the modification area and the three nearby wetland areas will not be impacted by changes in surface water drainage. All of the wetlands are either located in entirely separate drainage areas or will not see a decrease in surface water as a result of the quarry proposal.

3.2.2.1.4 Groundwater

Wells

The pump test, Hydrogeologic Analysis, and well inventory indicated that there is potential for quarry dewatering to create a localized cone of depression, and this cone may temporarily impact local groundwater elevations at nearby residential wells once the quarry approaches full buildout. Although all but one resident is connected to public water supply and the drawdown impact at full buildout may only be 5-10 feet, there may be some impact to that well depending on its overall depth.

Potential Impacts to Wetlands

The quarry drawdown is not anticipated to impact the southeastern wetlands due to the distance from the quarry edge and the underlying silt layers that cause them to be perched, or semi-perched, above the water table.

The ponds to the east of the proposed quarry (and within the LOM), will create a recharge boundary condition beyond which the water table will experience no drawdown because the pond level will be maintained in order to supply water for the wash plant.

The mined ponds in the northeast will be maintained by the quarry discharge which will be routed through that area on its way to the Maple St. culvert outlet. There may be some recycling of water if there is a good connection between the bedrock fracture system and the surficial sediments beneath this wetland.

The water then leaving the site via the Maple St. culvert will flow westward along a ditch and then through the wetland north of the site; consequently, it is assumed that the northern wetland will also act as a recharge boundary.

3.2.2.1.5 Noise and Vibrations

3.2.2.1.5.1 Noise

The Noise Impact Assessment determined that the potential worst-case sound level increases from consolidated mining activities at all receptors will either be less than current conditions or minimal and within the “unnoticed” to “tolerable” range described in the NYSDEC noise policy. This is mainly attributed to the fact that the proposed quarry will have substantial larger setbacks from nearby residences than current mining operations and will operate mainly within an excavated hole, using the natural topography as additional barrier attenuation.

3.2.2.1.5.2 Vibration

Potential impacts from blasting include noise, vibration, effects of repeated blasting and well integrity. Impacts from blasting were thoroughly evaluated in the Blasting Impact Assessment and summarized in Section 4.6.2. Consolidated excavation will be conducted using industry standard blasting techniques and practices. The Blasting Impact Assessment demonstrates blasting conducted following the U.S. Bureau of Mines guidelines will avoid detrimental impact to structures in the vicinity. Blasting will be intermittent and of short duration. Blasting techniques and Best Management Practices will be used and all blasting will be monitored to document compliance.

3.2.2.1.6 Traffic

No change to the current site access is proposed and trucks will continue to use the current paved access road off County Route 5/Eagle Harbor Road. There are limited permitted sand and gravel reserves left on-site and EHS&G anticipates that the modification area sand and crushed stone sales will completely replace the existing sand and gravel sales, resulting in no net change in truck traffic volume, types/size of trucks used, or the overall truck routes used.

The theoretical maximum number of trucks that could exit the mine site is 24 trucks/hour based on physical limitations with loadout and the scalehouse. Actual truck traffic will be closer to 5 trucks/hour based on past construction season sales.

3.2.2.1.7 Air Resources

Mining activities such as overburden removal, excavation of rock, equipment movement and aggregate processing will generate primarily particulate matter (PM) and greenhouse gases, but below any significant thresholds. The mine will operate under an air facility registration issued by NYSDEC and will comply with all applicable Federal and State air pollution regulations.

3.2.2.1.8 Open Space and Recreation

The proposal will convert a 99.7-acre portion of the 250.6-acre Life of Mine area from sand and gravel mining to consolidated bedrock excavation. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the permanent conversion of land that has previously been used for agriculture into open space/water reclamation.

The change in reclamation land-use from agricultural to open space represents an overall positive increase in post-mining open space and recreation land-use and is consistent with the goals listed in the Town of Barre Comprehensive Plan.

3.2.2.1.9 Consistency with Community Character

The EHS&G proposal, as proposed, does not have the potential to impact the community character of the Town of Barre or of Orleans County for the following reasons:

1. The existing land-use (mining) will not change.
2. There will be no noise impacts as a result of the quarry.
3. There will be no transportation impacts as a result of the quarry.

4. Mining is a temporary land-use and preserves open space and this proposal not only preserves but increases open recreational space as part of its reclamation objective.

3.2.2.1.10 Beneficial Impacts

The proposal will allow EHS&G to access approximately 9.5 million cubic yards of high-quality NYSDOT construction aggregate which will allow EHS&G to continue to produce construction aggregate products for the local market.

The approval of the EHS&G proposal will provide an additional source of NYSDOT quality crushed stone thereby reducing the overall county-wide haul distances needed to supply the current market demand. Having a local source of construction materials will help keep construction prices low. These savings will be realized every time a contractor buys crushed stone for a driveway or when a municipality purchases material to repair a local road.

- Continued supply of high-quality aggregate to meet local and regional needs.
- Reducing the overall county-wide haul distances.
- Maintaining and adding jobs.
- Revenue generation.
- Eventual creation of additional open space with the possibility of recreational uses and/or wildlife habitat.

This modification proposal will allow EHS&G to continue to provide economic and social benefits to the local community, including:

1. Continued employment with a financial impact in 2021 of over $.258 million for pay and benefits to four employees and a future financial employment impact of $0.5 million for eight employees.
2. Financial impact of purchases to community and surrounding area of $770,527 currently and $1,486,000 in the future.

Based upon the above projections, the overall annual financial impact (in 2021 dollars, and not including sales or income tax revenues) on Barre, NY and surrounding areas is $1,028,572 and the potential future financial impact on the surrounding community is $1,986,000.

In addition, mining preserves open space, and this proposal not only preserves but increases open recreational space as part of its reclamation objective.

3.2.3 Alternatives Considered

Alternatives to the proposal are discussed in Section 5.0 and include:

1. Alternative sites
2. Alternative layout
3. Alternative mining depths
4. Alternative reclamation designs
5. Alternative technologies
6. Alternative size
7. Alternative schedule
8. No action

The alternatives to the proposal either do not fulfill EHS&G's objective or add substantial mitigation to impacts on natural or human resources.

3.2.4 Mitigation Measures Proposed

3.2.4.1 Earth and Natural Resources

When this proposal is implemented, a nonrenewable resource, dolostone for use as crushed stone aggregate, will be irreversibly and irretrievably committed and is an unavoidable environmental impact. However, the demand for construction aggregates and other stone products has historically remained at a uniformly high level and it is assumed the demand will remain at a similar, if not higher level in the future. If the materials within the project area are not utilized, construction aggregates and other stone products will be obtained from other, more distant sites to meet local demand.

The loss of the farmland acreage is a non-avoidable impact. This impact will gradually occur over the life of the mine. Impact to the project site will be mitigated by:

1. Farming the unaffected areas as long as practicable and
2. Reclamation of the current sand and gravel mining areas outside of the quarry excavation area to agricultural use. See Section 3.2.1.2 for reclamation details and timeframes.

Impact to the available agricultural lands in the Town and County is minimal and no mitigation is necessary.

3.2.4.2 Agricultural Resources

The loss of the farmland acreage is a non-avoidable impact. This impact will gradually occur over the life of the mine. Impacts to agricultural resources will be mitigated by:

1. The creation of approximately 2 billion gallons of water storage, an identified climate change adaptation strategy[5] that could be utilized to address short-term drought and seasonal availability of water for agriculture. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the creation of a permanent large pond that could be used for irrigation to address potential short-term drought and seasonal availability of water for agriculture due to climate change.
2. The quarry will start in the southeastern corner of the consolidated excavation area and gradually increase in size over decades. Farming will continue in the unaffected areas as long as practicable.
3. Reclamation of the current sand and gravel mining areas outside of the quarry excavation area to agricultural use. See Section 3.2.1 for reclamation details and timeframes.

Impact to the available agricultural lands in the Town and County is minimal and no mitigation is necessary.

3.2.4.2.1 Surface Water and Wetlands

Surface runoff will be progressively intercepted by the slowly expanding quarry, drained internally to the quarry sump and pumped out into a series of ditches and ponds, ultimately discharging at Outfall 001.

Potential surface runoff impacts have been identified at the existing downstream culverts at the edge of the farm field which are currently too small to handle a 25-year storm event.

The issue of the storm water overtopping the access roads along the edge of the field will be mitigated by modifying the culverts at the edge of the cultivated field. The HydroCAD modeling indicates that the overtopping issue during storm events could be eliminated by replacing the existing 16-inch diameter upstream culvert at the edge of the farm with two, side-by-side, 18-inch diameter culverts or a single 24-inch culvert.

[5] From *Agriculture & Climate Change Adaptation: A Role for Communities* webinar by NYSDEC Office of Climate Change, NYS Climate Smart Communities and Cornell University, December 7, 2017.

The model indicates that the 100-yr storm event results in a 0.22-ft increase in water level in the wooded area, even with the modified culvert. The sediment basin with a weir/check dam, the ditch leading to the sediment basin, and the ability of the operator to divert discharge water to the settling ponds will offset the 0.22 ft rise in water level in the wooded area south of the access road during the 100-yr storm event due to the time delay for the quarry discharge to reach the outfall, subsequent culverts and downstream wetland areas.

3.2.4.2.2 Groundwater

All but one of the residences within the potential groundwater drawdown zone have been connected to the public water supply and no longer rely upon their wells as primary water sources. As outlined in the *Site Monitoring, Complaint Response and Mitigation Plan,* included as **Appendix 5**, EHS&G will conduct additional well surveys out to one half mile from the quarry excavation area prior to the commencement of quarry dewatering activies. EHS&G proposes the following water well mitigation measures:

A Residential Water Supply Agreement will be incorporated as a permit condition. The following permit condition is proposed:

PERMIT CONDITION: Residential Well Supply Agreement

1. In the event that an off-site property owner makes a claim of a loss of quality or quantity of water supply due to a blasting event or mining activities, the permittee shall investigate and determine whether or not the loss is well system related (pump, pressure tank, plumbing, etc..). The initial investigation will be conducted within five (5) business days of the claim.
2. If it is determined that the loss of quality or quantity is not well system related, or more than five (5) business days have passed without an initial investigation being conducted, the permittee shall:
    a. Immediately provide the property owner with a temporary potable residential water supply that meets NYSDOH quality and quantity standards for residential drinking water. This temporary potable water supply shall continue for as long as NYSDEC determines it is necessary or a permanent replacement potable supply is established pursuant to paragraph 2c. or 3 below.
    b. Notify the NYSDEC Regional Permit Administrator;
    c. Investigate the loss claim with the cooperation of the property owner and provide NYSDEC with a written report within 30 days of the property owner claim. The permittee reserves the right to deepen the existing well, drill a replacement well for the property owner, or hookup the residence to public water supply, all at the permittee's expense, rather than supplying the property owner with a temporary potable water supply.
3. If NYSDEC determines that blasting or mining is likely to be a contributing cause of the alleged loss of quality or quantity of water supply, then under the direction of NYSDEC staff (including the setting of deadlines) the permittee shall take immediate steps to correct the problem and to restore a potable residential water supply meeting NYSDOH quality and quantity standards for residential drinking water supply. Subject to approval by NYSDEC, the means of water supply restoration will be at the permittee's expense and can include, but is not limited to, repairing the water supply well, deepening the well,

drilling a new well, hooking up the residence to the public water supply, or providing an alternate water supply.

4. If NYSDEC determines that blasting or mining is not a contributing cause of the alleged loss of quality or quantity of water supply, NYSDEC will provide written notification of its findings to both the permittee and the well owner and there shall be no further obligation by the permittee. All substantiated complaints and a summary of the response actions taken will be reported to the NYSDEC in the annual report.

The following measures will be incorporated to mitigate potential pollution impacts to groundwater:

- Vehicles will be kept in good repair and will be checked regularly for leaking hydrocarbon products.
- The spill prevention measures currently in place will continue to be implemented.
- Containment structures for fuel tanks as applicable.
- No solid or liquid wastes will be disposed of at the project site. All refuse generated at the project site will be transported off-site disposal.

3.2.4.2.3 Noise and Vibrations

3.2.4.2.3.1 Noise

No mitigation measures are necessary as the Noise Impact Assessment calculations demonstrate that potential sound level increases from consolidated mining activities at all receptors will either be less than current operating conditions or minimal and within the “unnoticed” to “tolerable” range described in the NYSDEC noise policy.

Nevertheless, Eagle Harbor proposes to construct a perimeter berm around the edge of the active quarry area. This voluntary mitigation measure will further reduce mining related noise to all off-site receptors above and beyond what was determined in the noise assessment calculations.

3.2.4.2.3.2 Vibration

The following mitigation measures will be employed at the Eagle Harbor Mine to mitigate potential impacts from blasting:

1. **Follow USBM guidelines for ground vibration limits and monitor for compliance using seismographs.**

Research has shown that ground vibration levels many times higher than the limits developed by the USBM do not damage other building materials such as concrete. Concrete masonry can typically withstand ground vibration up to 3 inches per second (ips), concrete can withstand ground vibration up to 5 ips and an engineered steel structure can withstand even higher levels (5 to 10 ips).

The USBM guidelines for preventing cosmetic damage at residential structures due to ground vibration are summarized on **Figure 25**.

When vibrations pass through a house, the house reacts by moving. The response of the house depends on the magnitude of the vibration (expressed as peak particle velocity in inches per second for ground vibration and peak air overpressure in pounds per square inch for air overpressure) and the frequency of the vibrations. Research has shown that typical residences are most responsive to low frequency (less than 20 Hz) vibrations. Separate limits were set plaster and drywall in order to be equally protective.

The so-called "Z-curve" shown on **Figure 25** has been the industry standard since the 1980's and has been found to be effective in preventing blasting damage from ground vibration. Compliance with these limits is routinely required in NYSDEC Mined Land Reclamation permits. All blasts at the Eagle Harbor Mine will be designed and implemented to so that these levels are not exceeded at any off-site structure.

2. Follow USBM guidelines for airblast limits and monitor for compliance using seismographs.

The United States Bureau of Mines (USBM), formerly part of the United States Department of the Interior, undertook extensive research to determine the vibration levels that begin to cause damage. Based on the results of thousands of blasts in a wide range of geologic settings and laboratory tests simulating decades of blasting, the USBM developed guidelines intended to prevent cosmetic damage to the weakest building materials. These guidelines for ground vibration (Siskind et al., 1980b) and air overpressure (Siskind et al., 1980a) were presented in two landmark publications.

The USBM research indicates that the glass in windows is the building material most susceptible to air overpressure. A properly installed window can withstand an air overpressure of 151 dB. The USBM guidelines were set much lower and vary from 129-134 dB depending on the measuring system used.

The limits shown above have been the industry standard since the 1980's and have been found to be effective in preventing blasting damage from air overpressure. Compliance with these limits is routinely required in NYSDEC Mined Land Reclamation permits. All blasts at the Eagle Harbor Mine will be designed and implemented so that these limits are not exceeded at any offsite structure.

3. Incorporate Applicable Items from the Blasting Checklist

The following Blasting Checklist is provided for information only and is subject to change by the licensed blaster in order to comply with the USBM guidelines and the applicant's production needs.

It will change as new blasting technology is developed and proven or if experience shows that site specific conditions warrant it.

- *Frequency of Blasting*—Blasting will be done as often as needed to meet market demand. Blasting typically occurs during the production season of March through December. When faces are being developed, development shots will typically occur up to once per week. Production shots will occur roughly twice per month.

- *Blast Hole Diameter*—The blaster will vary the diameter of the blast hole depending on a wide variety of factors. Typically, blast holes will be 4 to 6.5 inches in production for a 30-foot-high face and as small as 3 inches for a 10-foot-high development shot.

- *Number of Holes Per Blast*—The blaster will vary the number of holes per shot as needed to meet production requirements. The number of holes per shot does not have a direct influence on the vibration levels due to the use of millisecond delays.

- *Burden and Spacing*—The blaster will vary the burden and spacing as needed to meet the goals of the blast.

- *Typical Pounds of Explosive Per Delay*—The blaster will vary the pounds of explosive per eight millisecond delay as needed to meet the production goals and comply with the USBM guidelines.

- *Predicted Peak Particle Velocity*—The blaster will design all blasts to comply with the USBM guidelines using predictive formulae as outlined in Section 3.5 above and his experience at the site. If the seismograph readings indicate the ground vibration or air overpressure levels are approaching the allowable limits, the blaster will adjust the blast as needed to avoid exceeding the limits. This could be accomplished a number of ways, including but not limited to reducing the hole diameter, reducing the density of explosive used, reducing the face height, increasing the amount of stemming and revising the blast timing.

- For a 30-foot-high face at a distance of 505 feet (the shortest distance from the bedrock excavation area to the closest off-site structure) using a 4-inch diameter

hole and 6.7 feet of stemming, the predicted peak particle velocity would be 0.44 inches per second.

- *Local Blasting Ordinances*—None

- *Location of Off-Site Receptors*—The nearest off-site receptor is 505 feet from the closest quarry excavation area; all other receptors are further away.

- *Best Management Practices to Prevent Fly Rock and Control Off-Site Vibrations*—Please refer to the Best Management Practices in item #2 below.

- *Seismographs*—All blasts will be monitored by properly calibrated seismographs set up at the off-site structures most likely to be impacted by any particular blast. The blaster in conjunction with the applicant will make this determination based on distance to off-site structures, past experience, requests from the public and the orientation of the blast.

- *Control of Blasting Emissions*— Blasting is an infrequent occurrence and overall, a very minor source of dust. Frame by frame examination of videos of blasts confirms that the majority of dust generated by blasting is generated in the interior of rock mass from the pulverization of rock immediately adjacent to the explosives column. This is unavoidable in all production blasts where sufficient displacement of the rock occurs to allow for relatively easy extraction.

- Gases will be reduced by proper and complete ignition of the explosives and use of the appropriate type of explosives for the drill hole conditions (e.g., straight ANFO would not be suitable for use in a hole containing rainwater).

- Blast Notification—Residents requesting to be notified prior to each blast will be called the morning of the blast. A siren will be sounded in a distinctive manner prior to each blast.

- *Pre-Blast Surveys*—This is covered in item #5 below.

4. <u>Employ Best Management Practices</u>

Eagle Harbor Sand & Gravel will follow the following standard procedures in the course of their blasting. The blaster will revise these best management practices as new technology is developed and proven or if experience shows that site specific conditions warrant it.

- All blasts will be designed and implemented following proper blast management practices in accordance with the requirements of the Mine Safety and Health Administration.

- A licensed expert blaster will do all blasting.

- The blaster will design and implement all blasts to comply with the USBM guidelines.

- The licensed expert blaster will lay out each blast, ensuring appropriate burden is maintained to properly confine the explosive column. The face will be profiled to aid in determining the front row burden at the blaster's discretion.

- The blaster will specify the drill hole location, size and depth.

- The driller will keep a log describing any unusual conditions found in the holes.

- The blaster will review the drill logs and make any adjustments needed to account for the conditions of the holes.

- The blaster will ensure the holes were drilled as specified. The holes will be bore tracked or equivalent at the discretion of the blaster.

- Holes containing large voids will be abandoned or the voids will be encased to avoid overloading of the holes.

- Blasting will be scheduled so as to avoid adverse weather conditions such as strong, low level thermal inversions and thunderstorms. The blaster will use a weather service to assist him in making such determinations.

- The blast holes will be loaded and implemented under the direct supervision of an expert licensed blaster.

- All blasts will be designed to assure proper confinement of the explosives column.

- The appropriate type of stemming will be used for the size of the hole.

- The blast area will be secured prior to each blast.

- Neighbors so desiring will be called the morning of each blast. This reduces the startle affect associated with some blasts.

- A siren will be sounded in a distinctive manner before each blast.

- Blasting will be done between 10 a.m. and 5 p.m. Monday through Friday. Blasting will not occur on New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving and Christmas Day. Blasting during the middle of the day and at similar times of the day reduces the human response to blasting.

- All blasts will be monitored with a properly calibrated seismograph.

- The blaster will check the shot before sounding the all-clear.

- The blaster will review the seismograph results to determine compliance with the USBM guidelines and adjust the blast design as needed.

- Records of all blasts will be kept and be made available to the Department upon request.

- The applicant will promptly and professional respond to and investigate all complaints.

- Offer pre-blast or condition inspections for neighbors to serve as a baseline in the event of a claim of blasting damage, as outlined below.

5. Conduct Pre-Blast Surveys

EHS&G will offer to conduct pre-blast condition surveys in accordance with the procedures detailed below for each off-site structure not owned by the Applicant or the Eagle Harbor Mine property owner located within 1000 feet of the planned limits of blasting. This survey shall determine and document the conditions of the structure at the time of the survey.

Pre-blast surveys will be conducted prior to any blasting activity and provided to NYSDEC as requested. A copy of the pre-blast request letter template that will be used is included in Appendix 10. Request letters will be sent certified mail with return receipt to all property owners with structures within 1000 feet of the quarry. Copies of all correspondence, including certified mail receipts, as well as acceptance and denial of access notifications will be sent to NYSDEC prior to any blasting activity.

Eagle Harbor Sand & Gravel will include in the written notification contact information for their blasting representative as well as a self-addressed, stamped envelope for the owner to accept or decline the offer to perform a condition survey. Any owner's failure to respond within 30 days of the postmark date (of the certified letter) shall be deemed a denial. If any owner decides not to participate in the Pre-Blast Survey, Eagle Harbor will not be required to include that dwelling in the survey.

Documentation will include voice-recorded descriptions, diagrams, notes and photographs and/or video as needed to detail existing defects in walls, ceilings, floors, foundations and windows both on the interior and exterior of the structure. Eagle Harbor Sand & Gravel will hire professionals experienced in condition or pre-blast surveys to perform all condition surveys. A copy of the documentation will be mailed to the owner, determined according to the municipal tax records, within 30 days of the completion of the survey.

All costs associated with conducting the Pre-Blast Surveys shall be paid by Eagle Harbor Sand & Gravel and they will maintain all correspondence to and from owners regarding condition surveys, all condition surveys performed and the supporting documentation.

3.2.4.2.4 Traffic

The following measures will be employed to further mitigate any potential issues related to truck traffic:

- EHS&G will maintain the paved entrance from County Route 5/Eagle Harbor Road to the scale to mitigate trackage and dust from vehicle movement.
- EHS&G will post signs to notify truck drivers of tarp laws to mitigate potential material spillage and dust from uncovered loads.
- The paved entrance is swept as often as necessary to control fugitive dust and trackage off-site.
- On road trucks will be restricted to the stockpile area and will not co-mingle with or use the haul roads of the off-road haul trucks to minimize trackage.
- A water truck equipped with spray nozzles will continue to wet down access roads in regular use as needed to control fugitive dust.
- Overloading of trucks will be avoided by weighing all trucks leaving the site and trimming any loads that are found to be over.

3.2.4.2.5 Air Resources

Greenhouse Gas Emissions

Following the NYSDSEC Program Policy: Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements, these on-site measures will be used to mitigate greenhouse gas emissions from consolidated mining activities:

- EHS&G has contracted with National Grid to determine the feasibility of upgrading electric service at EHS&G from 4.8 kV to 13.2 kV. This will allow EHS&G to switch the proposed portable processing plant from diesel generator power over to line power. This request is being processed under Work Request # 30687960 and is ongoing; the Department will be kept informed of any updates as we go forward.

- The project as proposed represents a redevelopment of an existing site, which minimizes vegetation/forest loss compared to developing a quarry at a greenfield location.
- The post-mining use will restore natural areas on-site as the reclamation objective is grass and open space.

Particulate Matter (PM)

The following methods will be used to mitigate particulate matter from consolidated mining activities:

- Soil overburden and the underlying sand will be removed from the rock prior to blasting.
- Soil overburden is typically stripped during the early winter and spring when soil conditions are not conducive for the generation of substantial amounts of dust.
- The consolidated extraction area will be surrounded by perimeter faces and berms. Since the most activity at a mine occurs at the bottom of the faces, the overlying benches and berms help screen the activity from the wind, reducing the wind velocity and reducing the potential for dust generation. The overlying benches and berms also help contain any fugitive dust to the site.
- Haul roads within the affected area will be periodically sprayed with water to keep the amount of dust generated by hauling to a minimum.
- Vehicle speed on haul roads is controlled.
- The stone has a natural moisture content that helps bind finer grained particles together and minimize the generation of dust.
- Drills equipped with dust control equipment including a shroud around the ground/drill hole interface and dust collectors will be used.
- All blasting will be conducted and supervised by a certified blaster, ensuring the proper blast design and drilling pattern.
- Dust generated by the processing of rock will be controlled by fog nozzles located at critical points within the processing circuit (such as crusher discharge points and conveyor head pulleys).
- The stockpiled product retains dust control moisture from processing. In addition, the stockpile area will be routinely sprayed down with water when needed to control fugitive dust.

In addition, all conditions in the existing Mined Land Reclamation Permit and Mined Land-Use Plan pertaining to dust suppression will continue to be followed.

These mitigation measures will allow the facility to continue to operate in compliance with current regulations and achieve state and national air quality standards. These dust-generating activities are regulated by New York State under 6 NYCRR Parts 200 (General Provisions), 201 (Permits and Certificates), 212 (General Process Emission Sources), and 422 (Mined Land-Use Plan) of the New York State air pollution regulations contained in Title 6 of the Codes, Rules and Regulations of New York State.

An Air Facility Registration has been prepared for the proposed portable plant and is being submitted as a separate document to the Division of Air Resources of the NYSDEC. A copy of the application and supporting calculations are included in Appendix 7.

3.2.4.2.6 Open Space and Recreation

3.2.4.2.6.1 Open Space

The project, as proposed, will convert land historically used for mining and agriculture into permanent open space as part of reclamation. The final reclamation objective is consistent with the goals outlined in the Town of Barre Comprehensive Plan which identifies open space as a Town-wide objective and lists Action #1 of their Agriculture Policy to be: "*(e)ncouraging farmland owners to keep land in open space and agriculture through creative development designs.*"

The project will result in a net increase in open space and therefore there are no impacts to mitigate.

3.2.4.2.6.2 Recreation

There are no recreational resources on the project site and therefore no impacts to recreational resources to address. The project area is privately owned and hunting or trapping by the general public is not allowed.

3.2.4.2.7 Consistency with Community Character

The EHS&G proposal, as designed, does not have the potential to impact the community character of the Town of Barre or of Orleans County. The potential impacts related to noise, visual, and truck traffic are thoroughly addressed with mitigation measures (see Section 4.8.2) and additional mitigation measures specifically addressing community character are not necessary.

3.2.5 Issues of Controversy

During the SEQR scoping process the NYSDEC received comments from the Town of Barre and Orleans County identifying their concerns.

Comment by the Town of Barre

While the Town of Barre's 2017 comprehensive plan recognizes the economic benefits of the existing mining operations, it also seeks to promote the expansion of the existing mine with environmentally responsible practices. Consistent with that goal, we request that additional sections be added to the scope of the Environmental Impact Statement addressing: impacts on open space and recreation; impact on human health; and consistency with community character.

Response by NYSDEC

Per the Town's request, the Department has included the following sections to the scope of the dEIS: "impacts on open space and recreation", and "consistency with community character". As per Section 4.0, detail on the impact on human health will be included in the individual sections.

Comment by the Town of Barre

With regard to the scope of the impacts on traffic section proposed, we believe it's appropriate to also examine whether the expanded operations will have an impact on the integrity of Eagle Harbor Road itself. The set-back of the mine appears to be less than fifty feet from Eagle Harbor Road. As owner of the road, if the Orleans County Department of Public Works has not previously been identified as an interested agency, it should be given notice of the proposed action and an opportunity to participate in SEQRA review.

Response by NYSDEC

The Department will include the Orleans County DPW as an interested agency and welcome their participation in the SEQRA review. Additionally, the dEIS will also consider potential direct impacts on the integrity of Eagle Harbor Road within the Section 4.5.

Comment by the Town of Barre

On behalf of the citizens of the Town of Barre, we also have concerns about the adequacy of notice and information being disseminated about this proposed permit modification. As impacts related to the proposed blasting, drilling, and crushing activities are likely to impact Town residents far beyond adjacent properties, it is appropriate to expand the radius for which direct-mail notice is provided to residents. Additionally, we hope to see opportunities for education of the public about the risks and benefits associated with the proposed action during the course of SEQRA review. We believe that additional notice,

education and transparency will be beneficial to the review and processing of this application.

Response by NYSDEC

The UPA and SEQR process is limited to specific intervals where there are opportunities for formal public comment. However, there is not a mechanism to require direct-mail notice to be provided to residents. Once it has determined that the dEIS prepared by the project sponsor is adequate for public review, the Department will determine whether or not to conduct a public hearing. The application will require the standard public comment period as required under 6 NYCRR Part 621. The Department will be glad to work with the town to help communicate and educate the area residents of the opportunities for education and comment.

Comment by the Orleans County DPW

The county should be listed as an interested agency, formally put on notice, and given the opportunity to participate in the SEQRA review.

Response by NYSDEC

The Department will include the Orleans County DPW as an interested agency and welcome their participation in the SEQRA review. It is noted that Section 4.5 of the dEIS will address "potential adverse impacts to traffic (and related debris and dust on the area roadways)" along with "potential direct impacts on the integrity of Eagle Harbor Road".

3.2.6 Matters to be Decided, including a List of Each Permit or Approval Required.

Agency approvals required for this proposal include: NYSDEC Mined Land Reclamation, Water Withdrawal, SPDES Multi-Sector, Air Facility Registration as well as a Special Use Permit from the Town of Barre. A summary table of all the agencies and permits involved is included as Table 1 located in Section 10.0.

3.3 PROJECT PURPOSE, NEED AND BENEFITS

3.3.1 Background and History

Eagle Harbor Sand & Gravel, Inc. is a locally owned and operated company located in the Town of Barre, New York (Figure 1). This property was originally mined by Bennett in the 1960's and the Eagle Harbor Mine has been a supplier of high-quality sand and gravel aggregates to Orleans County and surrounding regions since the mid-1970's.

Eagle Harbor is currently approved by NYSDEC to mine sand and gravel from a 250.6+/- acre Life of Mine area situated on a 300+/- acre parcel leased from A.L. Bennett & Sons.

The following list summarizes the history of this project up to this point:

1. The initial Mining Permit Modification application was made in January 2019
2. A Notice of Incomplete Application (NOIA) was issued by the NYSDEC on January 22nd, 2019.
3. The response the January 22nd, 2019 NOIA was submitted on June 6th, 2019.
4. A Notice of Incomplete Application (NOIA) was issued by the NYSDEC on June 24th, 2019, and additional comments were provided on July 30th, 2019.
5. The response to the June 24th NOIA and July 30th comments was submitted on September 3rd, 2019, and the Pumping Test Protocol was submitted on November 19th, 2019.
6. A Notice of Incomplete Application (NOIA) was issued by the NYSDEC on December 10th, 2019.
7. The response the December 10th, 2019 NOIA was submitted on September 22nd, 2020.
8. A Notice of Incomplete Application (NOIA) was issued by the NYSDEC on November 12th, 2020.
9. The response the November 12th, 2020 NOIA was submitted on February 17th, 2021.
10. The NYSDEC assumed Lead Agency Status and issued a positive Declaration of Environmental Significance on September 10, 2021.
11. The NYSDEC issued a draft scoping document on January 6th, 2022.
12. The NYSDEC issued a final scoping document on April 22nd, 2022.

Copies of all pertinent correspondence are included in Appendix 1 and the Final Scope is included in Appendix 2.

3.3.2 Public Need for the Project

Crushed stone aggregate[6] is a finite, non-renewable resource which is essential in the construction and maintenance of roads, industrial development, building structures,

[6] Any of several hard, inert materials, such as sand, gravel or crushed stone, used for mixing with a cementing or bituminous material to form concrete, mortar or plaster; or used alone as in railroad ballast or graded fill.

airports, railways and dams and should be recognized as a vital component of any comprehensive land-use or resource management program.

Construction aggregates are used primarily in asphalt and concrete. A high percentage of blacktop and concrete is composed of aggregate: approximately 95% of asphalt pavement and 80% of concrete is aggregate. Due to the high percentage of aggregates in pavement, every mile of interstate highway contains approximately 38,000 tons of aggregates and about 400 tons of aggregates are used in the construction of the average home (NSSGA).

The dominant factor driving market demand is the size and growth of the population. The growth in population and commerce means an increased demand for a variety of commercial services that require substantial amounts of construction aggregates. Although there is some variation in market demand that can be linked to variations in government spending on infrastructure, the strength of the economy and local construction projects, this typically results in only minor or short-term variations in demand. In short, as the population continues to expand and people continue to want safe roads, new schools, stores and warm homes, the overall market demand for aggregates will continue to go up.

The US Census estimates that the population of New York State reached 19,835,913 as of July 1, 2021. The New York State Department of Environmental Conservation Division of Mineral Resources website states that each person in New York consumes over 110 pounds of mineral products per day (NYSDEC Mined Land Reclamation Database). This amounts to approximately 360 million tons of mineral products consumed per year in New York State alone. Most of this consumption comes in the form of construction materials such as are currently provided by EHS&G and would continue to be provided by the proposed quarry.

The unrelenting growth of our cities and highway systems during the 20th century created a continuous, ever-increasing demand for aggregate resources. In addition, the people demanded bigger and better houses and bigger and better roads. Those demands resulted in a 2,000-percent increase in the country's per capita consumption of aggregate (Langer 2003).

Unfortunately, even with that incredible increase in construction aggregate use we have fallen behind on our infrastructure maintenance obligations and the number of mines New York State that supply high-quality aggreges has diminished over time as well, further complicating the issue. In 2021 the nation’s infrastructure earned a C- in the American Society of Civil Engineers’ Report Card for America’s Infrastructure and New York faces infrastructure challenges of its own. For example, driving on roads in need of repair in

New York costs each driver an extra $625 per year, 9.9% of bridges are rated structurally deficient (American Society of Civil Engineers', 2021).

According to the NYSDEC online Mined Land Reclamation Database (from July 2022) there were 1,763 active NYSDEC permitted mines in New York State, which is down from a total of 2,285 NYSDEC permitted mines sites from August of 2012, an almost 25% reduction in only 10 years. This is a worrying trend that, if it continues, will result in even less further options for construction aggregates resulting in higher prices and longer truck routes with all of the associated issues related to trucking materials for greater distances, particularly increased costs for delivered construction aggregates and increases in air emissions.

Success in a 21st-century economy requires serious, sustained leadership on infrastructure investment at all levels of government. Delaying these investments only escalates the cost and risks of an aging infrastructure system, an option that the country, New York, and families can no longer afford as this deteriorating infrastructure impedes New York's ability to compete in an increasingly global marketplace.

The importance of aggregate mining is recognized by New York State and the Town of Barre. The New York State legislature has declared a state-wide policy "to foster and encourage the development of an economically sound and stable mining industry, and the orderly development of domestic mineral resources and reserves necessary to assure satisfaction of economic needs compatible with sound environmental management practices." E.C.L. § 23-2703(1). The Town of Barre Comprehensive Plan (**Figure 23**) identifies the Eagle Harbor Mine property as "(a)reas designated for Mining/Excavation are intended for continued mining or excavation use. This designation recognizes the economic value of natural rock products, including sand and gravel."

Eagle Harbor's proposal also furthers the New York State smart growth policy "[t]o advance projects for the use, maintenance or improvement of existing infrastructure" within the meaning of ECL 6-0107(2)(A)." Eagle Harbor has made significant investments at the Site in the form of structures, machinery and processing equipment to enable long-term mining operations to meet local demand. The Eagle Harbor mine not only provides a crucial resource for the local highway department and local businesses, but also but also provides local jobs and contributes to the local tax base which, in turn, supports public services.

Eagle Harbor's proposal will serve to advance these legislative priorities and the compelling economic and social needs underlying them by enabling the survival of an existing mining operation and continued service to the local aggregate market in a manner that is compatible with sound impact mitigation principles. Construction materials, such

as the high-quality aggregate produced at the Eagle Harbor Mine, are used on a daily basis in roads, bridges, buildings, drainage courses and slope stabilization, landfills, construction projects, homes and commercial and residential developments. Construction materials make it possible to have safe roads and bridges, homes and comfortable offices, hospitals and stores.

It is important to note that a quarry cannot be built just anywhere because not all stone is suitable for aggregate. Many deposits of rock are not suitable for construction or road building. The rock may be too soft or have chemical properties that render it unsuitable for commercial use.

Generally, crushed stone aggregates must be able to resist weathering and mechanical breakdown resulting from the actions of mixers, mechanical equipment and traffic. Aggregates used in Portland cement concrete or bituminous mixes must also have favorable chemical properties. Some aggregates contain minerals that chemically react with or otherwise adversely affect the concrete or bituminous mixes. Consequently, strict specifications are set by the NYSDOT and other agencies for certain uses. As new high-performance materials are developed, even more stringent specifications are rendering some of today's aggregate resources unsuitable.

Of the 17 permitted mines in Orleans County only seven are quarries (NYSDEC Mined Land Reclamation Database). Currently only four of those seven quarries are approved by the New York State Department of Transportation for use as construction aggregate (use in DOT roads) (NYSDOT). The approval of the EHS&G proposal would increase the number of NYSDOT approved stone source to Orleans County by 25%, provide an alternative aggregate source and reduce overall haul distances for projects that are nearby. Crushed stone aggregate is a heavy, low cost per ton product and haul distance largely controls the price. As of July 2022, the trucking costs are $4.00/mile for trucking, 20 cents per mile ton and 40 cents per mile ton one way, meaning the cost of the trucking exceeds the cost of the aggregate after a very short distance. The cost savings that a closer local aggregate source provides will be realized every time a contractor buys crushed stone for a driveway or when a town purchases material to repair a road.

3.3.3 Objectives of the Project Sponsor

EHS&G proposes to excavate consolidated dolostone bedrock material in a 99.7-acre area within the existing 250.6-acre sand and gravel mine life-of-mine area. The proposed modification includes:

- Adding consolidated bedrock excavation using standard drilling and blasting techniques within a 99.7-acre area.

- Increasing the permitted depth of excavation. The bedrock to be mined is overlain by sand that averages about 35-40 feet in thickness within the proposed bedrock excavation area. The depth of excavation will be increased to remove the sand to access and mine the full thickness of the dolostone bedrock. The overall depth of excavation (sand and bedrock) will be approximately 80-100 feet.
- Adding a portable crushing plant to crush the rock prior to feeding it into the existing processing plant for sizing. No changes to the existing processing plant will occur as part of this modification.

This proposal will allow EHS&G to continue to operate the Eagle harbor Mine and provide a high-quality source of local construction aggregate to the Greater Orleans County market.

3.3.4 Benefits of the Proposed Action

The proposal will allow EHS&G to access approximately 9.5 million cubic yards of high-quality NYSDOT construction aggregate which will allow EHS&G to continue to produce construction aggregate products for the local market.

The approval of the EHS&G proposal will provide an additional source of NYSDOT quality crushed stone thereby reducing the overall county-wide haul distances needed to supply the current market demand. Having a local source of construction materials will help keep construction prices low. These savings will be realized every time a contractor buys crushed stone for a driveway or when a municipality purchases material to repair a local road. In addition to the direct cost savings that nearby contractors and towns will experience from reduced haul distances, the following benefits will also be realized:

1. Reduced fuel consumption, greenhouse gas emissions and air pollution.

   An additional local source of construction aggregate mitigates the overall fuel usage and subsequently reduces the overall air pollution and carbon footprint of the aggregate supply chain due to a more efficient use of energy (diesel fuel) compared to trucking in materials from further away.

2. Reduced traffic congestion and wear and tear on roadway infrastructure

   An additional local source of construction aggregate provides an alternative local source for contractors and towns to haul from. All other things being equal, with the high cost of fuel and trucking in general, contractors will purchase and haul aggregate from the closest source to the end use, which will reduce the overall truck highway miles and associated truck traffic needed to meet the current market demand.

This modification proposal will also allow EHS&G to continue to provide economic and social benefits to the local community, including:

1. Employees:
    a. Financial impact in 2021 of over $.258 million to pay four full time and seasonal employees including health care, 401k and other benefits.
    b. Future financial impact will result in $0.5 million to pay eight full time and seasonal employees including health care, 401k and other benefits.
2. Financial impact of purchases to community and surrounding area:
    a. Current: $770,527
    b. Future: $1,486,000

Based upon the above projections, the overall annual financial impact (in 2021 dollars, and not including sales or income tax revenues) on Barre, NY and surrounding areas is:

$1,028,572

Potential future financial impact on surrounding community:

$1,986,000

The New York State Museum publication entitled "The Mineral Industry of the State of NY" (Kelly, 2011) states that the majority of mining in New York is for construction materials used to build and maintain the state's infrastructure. The mined commodities, in addition to the hot mixed asphalt, ready mix concrete and cement industries, were responsible for generating $1.2 to $1.3 billion in wages and 28,000 to 30,000 jobs in New York State. The publication also estimates the mining and construction materials industry contributes about $100 million in public sector revenues (sales tax, personal income tax, motor fuel tax, corporate franchise tax and Mined Land Reclamation Law fees).

All of these benefits would be eliminated if EHS&G is forced to terminate its operations.

3.4 ENVIRONMENTAL REVIEW PROCESS

3.4.1 Approvals Required

Agency approvals required for this proposal include: NYSDEC Mined Land Reclamation Permit, Water Withdrawal Permit, SPDES Multi-Sector Permit and an Air Facility

Registration. A summary table of all the agencies and permits involved is included as Table 1 located in Section 10.0.

3.4.2 State Environmental Quality Review

The New York State Environmental Quality Review Act (SEQR) and its implementing regulations at 6 NYCRR Part 617 require agencies to assess the potential environmental impacts of proposed projects during the permitting process. Under SEQR, potentially significant adverse environmental impacts are evaluated in a DEIS.

A DEIS is intended to function as a disclosure document to provide information about the expected environmental impacts of the proposed action and provide a basis for informed decisions. This DEIS identifies and addresses the potential environmental impacts of the project and reasonable alternatives, if any, and identifies ways to avoid or mitigate any potential adverse impacts to the maximum extent practicable. This DEIS also addresses any irreversible and irretrievable commitments of resources, growth inducing aspects, and the use and conservation of energy.

The different steps, pathways and timeframes of the SEQR process are outlined on **Table 1** and **Figure 2**. Copies of pertinent SEQR correspondence are included in Appendix 1 and the Final Scoping Outline is provided in Appendix 2.

4.0 ENVIRONMENTAL SETTING, SIGNIFICANT ENVIRONMENTAL IMPACTS, IMPACT ON HUMAN HEALTH, AND MITIGATION MEASURES TO MINIMIZE ENVIRONMENTAL IMPACTS

The environmental setting (existing conditions), potentially significant environmental impacts, and mitigation measures are described in this section. Adverse environmental impacts that cannot be avoided or adequately mitigated if the proposed action is implemented are also discussed. Technical reports supporting the analysis provided in each subsection are included as appendices to the DEIS in Section 12.0.

4.1 EARTH AND NATURAL RESOURCES

The currently permitted Eagle Harbor Mine site consists of an approximately 250.6 acre of life-of mine area on a 300+/- acre parcel. As proposed, an approximately 99.7 area within the life of mine is proposed to be used for the excavation of consolidated bedrock material. The reclamation of this area will be as a pond, rather than that of agricultural land.

4.1.1 Existing Conditions

4.1.1.1 Geology

4.1.1.1.1 Soils

The majority of the soils within the modification area have been disturbed through historic mining activities and much of the previously mined areas have subsequently been reclaimed using topsoil saved from stripping activities.

The USDA Soil Survey of Orleans County mapped the original soils in the modification area as HoB – Howard Gravelly Loam, HpC – Howard Soils, BoB – Bombay Fine Sandy Loam, and CoC – Colonie Loamy Fine Sand.

The Howard series consists of deep, gently sloping to hilly, well drained to somewhat excessively drained soils on outwash terraces, glacial beaches, kettles, and kames. These soils formed in glacial outwash derived mainly from sandstone, limestone and shale.

The Bombay series consists of deep, nearly level to gently sloping, moderately well drained soils on glacial till plains. These soils formed in glacial till derived from sandstone and limestone.

The Colonie series consists of deep, nearly level to rolling, well drained soils on beaches and sand bars or deltaic positions associated with glacial lake deposits. These soils formed in water-laid or wind-deposited fine or very fine sand.

The topographically low areas to the north, northeast and southeast of the modification area are covered with mucky soils (Palms, Carlisle, Lamson) These muck soils are poorly drained, sapric soils that are commonly underlain by lacustrine silt (Bradford et al., 1977). Water is at, or near, the surface for extended periods of time throughout the year in these soils.

The soil map of the project site is included as Figure 6, a soil summary table is provided as Table 3 and a copy of the full Soil Resources Report can be found in Appendix 3.

4.1.1.1.2 Surficial Geology

The project site is mapped as a glacial kame deposit. Kame deposits are depositional features made by water from melting ice and form irregularly shaped hills or mounds composed of sand, gravel and till. This glacial deposit was created approximately 11,000 years ago as the glaciers were melting and is the source of the sand and gravel that has been mined at the Eagle Harbor Mine since the 1960's.

The Soils Map (**Figure 7**) shows the mapped surficial glacial deposits (Cadwell, 1988) and an excerpt on the glacial history from the Cadwell publication follows.

"GEOMORPHIC HISTORY OF WESTERN NEW YORK"

> The Niagara Sheet of the Surficial Geologic Map of New York includes part of two physiographic provinces: the Erie-Ontario Lowlands and the Appalachian Uplands. The Appalachian Uplands, which comprise most of the southern and eastern portions of the map are developed on Devonian sandstone, shale and limestone dipping gently to the southwest. The Erie-Ontario Lowlands, encompassing the relatively lower and flat terrain south of Lake Erie and Lake Ontario, are developed on Ordovician, Silurian and Devonian shale, and limestone with subordinate dolostone and sandstone which also dip gently southward.
>
> Major landscape features observed in the map area originated from the differential weathering and long history of erosion. Landscape evolution, though very slow, is an unending process and the imprint of past environments may be so gradually effaced that relict landforms dominate

for a long time. These major landscape features evolved primarily through fluvial erosion but were profoundly modified by glacial processes during the last 1-2 million years.

The main products of preglacial landscape development are physiographic features (the upland and lowland areas), limestone escarpments, saprolites and partly buried stream-drainage networks. Saprolites (deeply weathered overburden) are preserved beyond the Wisconsinan Terminal Moraine in the Salamanca Re-entrant south of the Allegheny River. Of preglacial landscapes, only a suggestion of summit accordance, a few drift-filled valleys and vestiges of the drainage pattern can be traced northward of the terminal moraine from south of the Allegheny River. The intensity of glacial modification of the landscape increases northward, obliterating all preglacial topographic details within a few tens of miles. Valley walls and upland areas have been reshaped by erosion during glaciation whereas lowland areas were modified by deposition of boulders, gravel, sand, silt and clay during retreat of the ice. However, this imprint of continental glaciation across western New York is not uniformly expressed everywhere. The most extensive erosion and deposition are found in the Erie-Ontario Lowlands and the northern part of the Appalachian Uplands, where weaker, more easily eroded strata occur.

New York State was subjected to glacial erosion and deposition several times during the Pleistocene. Each succeeding glacial episode, however, destroyed most of the earlier geologic record. Evidence of multiple glaciation, although rarely preserved, is recorded in a few favorable locations where unique topographic settings preserved earlier deposits from erosion during subsequent glaciation, as seen in exposures at Otto and Gowanda. At these two localities, organic remains dated from 52,000 to 64,000 years before present and indicative of boreal forest conditions are preserved between underlying and overlying glacial deposits. Contrary to earlier interpretations, evidence of multiple glaciation is found in the Salamanca Re-entrant south of the Allegheny River. Here, isolated areas of deeply weathered outwash gravel, kame gravel, diamict and remnant moraines suggest deposition during glacial advance more than 50,000 years ago.

Glacial deposits of the Niagara Sheet were formed almost entirely during Late Wisconsinan time by an expansion of the Laurentide Ice Sheet that began about 30,000 years ago and culminated perhaps 20,000 years ago. The Wisconsinan glacier transported large quantities of clay-to boulder-size sediment and spread them over the landscape. The erosive power of the glacier was enhanced in valley and lowland areas oriented parallel to glacier flow where the ice was thicker and flow enhanced; erosion was less effective in valleys transverse to its flow where thinner ice prevailed. Thus, major stream valleys like the Genesee Valley in the Appalachian Uplands and the Erie-Ontario Lowlands were deeply scoured.

The Wisconsinan Terminal Moraine in New York is preserved on Long Island and at the Salamanca Re-entrant. Deeply weathered glacial deposits along the Allegheny Valley indicate that at least one pre-Wisconsinan glacier reached a terminus south of the Wisconsinan Terminal Moraine. Most pre-Wisconsinan glacial deposits within the Re-entrant were either eroded or intensely modified by weathering, and very few remnants of the earlier glacial deposits have been preserved.

The Wisconsinan Terminal Moraine is composed of both till and stratified drift and is typically characterized by conspicuously hummocky terrain. The scarcity of stratified drift within some valleys beyond the moraine suggests concurrent drainage beneath the glacier. This supports a hypothesis of regional downwasting. Localized drainage around and under stagnating ice tongues deposited glacial, glaciolacustrine and glaciofluvial sediments at valley heads, both during retreat from the Terminal Moraine and from subsequent recessional margin positions. As the glacier retreated from western New York State it produced a series of proglacial lakes and recessional ice-margin features. As the upland regions were deglaciated, large masses of glacier ice remained in the adjacent lowlands. Glacier ice margins, as summarized in Figure 1, formed when the terminus of the glacier remained at one position for some time. These margins are younger from south to north. Deposits of drift in the valleys tend to be thicker (up to 300 meters) than drift in the uplands (generally less than 5 meters).

During retreat of the Wisconsinan glacier, successive proglacial lakes developed in the Erie Basin: Lakes Maumee, Whittlesey, and Warren. These drained to the west into the Mississippi River drainage

basin. With continued glacier retreat, eastward drainage developed for waters in the Erie Basin. This made possible a rapid lowering of lake level, represented by Glacial Lakes Glassmere and Tonawanda. A lake persisted in the Tonawanda basin for some time after glacial withdrawal and its basin is the site of the Byron-Bergen and Oak Orchard Swamps today. In the Ontario basin, Lake Iroquois came into existence with uncovering of the eastern threshold at the head of the Mohawk River near Rome. This lake remained in existence, with meltwater drainage down the Mohawk Valley, until deglaciation of the northern flank of the Adirondack Mountains.

The Wisconsinan glacier receded from New York State about 11,000 years ago. Subsequent to deglaciation the landforms of New York have been reshaped only moderately by postglacial processes, mainly along the floodplains of streams and the adjacent valley walls."

4.1.1.1.3 Bedrock Geology

The bedrock in the modification area are dolostones of the Goat Island and Gasport Members of the Lockport Dolostone Formation and the Decew Dolostone. The dolostones are underlain by the Rochester Shale, which is not proposed to be mined.

The project site has been core drilled to determine the suitability of the site for consolidated bedrock excavation. The total thickness of dolostone at the Eagle Harbor site is approximately 58 feet and top of the Rochester Shale/future floor slopes gently south southeasterly.

The overall thickness of high-quality dolostone is economical to mine in terms of overburden depth and location with respect local demand and transportation. The rock is capable of producing high quality, NYSDOT-approved crushed stone aggregate and high-grade agricultural lime.

South of the project site the Lockport is overlain by unusable shale bedrock and north of the project site the Lockport becomes increasingly thin.

4.1.1.2 Land Use

Approximately 85.5 acres of land are currently affected by mining activities within the 250.6-acre Life of Mine area. The 300+/- acres parcel that the mine is located on is a mix of mining, agricultural and wooded wetland areas.

The mining areas consist of active above and below water sand and gravel excavation areas, processing plant equipment, stockpiles of sand and gravel, a scale and scale house, a shop, and access roads. The agricultural areas on the site property consist of a rotating mix of hay fields and row crops. The remaining wooded areas on the property consist of steeper slopes and wet areas unsuitable for farming and/or mining.

The surrounding area is predominantly farmland with scattered residential homes. Drainage is poorly developed, and vegetation consists of farm crops interspersed with woods on slopes and wet areas unsuitable for farming.

Agriculture is the dominant land use in the town and surrounding areas. According to the Town of Barre Comprehensive Plan, approximately 56% of the Town of Barre or 19,500 acres is classified as agricultural use (**Table 9**) and the USDA Census of Agriculture lists 129,573 acres of land being farmed in Orleans County (**Figure 21**).

4.1.2 Potential Environmental Impacts

The proposal will convert a 99.7-acre portion of the 250.6-acre Life of Mine area from sand and gravel mining to consolidated bedrock excavation by mining deeper within the previously mined areas. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the permanent conversion of land that has previously been used for sand and gravel mining and agriculture into open space/water reclamation. A 94-acre portion of the project property and approximately 28 acres of proposed bedrock excavation area is within Orleans County Agricultural District #2 as shown on **Figure 20**.

The change in land use from agricultural to open space represents a reduction in overall agricultural land-use of approximately one half of one percent in the Town of Barre and less than eight one-hundredths of a percent in Orleans County.

4.1.3 Mitigation Measures

When this proposal is implemented, a nonrenewable resource, dolostone for use as crushed stone aggregate, will be irreversibly and irretrievably committed and is an unavoidable environmental impact. However, the demand for construction aggregates and other stone products has historically remained at a uniformly high level and it is assumed the demand will remain at a similar, if not higher level in the future. If the materials within the project area are not utilized, construction aggregates and other stone products will be obtained from other, more distant sites to meet local demand.

The loss of the farmland acreage is a non-avoidable impact. This impact will gradually occur over the life of the mine. Impacts to agricultural resources will be mitigated by:

1. The creation of approximately 2 billion gallons of water storage, an identified climate change adaptation strategy[7] that could be utilized to address short-term drought and seasonal availability of water for agriculture. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the creation of a permanent large pond that could be used for irrigation to address potential short-term drought and seasonal availability of water for agriculture due to climate change.
2. The quarry will start in the southeastern corner of the consolidated excavation area and gradually increase in size over decades. Farming will continue in the unaffected areas as long as practicable.
3. Reclamation of the current sand and gravel mining areas outside of the quarry excavation area to agricultural use. See Section 3.2.1 for reclamation details and timeframes.

Impact to the available agricultural lands in the Town and County is minimal and no mitigation is necessary.

4.2 WATER RESOURCES

The hydrogeology of the Eagle Harbor site is comprised of surface water, the unconsolidated aquifer (or water table aquifer), and the bedrock aquifer. The surface water at the site is locally perched, or semi-perched, and typified by shallow ponds and wetlands. Some ponds are the result of past excavation into the water table.

These surficial and groundwater resources were studied by Alpha Geoscience and their detailed findings are included in the Hydrogeologic Analysis of the Eagle Harbor Aggregate Mine of Eagle Harbor Sand & Gravel, Inc., included as Appendix 5 and described in the following sections.

4.2.1 Surface Water / Wetlands

4.2.1.1 Existing Conditions

The Eagle Harbor site is an active sand and gravel mine that contains numerous wash water and settling ponds as well as other man-made ponds created from historic excavation activities. The existing surface water conditions were determined through a combination of GPS and drone surveys, water level monitoring using shallow wells, staff

[7] From *Agriculture & Climate Change Adaptation: A Role for Communities* webinar by NYSDEC Office of Climate Change, NYS Climate Smart Communities and Cornell University, December 7, 2017.

gauges and flowmeters, and using existing public data including high resolution orthophotos, soils maps, LiDAR and GIS datasets. The locations of the staff gauges (SG-#) and monitoring wells (MW-#) are shown on the Mining Plan Map, included in Appendix 3 and provided as **Figure 3**.

The surface water at the site is locally perched, or semi-perched, and typified by shallow ponds and wetlands. The existing on-site surface water features generally drain from south to north and are shown on the Mining Plan Map, included in Appendix 3 and provided as **Figure 3**.

4.2.1.1.1 Drainage

Surface water currently leaves the Eagle Harbor property via a culvert beneath Maple Street identified as Outfall 001 on the Mining Plan Map included in Appendix 3 and provided as **Figure 3**. The Maple Street culvert drains into an unnamed stream on the north side of Maple Street. This stream leads northwest to a culvert beneath Kams Road, joins Otter Creek approximately 1.1 miles north of the site and ultimately enters the Albion Reservoir Number Two as shown on the Drainage Map included in Appendix 5 and provided as **Figure 9**.

The computer software model, HydroCAD, was used to model the existing drainage system to see if the flow capacity was exceeded during various precipitation events. Detailed findings of the hydrologic modeling are included in the Composite Hydrogeologic Assessment, included as Appendix 5 and described below.

The HydroCAD model indicated that the first of two downstream culverts (indicated as 4P/5P on **Figure 11**) currently undersized for the existing flow. These culverts are in a series and are located near the edge of a cultivated field, and just beyond (north of) the edge of the woods north of the quarry**.** The culverts run beneath parallel dirt/gravel field access roads.

The model indicated that flow currently overtops the first access road during 25-yr, or greater, storm events. The flooding that occurs during these events is restricted to the wooded wetland area west of Kams Rd, between Kams Rd and the edge of the field (and south of the two culverts). The model indicates that flooding does not, and will not, occur in the cultivated field downstream of the culverts during these events because the engineered swale that runs through the field is sufficient to contain the flow.

4.2.1.1.2 Wetlands

There are no NYSDEC regulated wetlands or adjacent areas within the modification area or the project property. There are no Federal jurisdictional wetlands within the modification area. There are potential Federal jurisdictional wetlands located to the southeast, east, northeast and north of the modification area. A Federal Jurisdictional Determination was not requested from the US Army CORP of Engineers since these potential wetlands are well outside the proposal area.

As discussed in Section 4.1.1.1.1, muck soils exist in topographically low areas to the north and southeast of the proposed quarry, well outside the proposed quarry area. These areas are indicated as wetlands on the US Fish & Wildlife Service's National Wetland Inventory (NWI) website and are identified by the NYSDEC as State-regulated wetlands KN-13 and KN-9, respectively. Identification of these areas as wetlands is consistent with the soils being described as having ground water near or at the surface for extended periods of time during the year. Both the southeastern and northern wetlands are beyond the life of mine.

The northern boundary of KN-9, located southeast of the quarry, was delineated by North Country Ecological Services to determine their proximity to the proposed expansion area. The Wetland Delineation Report is included as Appendix 8 and the map of the delineated wetlands is provided as **Figure 10**. Most of this wetland is mapped in Bradford et al. (1977) as the Carlisle Muck, which is indicated to be poorly drained and underlain by silt. The silt layer is likely a lacustrine deposit and limits, or retards, percolation. The southeastern wetland drains toward the south.

There are several open, shallow ponds in the northeastern part of the site and within the Life of Mine that all drain toward the Maple Street culvert to the north. Some of these ponds are water table ponds and are the result of historic mining; however, others are situated on Palms Muck soil (**Figure 6)**, which can hold water and restrict infiltration to the water table. The Hydrogeologic Analysis determined that the water table discharges locally to these ponded areas during the spring and discharges further north during the rest of the year.

Wetland KN-13 is located north of Maple Street and west of Kams Road. This wetland is over 800 ft to the north of the expansion area. It is situated primarily on Lamson Soils and Fredon Loam (**Figure 12**). The outflow from the culvert at Maple Street turns northward as it nears this wetland west of Kams Road (**Figure 9**). The outflow ditch provides some recharge to wetland KN-13 on a seasonal basis during times of low water table conditions. Portions of ephemeral wetland KN-13 likely drain toward the ditch during high water table

conditions. The approximate southern boundary of this wetland based on the topographic slope break and the mapped soil types is shown on **Figure 12**.

An additional wetland, KN-12, is located over 2500 feet northeast of the proposed quarry (**Figure 9**). A southward flowing, man-made drainage ditch runs through KN-12 and joins a westward flowing ditch, which crosses Kams Rd and joins the drainage from the mine outfall, approximately 2300 ft north of the proposed quarry. Both ditches are oversized, engineered swales that convey the flow through an agricultural field.

4.2.1.2 Potential Environmental Impacts

4.2.1.2.1 Drainage

The proposed quarry will need to be dewatered to maintain dry working conditions and the pumpout will be conveyed and discharged off-site through Outfall 001 (**Figure 3**). Potential drainage impacts related to the quarry pumpout include increased flow to downstream drainage systems.

The proposal will not alter the established surface drainage patterns of the site. Precipitation that falls on the site either percolates downward or migrates northward where it drains off-site north through the Maple Street culvert. As the quarry is developed and expands the precipitation runoff that used to percolate and/or run-off will now collect in the quarry and flow generally to the south and southeast into a sump, which will be excavated and maintained near the southeastern corner of the mine in the initial quarry excavation area (**Figure 3**). The collected water will be pumped out of the sump to a planned ditch that will convey the stormwater to the north. The ditch will lead to a planned sediment basin to allow suspended sediment to settle out. The water will exit the sediment basin and flow northward in another ditch. The water will then pass through two serially located, existing, ponded areas just as much of the runoff does today. The water will flow from the northern pond approximately 200 feet to Outfall 001 along the same route as exists today. Outfall 001 discharges to a ditch north of Maple Street. The ditch is an unnamed tributary of Otter Creek, which is approximately 1.8 miles north-northeast of Outfall 001 (**Figure 9**). Otter Creek is not an impaired waterway on the Clean Water Act, Section 303(d) list of impaired waters. The described onsite stormwater flow path and the discharge flow path from Outfall 001 to Otter Creek are indicated on **Figure 9**. Berms around the proposed sediment basin will keep runoff from Drainage Area 3 from entering the sediment basin.

The pumping system will have the capacity to pump 700 gpm from the sump to keep the quarry floor dry. The computer software model HydroCAD was used to assess the potential

impact that the proposed additional mine discharge could have on downstream flooding during various precipitation events under the worst-case full buildout situation. Alpha prepared a separate report entitled "Hydrologic Modelling of the Proposed Eagle Harbor Mine Discharge (Revised)" to discuss the methods and results of the hydrologic modelling. The report is provided with the Hydrogeologic Assessment Paperwork in Appendix 5 and discussed below.

The results of the HydroCAD model indicated that for a 5-year return storm event, the additional flow through the northeast wetland to Outfall 001 created by the hypothetical 700 gpm (1.56 cfs) quarry discharge would represent less than 10% of the total flow to the culvert. The outflow from the culvert is controlled by the size of the culvert and the available storage within the northeast wetland area. For greater return period storms with greater precipitation, the quarry discharge represents an even smaller percentage of the flow directed to the culvert. This relationship continues downstream with the quarry discharge making up a smaller and smaller percentage of the flow through successive culverts as the overall drainage area increases.

The HydroCAD model analysis determined that the first of two downstream culverts is currently undersized for the existing flow, as well as the future flow that includes the quarry discharge. As discussed in Section 4.2.1.1.1, these two culverts are located near the edge of a cultivated field, and just beyond (north of) the edge of the woods north of the quarry. The culverts run beneath parallel dirt/gravel field access roads. The model indicated that flow currently overtops the first access road during the 25-yr, or greater, storm events. The flooding that occurs during these events is restricted to the wooded wetland area west of Kams Rd, between Kams Rd and the edge of the field (and south of the two culverts). The model indicates that flooding does not, and will not, occur in the cultivated field downstream of the culverts during these events because the engineered swale that runs through the field is sufficient to contain the flow. The contribution of the mine discharge to the 25-yr or greater storm event is approximately 4%, or less, which is negligible compared to the natural runoff already occurring during the 25-yr storm event.

As discussed in Section 4.2.1.3, the overtopping the access road along the edge of the field can readily be addressed by modifying the upstream culvert at the edge of the farmer's field.

4.2.1.2.2 Wetlands

There are no NYSDEC regulated wetlands or adjacent areas within the modification area or the project property. There are no Federal jurisdictional wetlands within the modification area. There are potential Federal jurisdictional wetlands, outside the

proposal area, which have a potential to be impacted due to changes in surficial drainage: (1) southeast of the expansion area, (2) east and northeast of the expansion area and (3) north of Maple Street. There are no NYSDEC regulated wetlands or adjacent areas that have a potential to be impacted due to changes in drainage, therefore a NYSDEC Freshwater Wetlands Permit is not required.

As shown on **Figure 11,** KN-9, the NYSDEC wetlands located southeast of the expansion area are located within an entirely separate drainage area and will not experience a change in surface runoff due to the modification proposal. In addition, no drainage or water pumped from the quarry will enter this wetland; therefore, no impacts related to changes in surface drainage are expected.

The open, shallow ponds located in the northeastern part of the site and within the Life of Mine all drain toward the Maple Street culvert to the north. Some of these ponds are water table ponds and are the result of historic mining; however, others are situated on Palms Muck soil (**Figure 6)**, which can hold water and restrict infiltration to the water table. Water pumped from the quarry will enter a ditch that leads into a sediment basin prior to being discharged to one of the historically mined ponds on the west side of this wetland. The operator will have the ability to divert the discharge water to refill the adjacent settling ponds using the discharge water from the drainage ditch. The water from this pond will continue to flow toward Outfall 001 as it currently does. These ponds are expected to experience an increase in surface water, which will largely offset any drawdown impacts experienced from the quarry, see Section 4.2.2.2 for additional information on potential drawdown impacts.

The second NYSDEC wetland located in the proximity to the site, KN-13, north of Maple Street and west of Kams Road. As shown on **Figure 9,** this wetland is over 800 ft to the north of the expansion area and is located within an entirely separate drainage area and will not experience a change in surface runoff due to the modification proposal; therefore, no impacts related to changes in surface drainage are expected.

An additional wetland, KN-12, is located over 2500 feet northeast of the proposed quarry (**Figure 9**). A southward flowing, man-made drainage ditch runs through KN-12 and joins a westward flowing ditch, which crosses Kams Rd and joins the drainage from the mine outfall, approximately 2300 ft north of the proposed quarry. This wetland is located up gradient from the project property drainage route and in a separate drainage area; therefore, no impacts related to changes in surface drainage are expected.

4.2.1.3 Mitigation Measures

Surface runoff will be progressively intercepted by the slowly expanding quarry, drained internally to the quarry sump and pumped out into a series of ditches and ponds, ultimately discharging at Outfall 001.

Potential surface runoff impacts have been identified at the existing downstream culvert at the edge of the farm field which is currently too small to handle a 25-year storm event.

The issue of the storm water overtopping the access road along the edge of the field will be mitigated by modifying the culvert at the edge of the cultivated field. The HydroCAD modeling indicates that the overtopping issue during storm events could be eliminated by replacing the existing 16-inch diameter upstream culvert at the edge of the farm with two, side-by-side, 18-inch diameter culverts or a single 24-inch culvert.

The model indicates that the 100-yr storm event results in a 0.22-ft increase in water level in the wooded area, even with the modified culvert. The sediment basin with a weir/check dam, the ditch leading to the sediment basin, and the ability of the operator to divert discharge water to the settling ponds will offset the 0.22 ft rise in water level in the wooded area south of the access road during the 100-yr storm event due to the time delay for the quarry discharge to reach the outfall and subsequent culverts.

4.2.2 Groundwater

4.2.2.1 Existing Conditions

There are two water yielding aquifers at the Eagle Harbor site: an upper unconsolidated sand and gravel aquifer and a lower dolostone bedrock aquifer. Seasonal water level data was collected from wells and staff gauges within and adjacent to the Eagle Harbor site to assess the relationship between the surficial aquifer and the bedrock aquifer and determine ground water flow patterns.

4.2.2.1.1 Surficial Aquifer

The water table aquifer, or surficial aquifer, occurs within the unconsolidated sand and gravel deposits at the site. The surficial aquifer is recharged via direct precipitation on the sand and gravel. The depth to water in the surficial aquifer ranges from several feet to over 30 ft at the site and shows seasonal fluctuations of several feet.

A ground water elevation contour map was constructed from the seasonal low ground water elevations for wells that are screened in the water table aquifer (**Figure 13**). It is

during the natural, seasonal low water level conditions when residential wells potentially would be most vulnerable to water level decline due to quarry dewatering. Ground water within the modification area flows northeasterly, from the areas of high water-level elevations toward low water-level elevations perpendicular to the ground water elevation contours. The water table configuration and ground water flow direction during the seasonal high water table conditions is similar to the seasonal low, with flow directed northeast, except the water table is several feet higher during the seasonal high than during the seasonal low.

4.2.2.1.2 Bedrock Aquifer

The bedrock aquifer occurs within the consolidated bedrock below the surficial aquifer. The fracture logs in the Hydrogeologic Assessment paperwork included as Appendix 5 indicate that primary water-bearing fractures occur in the dolostones, with infrequent natural fractures in the uppermost Rochester Shale; consequently, the Rochester Shale can be considered the base of the bedrock aquifer at the site. The bedrock aquifer receives most of its recharge from the overlying sand and gravel aquifer where it is in contact with the bedrock; discontinuous or patchy silty/clayey layers occur in some areas and can limit, or retard, recharge and result in a confined, or semi-confined aquifer bedrock aquifer.

A ground water elevation contour map was constructed from the seasonal low ground water elevations for wells that are open within the bedrock aquifer (**Figure 14**). The map actually represents a potentiometric surface, which is the level to which water in a confined, or semiconfined, aquifer rises when tapped by wells. Water in the bedrock wells at the Eagle Harbor site rises to a level above the bedrock surface, but it does not rise above the water table. This condition indicates a downward vertical hydraulic gradient wherein the sand and gravel aquifer drains downward into (recharges) the bedrock aquifer. The downward vertical gradient at the Eagle Harbor site lessens to the north and northeast at the site; this is consistent with the interpretation that the discharge zone for the bedrock aquifer at the site is north of the site.

Long term water level monitoring indicates that the seasonal low for the bedrock aquifer occurs during the autumn months, just as it does for the surficial aquifer. The ground water flow direction within the bedrock aquifer is toward the northeast from the areas of high water-level elevations toward low water-level elevations perpendicular to the ground water elevation contours as shown on **Figure 14**. The water table configuration and ground water flow direction during the seasonal high water-level conditions is similar to the seasonal low, with flow directed northeast, except the water levels are three to five feet higher during the seasonal high than during the seasonal low.

A ground water divide is evident in the bedrock aquifer ground water elevation contours near the southern side of the site and in the area of the local topographic high. North of the divide, the northerly ground water flow direction is consistent with the overall pattern of stream flow north of the site. South of the divide, the southwesterly flow direction is also consistent with the south-southwestern flowing streams that occur southwest of the site.

4.2.2.2 Potential Environmental Impacts

The potential impact of the proposed quarry on nearby residential wells and wetlands was evaluated by analyzing seasonal water level data from wells and staff gauges located within and adjacent to the Eagle Harbor mine as well as using data collected from the pumping test, assessing the relationship between the surficial aquifer and the bedrock aquifer, and determining ground water flow patterns.

A comprehensive well survey/inventory was conducted at all residents that granted permission within the area of influence of the proposed quarry; the results are provided in Appendix 5 and the location of the wells in the survey are shown on **Figure 19**.

The well survey determined that:

1. Most of the water supply wells in the area are completed in bedrock because the water in the overburden aquifer is of poor quality.

2. The Town of Barre has installed municipal water supply lines on Maple Street (north of the site), Pine Hill Road (west of the site) and Kams Road (north-northeast of the site). All of the residences within the predicted water table drawdown area, except for the residence at 4764 Pine Hill Road, are now on municipal water.

4.2.2.2.1 Surficial Aquifer

To determine the future conditions of the surficial aquifer during the full buildout final phase of mining, the Hydrogeologic Assessment conservatively assumed that the surficial aquifer will be drawn down to the top of the bedrock at the edge of the quarry, and that the future water table will slope upward and outward from the quarry edge until it merges with the existing water table or encounters a recharge boundary condition. The slope of the water table outward from the edge of the quarry was approximated using the slope of the impacted water table from the pumping test.

To determine the potential impact, the surficial aquifer ground water contour maps for the existing conditions (**Figure 13**) and future conditions (**Figure 15**) were compared and a drawdown contour map was created based on the difference in ground water elevation contours between the two maps. The water table drawdown contour map is included as **Figure 16**. The map shows that the lateral extent of drawdown within the surficial aquifer at the final full buildout stage of the mine is predicted to be greatest to the west of the mine, with drawdown impacts extending as far as 1950 ft. Drawdown at the quarry edge ranges from approximately 20 to 35 feet. The magnitude of the drawdown depends on the bedrock elevation and the elevation of the existing water table.

Potential Impacts to Wells

The four known surficial aquifer wells along Pine Hill Rd southwest of the mine could experience drawdowns of between five and 18 feet by the end of full mine buildout (**Figure 16**). There are two wells in the well survey for which there is no information available because the homeowners opted not to respond. If these two wells are tapping the surficial aquifer, they could experience between five and 10 feet of drawdown by the end of full mine buildout, decades from now.

Figure 16 also shows three wells further south on Pine Hill Rd that are at the limit of the lateral extent of surficial aquifer drawdown impact. These three wells were not included in the residential well survey; however, these wells would experience a negligible drawdown impact of less than a foot if they are tapping the surficial aquifer (and zero impact if they are bedrock wells) but only at the end of mining, at full buildout of the quarry, decades from now.

Potential Impacts to Wetlands

The ponds to the east of the proposed quarry (and within the LOM), will create a recharge boundary condition beyond which the water table will experience no drawdown because the pond level will be maintained in order to supply water for the wash plant.

The historically mined wet areas and ponds in the northeast will be maintained by the quarry discharge which will be routed through that area on its way to the Maple St. culvert outlet. There may be some recycling of water if there is a good connection between the bedrock fracture system and the overlying surficial sediments underneath these areas.

The water then leaving the site via the Maple St. culvert will flow westward along a ditch and then through the wetland north of the site (**Figure 9**); consequently, it is assumed that the northern wetland will also act as a recharge boundary.

Wetland KN-9

Wetland KN-9, which is southeast of the proposed quarry, is underlain by Carlisle and Palms muck soils, which are poorly drained and underlain by lacustrine silt, which limits, or retards, percolation. The presence of the muck soil and underlying silt was confirmed by test pit observations and the results of laboratory sieve analyses that were performed on soil samples from the test pits.

The results of the pumping test (Appendix 4) indicated negligible, if any, impact in response to pumping at approximately 300 gpm from bedrock well PW-1 for 72 hours.

The conclusion that Wetland KN-9 will not be impacted by the drawdown from the quarry is consistent with observations at the Shelby Crushed Stone Quarry Stone Quarry (Shelby), which is a sister company to Eagle Harbor located west of the proposed Eagle Harbor Quarry. At Shelby, there is a large wetland (MD-9) located approximately 100 feet south of the southern quarry highwall (by comparison, wetland KN-9 will be over 400 feet from the Eagle Harbor quarry highwall). The Soil Survey maps the Shelby wetland MD-9 as being the Carlisle Muck, just like at Eagle Harbor. Seepage is observed approximately halfway up the face on the southern highwall, approximately 100 feet north of the wetland. The wetland continues to be wet and mucky with no observable impact related to the drawdown at the quarry. It is reasonable to conclude that the relationship between the proposed Eagle Harbor quarry and wetland KN-9 will be similar to that currently witnessed at Shelby.

As outlined in the *Site Monitoring, Complaint Response and Mitigation Plan,* included as **Appendix 5**, EHS&G will continue to monitor and report water levels in and around this wetland. If directed to by the NYSDEC, EHS&G has the ability to divert clean water from the onsite ponds to wetland KN-9 to maintain the integrity of the wetland.

Wetland KN-13

Wetland KN-13 is approximately 900 feet north of the proposed quarry. Wetland KN-13 exists in the topographically low area north of Maple Street and consists primarily of Fredon Loam and Lamson very fine sandy loam. Lamson soils are poorly to very poorly drained. Deeper, undisturbed soil within the Lamson soils exhibit varved textures with thin layers of material ranging from very fine sand to silty clay loam. These deeper, varved portions of the Lamson soil limit, or retard, percolation, causing the wetland to be perched, or semi-perched, above the water table.

The quarry discharge will flow offsite via the Maple Street culvert. The receiving ditch on the north side of Maple Street flows westward through a culvert beneath Kams Road and then turns northward as it nears wetland KN-13 (**Figure 9**). The ditch provides some recharge to wetland KN-13 on a seasonal basis during times of low water table conditions. Portions of ephemeral wetland KN-13 drain toward the ditch during high water table conditions.

The southern edge of Wetland KN-13 is near the edge of the anticipated drawdown impact of the surficial aquifer. With similar soils to wetland KN-9, it is not anticipated that the drawdown of the surficial aquifer will impact Wetland KN-13. The increased flow in the outfall ditch will likely recharge the wetland KN-13 and offset any negligible drawdown that may occur.

During flooding situations, the onsite sediment basin will have a weir/check-dam system in place so that water can be retained for a while if necessary. EHS&G can also divert some water from quarry discharge to the onsite freshwater ponds until the flood stage returns to normal.

Wetland KN-12

KN-12 is completely separated from KN-13 and is over 2500 feet northeast of the proposed quarry. Wetland KN-12 is well beyond any potential drawdown impacts from the proposed quarry.

4.2.2.2.2 Bedrock Aquifer

To determine the future conditions of the bedrock aquifer during the full buildout, final phase of mining, the Hydrogeologic Assessment interpreted that the base of the aquifer was defined by the deepest fractures associated with the aquifer and that the ground water cannot be drawn down lower than the base of the aquifer. The vast majority of water-bearing fractures that were observed in the core were in the dolostones above the Rochester Shale.

The maximum drawdown was based on the premise that ground water will enter the mine through a seepage face on the quarry wall that extends upward from the aquifer base. The predicted seepage face around the quarry walls is anticipated to be approximately one third the vertical distance between the base of the aquifer and the elevation of the existing potentiometric surface. This is a conservative estimate because seepage is often seen coming from quarry faces at elevations higher than one third the way up the wall. The effect of this is that the maximum drawdown, and the extent of drawdown away from the mine, likely would be less than predicted herein. The gradient of the potentiometric surface is assumed to be steeper close to the quarry walls and flatten with distance away from the quarry until it approaches and merges with the original potentiometric surface.

The slope of the potentiometric surface from that map was used for the first 100 feet outward from the quarry wall seepage face. The drawdown curve from the February 2020 pumping test (included in Appendix 5) was used to project the bedrock aquifer potentiometric surface outward beyond 100 ft until the future potentiometric surface merged with the existing potentiometric surface (**Figure 17**). The bedrock aquifer ground water contour map from the Hydrogologic Analysis (**Figure 14**) was used to represent existing conditions, rather than the February 2020 map in the Pumping Test Report because the autumn water levels of 2016 were several feet lower than the winter water levels of 2020. To determine the potential impact, the bedrock aquifer

ground water contour maps for the existing conditions (**Figure 14**) and future conditions (**Figure 17**) were compared and a drawdown contour map was created based on the difference in ground water elevation contours between the two maps. The water table drawdown contour map is included as **Figure 18**. The use of the most conservative drawdown curve coupled with the most conservative water table represents a worst-case scenario for drawdown impacts in the bedrock aquifer to be evaluated.

Potential Impacts to Wells

The drawdown contour map shows that the lateral extent of drawdown within the bedrock aquifer at full buildout of the mine is predicted to be greatest to the west of the mine, with drawdown impacts extending as far as 1900 ft.

Figure 19 shows all of the water supply wells within the area of influence of the proposed quarry. All of these wells were covered by the residential well survey and their locations and well data are included with the with the Hydrogeologic Assessment paperwork in Appendix 5.

The three known bedrock wells west of the site could experience between 10 and 20 feet of drawdown by the end of full mine buildout (**Figure 18**). The aquifer being tapped is unknown for two of the wells that are located further south on Pine Hill Rd. These wells are at the edge of the lateral extent of drawdown impact (**Figure 19**). No information pertaining to the aquifer these wells are tapping is available because the homeowners chose not to respond to the well survey (See the June 6, 2019 NOIA Response – Table 1 and Figure 1 included in Appendix 5).

If these two wells are bedrock wells, they could experience a negligible drawdown of less than a foot by the time of full buildout of the mine. All but one of the residences along Pine Hill Rd west of the mine have been connected to the public water supply and no longer rely upon their wells as primary water sources. The well at 4764 Pine Hill Rd is the only known bedrock well west of Pine Hill Rd on Figure 4.

Figure 18 indicates that the bedrock well at on Maple St, north of the mine, could experience five to 10 feet of drawdown at full buildout of the quarry. The Maple St well (13303 Maple St) had a very strong sulfur odor that was noted during the residential well survey conducted in 2019 and the owner reported his dissatisfaction with the well water, along with his eagerness to have his residence hooked up to the public water supply line. The residence at 13303 Maple St has since been connected to the public water supply line.

There are no bedrock wells south or east of the mine within the zone of drawdown impact.

4.2.2.3 Mitigation Measures

All but one of the residences within the potential groundwater drawdown zone have been connected to the public water supply and no longer rely upon their wells as primary water sources. As outlined in the *Site Monitoring, Complaint Response and Mitigation Plan,* included as **Appendix 5**, EHS&G will conduct additional well surveys out to one half mile from the quarry excavation area prior to the commencement of quarry dewatering activies. EHS&G proposes the following water well mitigation measures:

A Residential Water Supply Agreement will be incorporated as a permit condition. The following permit condition is proposed:

PERMIT CONDITION: Residential Well Supply Agreement

5. In the event that an off-site property owner makes a claim of a loss of quality or quantity of water supply due to a blasting event or mining activities, the permittee shall investigate and determine whether or not the loss is well system related (pump, pressure tank, plumbing, etc..). The initial investigation will be conducted within five (5) business days of the claim.
6. If it is determined that the loss of quality or quantity is not well system related, or more than five (5) business days have passed without an initial investigation being conducted, the permittee shall:
    a. Immediately provide the property owner with a temporary potable residential water supply that meets NYSDOH quality and quantity standards for residential drinking water. This temporary potable water supply shall continue for as long as NYSDEC determines it is necessary or a permanent replacement potable supply is established pursuant to paragraph 2b. or 3 below.
    b. Notify the NYSDEC Regional Permit Administrator;
    c. Investigate the loss claim with the cooperation of the property owner and provide NYSDEC with a written report within 30 days of the property owner claim. The permittee reserves the right to deepen the existing well, drill a replacement well for the property owner, or hookup the residence to public water supply, all at the permittee's expense, rather than supplying the property owner with a temporary potable water supply.
7. If NYSDEC determines that blasting or mining is likely to be a contributing cause of the alleged loss of quality or quantity of water supply, then under the direction of NYSDEC staff (including the setting of deadlines) the permittee shall take immediate steps to correct the problem and to restore a potable residential water supply meeting NYSDOH quality and quantity standards for residential drinking water supply. Subject to approval by NYSDEC, the means of water supply restoration will be at the permittee's expense and can include, but is not limited to, repairing the water supply well, deepening the well, drilling a new well, hooking up the residence to the public water supply, or providing an alternate water supply.
8. If NYSDEC determines that blasting or mining is not a contributing cause of the alleged loss of quality or quantity of water supply, NYSDEC will provide written notification of its findings to both the permittee and the well owner and there shall be no further obligation by the permittee. All substantiated complaints and a summary of the response actions taken will be reported to the NYSDEC in the annual report.

The following measures will be incorporated to mitigate potential pollution impacts to groundwater:

- Vehicles will be kept in good repair and will be checked regularly for leaking hydrocarbon products.

- The spill prevention measures currently in place will continue to be implemented.
- Containment structures for fuel tanks will be employed as applicable.
- No solid or liquid wastes will be disposed of at the project site. All refuse generated at the project site will be transported off-site disposal.

4.2.2.3.1 Mitigation Considered but Not Proposed

Different setbacks were considered during the design phase of the quarry and the currently proposed design represents a reduction from the potential quarry plans. Additional setbacks would mean that less land would be excavated and that the potential to affect any subsurface groundwater conditions would be lessened. The size reduction would decrease the cone of influence created by dewatering the quarry, roughly proportional to the change in setbacks. A quarry size reduction would logically occur along the west and northern portions of the quarry modification area and therefore would lessen but not eliminate drawdown impact upon that area. However, since public water lines service all but one of the nearby residents, and that the existing proposed setbacks were established to limit the cone of depression to minimize the potential impacts if the residences were not utilizing municipal water, increasing the setbacks further would have very limited benefits. Further, any impacts to wells will be fully mitigated by the proposed *Site Monitoring, Complaint Response and Mitigation Plan*.

4.3 AIR RESOURCES

4.3.1.1 Existing Conditions

This property was originally mined by Bennett in the 1960's and the EHS&G Mine has been a supplier of high-quality sand and gravel aggregates to Orleans County and surrounding regions since the mid-1970's. Eagle Harbor is currently approved by NYSDEC to mine sand and gravel from a 250.6+/- acre Life of Mine area situated on a 300+/- acre parcel.

Existing impacts to air resources include greenhouse gas (GHG) emissions and particulate matter[8] (PM_{10} and $PM_{2.5}$) sources. Existing air emission sources include mobile mining

[8]"Particulate matter" (PM) is a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles (liquid droplets or solids) over a wide range of sizes. For regulatory purposes, particulate matter has been classified in terms of the particle's aerodynamic diameter. $PM_{2.5}$ is particulate matter with an aerodynamic diameter of 2.5 microns or less. PM_{10}, which is already regulated pursuant to federal and New York's permitting programs, includes all particulate matter with an aerodynamic diameter of 10 microns or less. Thus, PM2.5 is, by definition, a subset of PM_{10}. In general, the term "fine particulate matter" is used to describe $PM_{2.5}$, while "coarse" particulate matter describes particulate matter with an aerodynamic diameter of greater than 2.5 microns and equal to or less than 10 microns (NYSDEC Policy CP-33).

equipment including loaders, trucks, bulldozers and excavators, and the sand and gravel processing plant.

Greenhouse Gas Emissions

The six main GHGs are carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (NYSDEC Greenhouse Gas Policy). Current mining operations at the site generate greenhouse gas emissions from fuel combustion which mainly results in CO_2 and N_2O emissions. Existing sources of the greenhouse gas emissions include loaders, off road haul trucks, bulldozers and excavators.

Particulate Matter

Current mining operations at the site have the potential to generate coarse and fine particulate matter (PM_{10} and $PM_{2.5}$) in the form of fugitive dust and fine particulate matter from fuel combustion. The current mining and processing activities that generate particulate matter include excavation and loading, mobile equipment traffic on haul roads and the processing and stockpiling of the aggregate. Intermittent activities that can generate dust include vegetation and topsoil clearing.

4.3.1.2 Potential Environmental Impacts

Potential impacts to air resources as a result of the proposed modification include new greenhouse gas emissions (point) and new particulate matter sources in the form of diesel combustion (point) and fugitive dust (non-point) sources. The existing mobile equipment, haul roads, processing plant and stockpile area will continue to be used and the new sources of potential air emissions include a rock drill, blasting rock, and a new generator powered portable crushing plant. A copy of the NYSDEC Air Facility Registration paperwork for this proposed modification is included in Appendix 7.

Greenhouse Gas Emissions

Point sources of greenhouse gas emissions common to the mining industry are typically in the form of generators used to supply power to the plants. The portable crushing plant will be powered by diesel generators. The processing will operate under a New York State Department of Environmental Conservation Air Facility Registration Certificate in accordance with 6 NYCRR Part 201-4. The registration will require EHS&G to operate the processing plant in accordance with all applicable Federal and State air pollution control laws and regulations. Point source emissions are regulated by 6 NYCRR Parts 200 (General Provisions), 201 (Permits and Certificates), 212 (General Process), and 227 (Stationary Combustion Installation).

The Air Emissions Summary calculations, included with the Air Facility Registration paperwork and provided in Appendix 7, determined that the annual greenhouse gas emissions Potential to Emit[9] (PTE) from the processing plant were estimated to be 2,890 tons of CO_2 equivalents based on an annual 24-hour 7 days a week production rate of 2,628,000 tons. Actual production, which is driven by marked demand and limited by operating hours, is expected to remain consistent at the current rate of 120,000–140,000 tons/year. Conservatively assuming a production of 150,000 tons/year, the additional greenhouse gas emissions from the portable processing plant would be 165 tons ((150,000 tons/year /2,628,000 tons/year) x 2,890 tons = 165 tons).

Particulate Matter

Emissions from diesel fuel combustion and fugitive dust generated by operations at the site will create a potential for impact to air resources. The additional activities associated with the proposal that can produce particulate matter include drilling, blasting, crushing of the rock and fuel combustion.

Generally non-point sources in mining operations create coarse particulate matter (PM_{10}) that settles quickly and are typically not transported beyond the quarry boundary. Any large particle dust generated quickly settles out of the air or is trapped by the surrounding vegetation. It does not reach potential receptors due to the distance of travel or due to capture.

Fine Sources of fine particulate matter ($PM_{2.5}$) can be generated by either point or non-point sources and elevated levels of $PM_{2.5}$ in the atmosphere have been linked to serious health conditions (NYSDEC CP-33).

Particulate emissions from drilling and blasting can be estimated using published emissions factors (USEPA, March 1990). These factors are determined using the Aerometric Information Retrieval System (AIRS), which is a data system containing "information pertaining to emissions and compliance data of individual facilities, area and mobile source data, and ambient air quality monitoring data" that is administered by the USEPA (USEPA, November 1992). These are worst-case scenario estimates that do not consider the efficiencies of control measures. Conservatively estimating a production of

[9]The term potential to emit means that an emission point with no enforceable restrictions on its hours of operation is allowed to operate 24 hours per day over 365 days per year, or a total of 8,760 hours per year.

150,000 tons of aggregate per year, particulate emissions for drilling are estimated at 0.01 tons of airborne particulate matter that is less than 10 microns in size (PM_{10}). Particulate emissions from blasting are estimated at 16 tons per year (total particulate).

There are also particulate emissions associated with proposed portable plant. Each piece of equipment, including the crusher, screen and conveyors, has its own emissions factor. Particulate emissions from the plant are estimated to be capped[10] at about 0.25 tons $PM_{2.5}$ and 7.79 tons[11] PM_{10} per year based on established emissions factors for the equipment. The emissions calculations can be found at the end of the State Air Facility Registration application in Appendix 7. The individual equipment emission factors as well as the estimated annual PM output for each piece of equipment operating at the plant's capacity on the proposed schedule are detailed in **Table 4**; however, the plant is expected to produce no more than 150,000 tons per year, or approximately 18% of the capped limit presented in the State Air Facility Registration. Only about 0.045 tons of $PM_{2.5}$ (18% of 0.25 tons estimated at the cap limit) would be produced by the plant at 150,000 tons/year.

Particulate emissions from stockpiles depend on the number, placement, and size of the stockpiles, the wind speed and direction, the atmospheric humidity, and the moisture content and particle size of the stockpiled materials. Dust emission estimations for stockpiles are not reliable or useful since there are so many factors, such as the constantly changing stockpiles, which would significantly affect dust production.

NYSDEC's Policy CP-33: Assessing and Mitigating Impacts of Fine Particulate Matter Emissions states that, "[i]f the operation of the proposed project will result in the emission of fine particulate matter above certain de minimis thresholds, Department staff shall require an air quality impact assessment of those emissions in accordance with the terms of this policy." (NYSDEC, 2003). The policy allows for the assessment using the $PM_{2.5}$ fraction where a reasonably accurate measure of the PM2.5 fraction if a source's particulate matter emission is available. If primary PM10 (or accurate measures of PM2.5) emissions from the project are less than 15 tons per year, then according to Policy CP-33, the PM2.5 impacts from the project are insignificant and no further assessment is required.

[10] Processing operations in the EHS&G Air Facility Registration are capped at 2,800 hours/year for compliance, actual processing hours will be much less.

[11] 0.29 tons $PM_{2.5}$ and 8.16 tons PM_{10} including existing processing equipment.

The estimated emissions provided above were based upon a projected production of 150,000 tons per year of aggregate. While this will vary according to market demand, this is a conservatively high estimate based on historic sales of 120,000-140,000 tons/year and the calculations document that $PM_{2.5}$ emissions are well below the DEC Policy CP-33 threshold limits of 15 tons per year. Supporting emissions calculations are provided in Appendix 7 and are summarized on **Table 4.**

4.3.1.3 Mitigation Measures

Greenhouse Gas Emissions

Following the NYSDSEC Program Policy: Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements, these on-site measures will be used to mitigate greenhouse gas emissions from consolidated mining activities:

- EHS&G has contracted with National Grid to determine the feasibility of upgrading electric service at EHS&G from 4.8 kV to 13.2 kV. This will allow EHS&G to switch the proposed portable processing plant from diesel generator power over to line power. This request is being processed under Work Request # 30687960 and is ongoing; the Department will be kept informed of any updates as we go forward.
- The project as proposed represents a redevelopment of an existing site, which minimizes vegetation/forest loss compared to developing a quarry at a greenfield location.
- The post-mining use will restore natural areas on-site as the reclamation objective is grass and open space.

Particulate Matter (PM)

The following methods will be used to mitigate particulate matter from consolidated mining activities:

- Soil overburden and the underlying sand will be removed from the rock prior to blasting.
- Soil overburden is typically stripped during the early winter and spring when soil conditions are not conducive for the generation of large amounts of dust.
- The consolidated extraction area will be surrounded by perimeter faces and berms. Since the most activity at a mine occurs at the bottom of the faces, the overlying benches and berms help screen the activity from the wind, reducing the wind velocity and reducing the potential for dust generation. The overlying benches and berms also help contain any fugitive dust to the site.
- Haul roads within the affected area will be periodically sprayed with water to keep the amount of dust generated by hauling to a minimum.

- Vehicle speed on haul roads is controlled.
- The stone has a natural moisture content that helps bind finer grained particles together and minimize the generation of dust.
- Drills equipped with dust control equipment including a shroud around the ground/drill hole interface and dust collectors will be used.
- All blasting will be conducted and supervised by a certified blaster, ensuring the proper blast design and drilling pattern.
- Dust generated by the processing of rock will be controlled by fog nozzles located at critical points within the processing circuit (such as crusher discharge points and conveyor head pulleys).
- The stockpiled product retains dust control moisture from processing. In addition, the stockpile area will be routinely sprayed down with water when needed to control fugitive dust.

In addition, all conditions in the existing Mined Land Reclamation Permit and Mined Land-Use Plan pertaining to dust suppression will continue to be followed.

These mitigation measures will allow the facility to continue to operate in compliance with current regulations and achieve state and national air quality standards. These dust-generating activities are regulated by New York State under 6 NYCRR Parts 200 (General Provisions), 201 (Permits and Certificates), 212 (General Process Emission Sources), and 422 (Mined Land-Use Plan) of the New York State air pollution regulations contained in Title 6 of the Codes, Rules and Regulations of New York State.

An Air Facility Registration has been prepared for the proposed portable plant and is being submitted as a separate document to the Division of Air Resources of the NYSDEC. A copy of the application and supporting calculations are included in Appendix 7.

4.4 IMPACTS ON AGRICULTURAL RESOURCES

4.4.1 Existing Conditions

Approximately 85.5 acres of land are currently affected by mining activities within the 250.6-acre Life of Mine area. The 300+/- acres parcel that the mine is located on is a mix of mining, agricultural and wooded wetland areas. A 94-acre portion of the project property and approximately 28 acres of proposed bedrock excavation area is within Orleans County Agricultural District #2 as shown on **Figure 20**.

The mining areas consist of active above and below water sand and gravel excavation areas, processing plant equipment, stockpiles of sand and gravel, a scale and scale house, a shop, and access roads. The agricultural areas on the site property consist of a rotating mix of hay fields and row crops. The remaining wooded areas on the property consist of steeper slopes and wet areas unsuitable for farming and/or mining.

The surrounding area is predominantly farmland with scattered residential homes. Drainage is poorly developed, and vegetation consists of farm crops interspersed with woods on slopes and wet areas unsuitable for farming.

Agriculture is the dominant land use in the town and surrounding areas. According to the Town of Barre Comprehensive Plan, approximately 56% of the Town of Barre or 19,500 acres is classified as agricultural use (**Table 9**) and the USDA Census of Agriculture lists 129,573 acres of land being farmed in Orleans County (**Figure 21**).

4.4.2 Potential Environmental Impacts

The proposal will convert a 99.7-acre portion of the 250.6-acre Life of Mine area from sand and gravel mining to consolidated bedrock excavation. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the permanent conversion of land that has previously been used for agriculture into open space/water reclamation. The change in land use from agricultural to open space represents a reduction in overall agricultural land-use of approximately one half of one percent in the Town of Barre and less than eight one-hundredths of a percent in Orleans County.

4.4.3 Mitigation Measures

The loss of the farmland acreage is a non-avoidable impact. This impact will gradually occur over the life of the mine. Impacts to agricultural resources will be mitigated by:

1. The creation of approximately 2 billion gallons of water storage, an identified climate change adaptation strategy[12] that could be utilized to address short-term drought and seasonal availability of water for agriculture. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the creation of a permanent large pond that could be used for irrigation to address potential short-term drought and seasonal availability of water for agriculture due to climate change.

[12] From *Agriculture & Climate Change Adaptation: A Role for Communities* webinar by NYSDEC Office of Climate Change, NYS Climate Smart Communities and Cornell University, December 7, 2017.

2. The quarry will start in the southeastern corner of the consolidated excavation area and gradually increase in size over decades. Farming will continue in the unaffected areas as long as practicable.
3. Reclamation of the current sand and gravel mining areas outside of the quarry excavation area to agricultural use. See Section 3.2.1 for reclamation details and timeframes.

Impact to the available agricultural lands in the Town and County is minimal and no mitigation is necessary.

4.5 IMPACT ON TRAFFIC

4.5.1 Existing Conditions

Current access to the EHS&G mine is via a paved entrance located on the west side of County Route 5/Eagle Harbor Road approximately 2,250 feet south of the intersection with Maple Street as shown on the Mining Plan Map (**Figure 3**).

EHS&G currently sells approximately 120,000 to 140,000 tons of construction aggregate/year to meet local demand. EHS&G estimates the current traffic load on County Route 5/Eagle Harbor Road from EHS&G to average approximately 128 truckloads/week, assuming 21-tons per truckload.

4.5.2 Potential Environmental Impacts

No change to the current site access is proposed and trucks will continue to use the current paved access road located off County Route 5/Eagle Harbor Road. Anticipated annual production at the mine site is not anticipated to change. While there are substantial medium to fine sand reserves remaining in the mine floor, the coarse sand and gravel reserves are almost depleted. EHS&G anticipates that the modification area sand and crushed stone sales will completely replace the existing sand and gravel sales. Once this proposal is granted, EHS&G will start development[13] of the initial quarry area, and it is anticipated that it will take 1-2 years to reach regular production levels. During this development phase there will be a progressive transition from gravel to crushed stone production.

[13] Stripping, removing the overlying sand, construction of the sump and stormwater infrastructure, ramping into the quarry, etc..

Once implemented, the quarry will ultimately operate with a smaller excavation footprint[14] with no net change in production or sales, resulting in no net change in truck traffic volume or truck routes used. Overall production and sales at EHS&G are physically limited by the processing plant, stockpile loadout and the scalehouse.

The overall production at EHS&G is limited by temperature and the overall plant processing capacity. The wash system limits EHS&G from operating the processing plant to when temperatures are above freezing, which is typically April 15th to November 1st. The overall throughput capacity of the plant also limits production. Over the past 17 years the EHS&G plant has averaged 146,538 tons/year operating at 76.4% uptime, which is close to capacity when you factor in downtime for maintenance and repairs. No changes to the wash system or plant capacity are proposed as part of this proposal.

The theoretical maximum number of trucks that could exit the mine site is 24 trucks/hour based on physical limitations with loadout and the scalehouse. Based on past construction season sales EHS&G anticipates actual truck traffic will be closer to 5 trucks/hour. EHS&G does not own or operate any trucks and all truck traffic is, and will continue to be, driven by local construction supply and demand forces.

4.5.3 Mitigation Measures

The following potential impacts are typically assessed and mitigated, as needed, for mining related truck traffic: noise, dust, safety and wear and tear on the infrastructure.

1. **Noise**

There will be no increase in potential noise impacts related to truck traffic as the overall truck traffic volume, delivery routes utilized, and site access location will not change.

2. **Dust and Tracking**

There will be no increase in potential impacts related to dust and tracking from trucks as the overall truck traffic volume, delivery routes utilized, and site access location will not change.

The following mitigation measures will be employed to further mitigate any potential truck related dust generation and tracking:

- EHS&G will maintain the paved entrance from County Route 5/Eagle Harbor Road to the scale to mitigate trackage and dust from vehicle movement.

[14] 99.7 acre quarry area vs. 250.6 acre total Life of Mine.

- EHS&G will post signs to notify truck drivers of tarp laws to mitigate potential material spillage and dust from uncovered loads.
- The paved entrance is swept as often as necessary to control fugitive dust and trackage off-site.
- On road trucks will be restricted to the stockpile area and will not co-mingle with or use the haul roads of the off-road haul trucks to minimize trackage.
- A water truck equipped with spray nozzles will continue to wet down access roads in regular use as needed to control fugitive dust.

3. Safety

There will be no increase in potential impacts related to dust and tracking from trucks as the overall truck traffic volume, delivery routes utilized, and site access location will not change.

The following mitigation measures will be employed to further mitigate any potential safety issues related to truck traffic:

- Overloading of trucks will be avoided by weighing all trucks leaving the site and trimming any loads that are found to be over.
- EHS&G will post signs to notify truck drivers of tarp laws to mitigate potential material spillage from uncovered loads.

4. Wear and Tear on Infrastructure

There will be no increase in wear and tear on the infrastructure from trucks as the overall truck traffic volume, delivery routes utilized, and site access location along County Route 5/Eagle Harbor Road will not change.

4.6 IMPACT ON NOISE AND VIBRATION

4.6.1 Noise

Noise is defined by the New York State Department of Environmental Conservation's Program Policy: Assessing and Mitigating Noise Impacts as: "...any loud, discordant or disagreeable sound or sounds. More commonly, in the environmental context, noise is defined simply as unwanted sound."

4.6.1.1 Noise Background

Audible sound is a physical phenomenon that results when a sound source vibrates in the air at frequencies that the human ear can perceive. Sound travels as longitudinal, or compressional, waves through the air or other media that creates a fluctuation in the atmospheric pressure within the propagating media. These fluctuations in pressure are

the sounds that are heard by the human ear. Sound is characterized by several variables including sound pressure level and frequency.

Sound pressure describes the loudness, or intensity, of sound and is measured in Pascals (PA) and commonly expressed in decibels (dB). The decibel scale is logarithmic because the range of sound intensities that the human ear can detect is so large.

Frequency describes the pitch of sound and is measured in cycles per second or hertz (Hz). Frequency is the rate at which a sound source vibrates, or makes the air vibrate. Most sounds are comprised of many different frequencies each with varying intensity.

The range frequencies that make up sounds dictate how sound reacts with the environment and how we perceive that sound. For example, lower frequency sound, like bass from a car stereo, is affected less by barriers and vegetation than higher frequency sounds. Human hearing, on the other hand, is most sensitive to higher frequency sounds, with the maximum sensitivity at around 2000 Hertz. The human ear sensitivity to frequency gradually falls off at lower and higher frequencies. To account for human perception of sound pressure levels at different frequencies, filters are used that have been weighted for the human ear and are referred to as the "A-weighted" filter and are denoted as dB(A) or dBA.

Because decibels are reported on a logarithmic scale, sound levels from multiple sources are added logarithmically to calculate the combined sound level. For approximation purposes, two sounds with the same sound level intensity and frequency spectrum will increase the overall sound pressure by approximately 3 dB. Combining noise sources where one sound level intensity is less than another will cause an overall increase of less than 3 dB. Once the difference between two sound levels is 10 dB or more the lower intensity sound adds little to nothing to the overall sound level.

4.6.1.2 Noise Attenuation

Attenuation is a reduction in force, value, amount or degree. Sound is attenuated by a number of factors including distance, intervening topography and barriers, atmosphere, soft ground and vegetation. The effectiveness of each type of attenuation is dependent on a number of variables with distance and frequency being two of the principal factors.

1. **Distance Attenuation**

Attenuation of sound over distance follows the inverse-square law which applies when any force or energy is evenly radiated outward from a point source in three-dimensional

space. The sound pressure from a spherical wavefront radiating from a point source decreases by 50% (or 6.02 dB) for every doubling of distance.

2. **Topographic and Barrier Attenuation**

Topography and barriers located between sound sources and the receptors will attenuate sound to varying degrees based on the path length difference of the sound source over a barrier vs. a straight-line distance.

As demonstrated on Table 5, barriers and topography attenuate higher frequency sound more effectively than lower frequency sound based on the path length difference.

3. **Atmospheric Attenuation**

Sound energy is attenuated in air by two major mechanisms:

- Viscous losses due to friction between air molecules, called "classical absorption".
- Relaxational process where sound energy is momentarily absorbed in the air molecules which causes the molecules to vibrate. These molecules then re-radiate sound at a later instant which can partially interfere with the incoming sound.

These mechanisms have been extensively studied, qualified and codified into international standards: ANSI Standard S1.26:1995 and ISO 9613-1:1996.

The Noise Impact Assessment did not factor in atmospheric attenuation to keep the calculations conservative.

4. **Ground Attenuation**

If sound is propagating over ground, attenuation will occur due to acoustic energy losses on reflection. These losses will depend on the surface. Smooth, hard surfaces (like water or pavement) will produce little absorption whereas thick grass may result in sound levels being reduced by up to about 10 dB per 100 meters at 2000 Hz (Aylor 1972 and Wiener and Keast 1959). High frequencies are generally attenuated more than low frequencies.

The Noise Impact Assessment assumed all surfaces were acoustically hard and no ground attenuation was used to keep the calculations conservative.

5. **Attenuation Due to Vegetation**

Vegetation provides attenuation if it lies between the source of the sound and the receptor. The attenuation from vegetation varies by frequency and is generally limited to a maximum reduction of 10 dBA to be conservative.

The Noise Impact Assessment did not factor in attenuation from vegetation to keep the calculations conservative.

4.6.1.3 Noise Impact Assessment Methodology

A full Noise Impact Assessment was prepared for the EHS&G project and is included as Appendix 9. The Noise Impact Assessment compared the maximum potential, or worst-case, sound levels that would be expected under the current and proposed mining scenarios for comparison/assessment purposes.

Two separate operating scenarios were modeled for each receptor location using the formulas identified in the previous section and compared to one another for the Noise Impact Assessment:

1. Existing conditions determined/limited by the current mining permit and
2. Proposed conditions.

A combination of actual Eagle Harbor equipment and equivalent equipment noise source data from operating mine sites were used in the calculations.

Actual mining noise will be less than calculated in the assessment for the following reasons:

1. Berms and stockpiles were not used in the barrier calculations.
2. Only the loudest directional sound level reading for each piece of equipment was used in the calculations in an effort to be conservative.
3. All equipment for each scenario was modeled operating at the same time at the closest potential operating distance to be conservative.
4. Background sound level measurements were not added to the modeled sound levels to be conservative. For example, in a hypothetical scenario, a background sound level of 55 dBA is added to a current sound level of 60 dBA and a proposed sound level of 66.5 dBA. The current sound level would be increased by 1.2 dBA to 61.2 dBA and the proposed sound level would be increased by only 0.3 dBA to 66.8 dBA (a difference of 5.6 dBA vs. 6.5 dBA between current and proposed).
5. The Noise Impact Assessment did not factor in attenuation from vegetation.
6. The Noise Impact Assessment did not factor in atmospheric attenuation.
7. The Noise Impact Assessment assumed all surfaces were acoustically hard and no ground attenuation was used.

4.6.1.4 Existing Conditions

The Eagle Harbor Mine is an active 250+/- acre sand and gravel mine located within a rural agricultural area with few neighbors. Permitted operations include mining above and below the water table and sand and gravel processing.

The mining related sound levels under the existing conditions were calculated by collecting background sound level readings and calculating the mine related noise at each nearby receptor location using the attenuation formulas outlined above.

4.6.1.4.1 Background Sound Levels

Background sound levels (1-hour Leq) were measured at the two locations indicated on the Site Plan Map (**Figure 24**) while the mine was not operating. The background sound levels are 43.7dBA at Location A and 46.2 dBA at Location B, which is consistent with typical rural background sound levels of approximately 45 dB(A).

4.6.1.4.2 Receptor Locations

The five closest neighbors in each general direction from the operation were chosen for the existing conditions assessment; they are identified on the Site Plan Map (**Figure 24**) and are as follows:

R1: Residence N/F of Ernst located approximately 150 feet northwest of the existing Life of Mine.

R2: Residence N/F of Parsons located approximately 150 feet north of the existing Life of Mine.

R3: Residence N/F of Miller located approximately 215 feet east of the existing Life of Mine.

R4: Residence N/F of Babcock located approximately 725 feet southeast of the southeastern corner of the existing Life of Mine.

R5: Residence N/F of Kingdollar located approximately 140 feet west of the existing Life of Mine.

These locations represent the closest receptors in all directions around the mine; existing mining related sound levels from the Eagle Harbor Mine will be less at other, further away receptors.

4.6.1.5 Mining Noise Scenarios

There are two main sources of mining related noise under the existing conditions: mining sand and gravel and processing/sales of sand and gravel.

Mining consists of digging sand and gravel with an excavator, placing the material into dewatering piles, loading dewatered material into haul trucks by a loader and transporting sand and gravel to the hopper. This scenario was modeled separately for each identified receptor as M1 through M5 at the locations shown on the Site Plan Map (**Figure 24**).

Processing occurs at a fixed location in the plant and stockpile area and the noise sources associated with this activity consist of the processing plant and trucks being loaded by the plant loader. This was modeled as Location P at the location shown on the Site Plan Map (**Figure 24**).

4.6.1.5.1 Existing Mining Noise Results

As shown on (**Table 6**) the existing sound levels at the closest receptor locations range from 53.7 to 68.7 dB(A). Detailed calculation sheets are included in the Noise Impact Assessment which is attached as Appendix 9.

4.6.1.6 Potential Environmental Impacts

The mining related sound levels under the proposal were calculated by collecting background sound level readings and calculating the mine related noise at each nearby receptor location using the attenuation formulas outlined above.

4.6.1.6.1 Background Sound Levels

The background sound levels used for the existing conditions were also used to determine the potential noise impacts from the proposal.

4.6.1.6.2 Receptor Locations

The same receptor locations used for the existing conditions were also used to determine the potential noise impacts from the proposal; they are identified on the Site Plan Map (**Figure 24**).

4.6.1.7 Mining Noise Scenarios

Under the modification proposal conditions there will be four main sources of noise:

1. Drilling,
2. Loading of shot rock at the face and hauling to the portable plant,
3. Initial processing at the portable plant and
4. Final processing and sales at the current plant and stockpile area.

Drilling will intermittently occur on top of the rock face, above the mine floor. This intermittent noise source was included in the impact assessment to be conservative. Mining at the face includes loading shot rock into haul trucks for transport to the portable processing plant. The portable plant will be located outside of the active quarry excavation area and the crushed stone will be transported to the existing processing plant for sizing and sales. The existing plant will be used to alternately process sand and gravel

and crushed shot rock so no change will occur as part of the final processing and sales portion of the assessment.

4.6.1.7.1 Proposed Mining Noise Results

As shown on **Table 7** the proposed sound levels at the closest receptor locations range from 48.6 to 58.5 dB(A). Detailed calculation sheets are included in the Noise Impact Assessment which is attached as Appendix 9.

4.6.1.8 Mitigation Measures

As documented in the Nosie Impact Assessment and summarized on **Table 8,** the calculations indicate that potential worst-case sound level increases from consolidated mining activities at all receptors will be less than current conditions or minimal and within the "unnoticed" to "tolerable" range described in the NYSDEC noise policy. This is mainly attributed to the fact that the proposed quarry operations will have increased setbacks from nearby residences and will mainly be within an excavated hole, using the natural topography as additional barrier attenuation.

No mitigation measures are necessary as the calculations indicate that potential sound level increases from consolidated mining activities at all receptors will either be less than current operating conditions or minimal and within the "unnoticed" to "tolerable" range described in the NYSDEC noise policy.

Nevertheless, Eagle Harbor proposes to incorporate the following measures to further minimize off-site noise impacts:

- *A perimeter berm will be constructed around the edge of the active quarry area. This voluntary mitigation measure will further reduce consolidated mining related noise to all off-site receptors above and beyond what was determined in the noise assessment calculations.*

4.6.2 Blasting

Blasting is proposed for the 99.7-acre bedrock excavation area which is located entirely within the current 250.6-acre Life of Mine Area. The proposed bedrock excavation area is located more than 500 feet away from the closest off-site structure, nearly 400 feet away from Maple Street, more than 750 feet away from Pine Hill Road and more than 1,100 away from Eagle harbor Road.

The purpose of mine blasting is to fragment the solid rock so it can be excavated and crushed. Blasting is the most effective and environmentally friendly method of loosening solid rock. Holes are drilled to prescribed depths in a regular pattern, loaded with explosives and covered with crushed stone (stemming). The explosive column is effectively confined by the surrounding rock mass and the stemming and is not comparable to an explosion seen in a Hollywood movie.

Blasting is an expensive process that makes up a significant portion of the overall cost of mining. The vibrations that people might feel at their home during a blast are wasted energy that escaped from the rock mass being blasted. This wasted energy costs the mining company money and consequently, it is in the best financial interests of the miner to reduce off-site blasting vibrations.

Blasting Procedure

Once the overburden has been stripped, the producer and the driller determine the area that will be blasted. The blaster then lays out a location, depth and diameter of holes to be drilled to achieve the desired goal. Each shot is analyzed separately by the blaster depending on influential factors including but not limited to the type of rock, presence of fractures in the rock, the geologic characteristics of the rock, the height of the face, the size of the primary crusher, the type of equipment used to excavate the stone from the shot rock pile, the location of structures relative to the blast, the allowable vibration limits, the presence of seams in the rock and the shape of the face.

All relevant information is assessed by the licensed blaster and incorporated into the blast design to meet the goals of:

- Preventing flyrock.
- Complying with the USBM guidelines.
- Properly fragmenting the rock.
- Properly displacing the rock so that it can readily excavated and
- Minimizing fracturing of the rock face immediately adjacent to the blast.

Typically, the grid pattern will have a burden (distance between rows or a row and the face) and spacing (distance between holes in the same row) ranging from about six feet by six feet for short faces to about 16 feet by 18 feet for tall faces.

The holes will then be drilled in the grid pattern to the depths specified by the blaster. The driller will keep a log of the holes and provide it to the blaster. The blaster will check to ensure the holes were drilled as directed and then schedule a date for the blast.

The frequency of blasts will be dependent on market demand for the product. Blasting will be scheduled based on short term weather forecasts to meet the applicant's market demand. The decision to blast on the scheduled day will be made early in the morning. If strong, low-level thermal inversions or thunderstorms are forecast throughout the day, the blast will be postponed to avoid such adverse weather conditions.

Once the decision to blast has been made, the holes will be cleaned out and loaded with explosives by a team of trained professionals under the direction of the licensed blaster. Each hole will be loaded with explosives and connected by millisecond delays, or equivalent. The blasting team will secure the blast area, sound a warning in a distinctive manner and then detonate the blast. Shot rock will fall to the bottom of the mine face. Once the blast area has been checked, the blaster will provide the "all clear signal" and loadout from the shot rock pile will begin.

All blasts will be monitored using a properly calibrated seismograph to determine compliance with the USBM guidelines. The licensed blaster also uses the monitoring reports to design future blasts. These records will be maintained by the applicant and provided to the Department upon request.

Blasting will be done between 10 a.m. and 5 p.m. Monday through Friday. Blasting will not occur on New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving and Christmas Day.

4.6.2.1 Existing Conditions

The existing mining operation is an unconsolidated sand and gravel mine and blasting is currently not employed as an extraction method.

4.6.2.2 Potential Environmental Impacts

The energy and gas produced by the controlled detonation of the explosives expands outward fragmenting the rock in the immediate vicinity of the drill holes. Quarry blasts are designed to be as efficient as possible so that most of the energy and gases are used up in breaking the rock in the blast area. The excess vibrations that leave the blast area have the potential to create an environmental impact; excess energy leaving the blast area through the ground are called ground vibration; those leaving through the air are referred to as air overpressure.

Potential impacts from blasting include those caused by vibration and air overpressure. All potential impacts from blasting at the Eagle Harbor Mine were evaluated in detail in

the Blasting Impact Assessment report included in Appendix 10 and are summarized below.

4.6.2.2.1 Blasting Noise

Air overpressure is measured by the microphone component of a seismograph and is usually measured in psi and reported as decibels (dB). Many people mistakenly compare the dB reading for air overpressure and a steady state community sound level. The human ear is sensitive to particular frequencies of sound, typically in the range from 15 to 16,000 hertz for a young person with normal hearing. Sound meters that measure community sounds filter out those frequencies that the human ear does not hear. The microphone used to measure air overpressure measures all frequencies, including those outside of the normal hearing range.

Most of the air overpressure occurs at frequencies below the normal human hearing range of 15 hertz. Consequently, air overpressure is not a significant source of noise.

The United States Bureau of Mines (USBM), formerly part of the United States Department of the Interior, undertook extensive research to determine the vibration levels that begin to cause damage. Based on the results of thousands of blasts in a wide range of geologic settings and laboratory tests simulating decades of blasting, the USBM developed guidelines intended to prevent cosmetic damage to the weakest building materials. These guidelines for ground vibration (Siskind et al., 1980b) and air overpressure (Siskind et al., 1980a) were presented in two landmark publications.

The USBM research indicates that the glass in windows is the building material most susceptible to air overpressure. A properly installed window can withstand an air overpressure of 151 dB. The USBM guidelines were set much lower and vary from 129-134 dB depending on the measuring system used.

The limits shown above have been the industry standard since the 1980's and have been found to be effective in preventing blasting damage from air overpressure. Compliance with these limits is routinely required in NYSDEC Mined Land Reclamation permits. All blasts at the Eagle Harbor Mine will be designed and implemented so that these limits are not exceeded at any offsite structure.

4.6.2.2.2 Blasting Vibrations

The USBM guidelines for ground vibration were developed to prevent cosmetic damage to the building material most susceptible to ground vibration. The USBM research indicated that plaster and gypsum wallboard are the first materials to show evidence of damage.

The USBM defined cosmetic damage as the opening of new hairline cracks or the widening of existing cracks.

Research has shown that ground vibration levels many times higher than the limits developed by the USBM do not damage other building materials such as concrete. Concrete masonry can typically withstand ground vibration up to 3 inches per second (ips), concrete can withstand ground vibration up to 5 ips and an engineered steel structure can withstand even higher levels (5 to 10 ips).

The USBM guidelines for preventing cosmetic damage at residential structures due to ground vibration are summarized on **Figure 25**.

When vibrations pass through a house, the house reacts by moving. The response of the house depends on the magnitude of the vibration (expressed as peak particle velocity in inches per second for ground vibration and peak air overpressure in pounds per square inch for air overpressure) and the frequency of the vibrations. Research has shown that typical residences are most responsive to low frequency (less than 20 Hz) vibrations. Separate limits were set plaster and drywall in order to be equally protective.

The so-called "Z-curve" shown on **Figure 25** has been the industry standard since the 1980's and has been found to be effective in preventing blasting damage from ground vibration. Compliance with these limits is routinely required in NYSDEC Mined Land Reclamation permits. All blasts at the Eagle Harbor Mine will be designed and implemented to so that these levels are not exceeded at any off-site structure.

4.6.2.2.3 Effects of Repeated Blasting

In order to scientifically examine the effects of repeated blasting the United States Bureau of Mines (USBM) constructed a test house in the path of an advancing surface mine. Over the duration of the test, the test house was subjected to 587 production blasts with ground vibration levels ranging from 0.10 to 6.94 inches per second. Following this study, the test house was mechanically shaken. The first cosmetic cracks from shaking only appeared in the test house after the equivalent of 392 years of blasting once per week, or 20,384 blasts, with a ppv of 0.5 inches per second (Stagg et al., 1984).

While the test house was being built hairline cracks formed due to settling and workmanship and they also formed during periods when no blasts were detonated due to changes in temperature and humidity. The test concluded that, when blasting, the number of new cracks per week did not increase with time when the blast vibrations were up to 1 inch per second and therefore those blasts did not cause fatigue-related damage.

4.6.2.2.4 Potential Impacts to Wells

Blasting does not create enough energy to crack rock further than a few feet past the blasting area, does not divert water and does not crack well casings (research shows that steel casings will not crack unless subjected to ground vibrations in excess of 10 inches per second). Extensive research by the United States Bureau of Mines including "*Survey of Blasting Effects on Ground Water Supplies in Appalachia*" (Robertson, 1980) proved that blasting does not impact groundwater quality or quantity and key report findings include:

- Chemical analyses of water samples taken before and after the blasts, and at periodic intervals throughout the testing period, reveal that no significant chemical change occurred.

- All of the data collected in this study indicate that the commonly accepted limit of 2.0 in/sec peak particle velocity is adequate to protect water wells from any significant damage.

4.6.2.3 Mitigation Measures

The following mitigation measures will be employed at the Eagle Harbor Mine to mitigate potential impacts from blasting:

1. **Incorporate Applicable Items from the Blasting Checklist**

The following Blasting Checklist is provided for information only and is subject to change by the licensed blaster in order to comply with the USBM guidelines and the applicant's production needs.

It will change as new blasting technology is developed and proven or if experience shows that site specific conditions warrant it.

- *Frequency of Blasting*—Blasting will be done as often as needed to meet market demand. When faces are being developed, development shots will typically occur up to once per week. Production shots will occur roughly twice per month.

- *Blast Hole Diameter*—The blaster will vary the diameter of the blast hole depending on a wide variety of factors. Typically, blast holes will be 4 to 6.5 inches in production for a 30-foot-high face and as small as 3 inches for a 10-foot-high development shot.

- *Number of Holes Per Blast*—The blaster will vary the number of holes per shot as needed to meet production requirements. The number of holes per shot does not have a direct influence on the vibration levels due to the use of millisecond delays.

- *Burden and Spacing*—The blaster will vary the burden and spacing as needed to meet the goals of the blast.

- *Typical Pounds of Explosive Per Delay*—The blaster will vary the pounds of explosive per eight millisecond delay as needed to meet the production goals and comply with the USBM guidelines.

- *Predicted Peak Particle Velocity*—The blaster will design all blasts to comply with the USBM guidelines using predictive formulae as outlined in Section 3.5 above and his experience at the site. If the seismograph readings indicate the ground vibration or air overpressure levels are approaching the allowable limits, the blaster will adjust the blast as needed to avoid exceeding the limits. This could be accomplished a number of ways, including but not limited to reducing the hole diameter, reducing the density of explosive used, reducing the face height, increasing the amount of stemming and revising the blast timing.

- For a 30-foot-high face at a distance of 505 feet (the shortest distance from the bedrock excavation area to the closest off-site structure) using a 4-inch diameter hole and 6.7 feet of stemming, the predicted peak particle velocity would be 0.44 inches per second.

- *Local Blasting Ordinances*—None

- *Location of Off-Site Receptors*—The nearest off-site receptor is 505 feet from the closest quarry excavation area; all other receptors are further away.

- *Best Management Practices to Prevent Fly Rock and Control Off-Site Vibrations*—Please refer to the Best Management Practices in item #2 below.

- *Seismographs*—All blasts will be monitored by properly calibrated seismographs set up at the off-site structures most likely to be impacted by any particular blast. The blaster in conjunction with the applicant will make this determination based on distance to off-site structures, past experience, requests from the public and the orientation of the blast.

- *Control of Blasting Emissions*— Blasting is an infrequent occurrence and overall, a very minor source of dust. Frame by frame examination of videos of blasts confirms

that the majority of dust generated by blasting is generated in the interior of rock mass from the pulverization of rock immediately adjacent to the explosives column. This is unavoidable in all production blasts where sufficient displacement of the rock occurs to allow for relatively easy extraction.

- Gases will be reduced by proper and complete ignition of the explosives and use of the appropriate type of explosives for the drill hole conditions (e.g., straight ANFO would not be suitable for use in a hole containing rainwater).

- Blast Notification—Residents requesting to be notified prior to each blast will be called the morning of the blast. A siren will be sounded in a distinctive manner prior to each blast.

- *Pre-Blast Surveys*—This is covered in item #3 below.

2. <u>Employ Best Management Practices</u>

Eagle Harbor Sand & Gravel will follow the following standard procedures in the course of their blasting. The blaster will revise these best management practices as new technology is developed and proven or if experience shows that site specific conditions warrant it.

- All blasts will be designed and implemented following proper blast management practices in accordance with the requirements of the Mine Safety and Health Administration.

- A licensed expert blaster will do all blasting.

- The blaster will design and implement all blasts to comply with the USBM guidelines.

- The licensed expert blaster will lay out each blast, ensuring appropriate burden is maintained to properly confine the explosive column. The face will be profiled to aid in determining the front row burden at the blaster's discretion.

- The blaster will specify the drill holes location, size and depth.

- The driller will keep a log describing any unusual conditions found in the holes.

- The blaster will review the drill logs and make any adjustments needed to account for the conditions of the holes.

- The blaster will ensure the holes were drilled as specified. The holes will be bore tracked or equivalent at the discretion of the blaster.

- Holes containing large voids will be abandoned or the voids will be encased to avoid overloading of the holes.

- Blasting will be scheduled so as to avoid adverse weather conditions such as strong, low level thermal inversions and thunderstorms. The blaster will use a weather service to assist him in making such determinations.

- The blast holes will be loaded and implemented under the direct supervision of an expert licensed blaster.

- All blasts will be designed to assure proper confinement of the explosives column.

- The appropriate type of stemming will be used for the size of the hole.

- The blast area will be secured prior to each blast.

- Neighbors so desiring will be called the morning of each blast. This reduces the startle affect associated with some blasts.

- A siren will be sounded in a distinctive manner before each blast.

- Blasting will be done between 10 a.m. and 5 p.m. Monday through Friday. Blasting will not occur on New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving and Christmas Day. Blasting during the middle of the day and at similar times of the day reduces the human response to blasting.

- All blasts will be monitored with a properly calibrated seismograph.

- The blaster will check the shot before sounding the all-clear.

- The blaster will review the seismograph results to determine compliance with the USBM guidelines and adjust the blast design as needed.

- Records of all blasts will be kept and be made available to the Department upon request.

- The applicant will promptly and professional respond to and investigate all complaints.

- Offer pre-blast or condition inspections for neighbors to serve as a baseline in the event of a claim of blasting damage, as outlined below.

3. Conduct Pre-Blast Surveys

EHS&G will offer to conduct pre-blast condition surveys in accordance with the procedures detailed below for each off-site structure not owned by the Applicant or the Eagle Harbor Mine property owner located within 1000 feet of the planned limits of blasting. This survey shall determine and document the conditions of the structure at the time of the survey.

Pre-blast surveys will be conducted prior to any blasting activity and provided to NYSDEC as requested. A copy of the pre-blast request letter template that will be used is included in Appendix 10. Request letters will be sent certified mail with return receipt to all property owners with structures within 1000 feet of the quarry. Copies of all correspondence, including certified mail receipts, as well as acceptance and denial of access notifications will be sent to NYSDEC prior to any blasting activity.

Eagle Harbor Sand & Gravel will include in the written notification contact information for their blasting representative as well as a self-addressed, stamped envelope for the owner to accept or decline the offer to perform a condition survey. Any owner's failure to respond within 30 days of the postmark date (of the certified letter) shall be deemed a denial. If any owner decides not to participate in the Pre-Blast Survey, Eagle Harbor will not be required to include that dwelling in the survey.

Documentation will include voice-recorded descriptions, diagrams, notes and photographs and/or video as needed to detail existing defects in walls, ceilings, floors, foundations and windows both on the interior and exterior of the structure. Eagle Harbor Sand & Gravel will hire professionals experienced in condition or pre-blast surveys to perform all condition surveys. A copy of the documentation will be mailed to the owner, determined according to the municipal tax records, within 30 days of the completion of the survey.

All costs associated with conducting the Pre-Blast Surveys shall be paid by Eagle Harbor Sand & Gravel and they will maintain all correspondence to and from owners regarding condition surveys, all condition surveys performed and the supporting documentation.

4.7 IMPACT ON OPEN SPACE AND RECREATION

4.7.1 Existing Conditions

Approximately 85.5 acres of land are currently affected by mining activities within the 250.6-acre Life of Mine area. The 300+/- acres parcel that the mine is located on is a mix of mining, agricultural and wooded wetland areas.

The vast majority of the area within the 250.6-acre Life of Mine is either being used for mining or was mined in the past and is now used for agriculture. The mining areas consist

of active above and below water sand and gravel excavation areas, processing plant equipment, stockpiles of sand and gravel, a scale and scale house, a shop, and access roads. The agricultural areas on the site property consist of a rotating mix of hay fields and row crops. The remaining wooded areas in the Life of Mine area consist of steeper slopes and wet areas unsuitable for farming and/or mining.

The surrounding area is predominantly farmland with scattered residential homes. Drainage is poorly developed, and vegetation consists of farm crops interspersed with woods on slopes and wet areas unsuitable for farming.

Agriculture is the dominant land use in the town and surrounding areas. According to the Town of Barre Comprehensive Plan, approximately 56% of the Town of Barre or 19,500 acres is classified as agricultural use (**Table 9**) and the USDA Census of Agriculture lists 129,573 acres of land being farmed in Orleans County (**Figure 21**).

The project site is privately owned and has historically been mined and farmed. It provides no recreational resources.

4.7.2 Potential Environmental Impacts

4.7.2.1 Open Space

The proposal will convert a 99.7-acre portion of the 250.6-acre Life of Mine area from sand and gravel mining to consolidated bedrock excavation. The reclamation objective of the 99.7-acre consolidated bedrock excavation area will result in the conversion of land that has previously been used for sand and gravel mining and agriculture into permanent open space/water reclamation.

The change in land-use from mining and agricultural to permanent open space represents an overall positive increase in post-mining open space and is consistent with the goals listed in the Town of Barre Comprehensive Plan which states:

> *"Encourage farmland owners to keep land in open space and agriculture through creative development designs. Such a design would subdivide portions of an agricultural parcel into residential sites and preserve the remainder, under conservation protective easements, for agriculture, wildlife habitat or open space."*

4.7.2.2 Recreation

There are no recreational resources on the project site and therefore no impacts to recreational resources to address. The project area is privately owned and hunting or trapping by the general public is not allowed.

4.7.3 Mitigation Measures

4.7.3.1 Open Space

The project, as proposed, will convert land historically used for mining and agriculture into permanent open space as part of reclamation. The final reclamation objective is consistent with the goals outlined in the Town of Barre Comprehensive Plan which identifies open space as a Town-wide objective and lists Action #1 of their Agriculture Policy to be: "*(e)ncouraging farmland owners to keep land in open space and agriculture through creative development designs.*"

The project will result in a net increase in open space and therefore there are no impacts to mitigate.

4.7.3.1.1 Recreation

There are no recreational resources on the project site and therefore no impacts to recreational resources to mitigate. The project area is privately owned and hunting or trapping by the general public is not allowed.

4.8 IMPACT TO THE CONSISTENCY WITH COMMUNITY CHARACTER

4.8.1 Existing Conditions

Community character is the distinguishing physical and social quality of a region, town, city, village or hamlet. This character is shaped by natural, cultural, societal, and economic forces over time. It is the collective impression a neighborhood or town makes on residents and visitors. Open space often is a defining component of community character. Any development that affects the physical and/or social quality of a region has the potential to affect the community character.

This property was originally mined by Bennett in the 1960's and the EHS&G Mine has been operating on this property as a supplier of high-quality sand and gravel aggregates to the Town, Orleans County and surrounding regions since the mid-1970's. Current permitted operations include mining above and below the water table and sand and gravel processing over a 250.6-acre Life of Mine area.

The Town of Barre Comprehensive Plan (**Figure 23**), classifies the EHS&G mine property as a Mining/Excavation land-use and with almost 50-years of continuous active mining occurring on this property, EHS&G is part of the community and contributes to the community character.

4.8.2 Potential Impacts to Community Character

The EHS&G proposal, as designed, does not have the potential to impact the community character of the Town of Barre or of Orleans County for the following reasons:

1. Mining on this property has been ongoing for nearly 50-years and the current land-use (mining) will not change. As documented in the Town of Barre Comprehensive Plan (**Figure 23**), the EHS&G mine property is classified as a Mining/Excavation land-use. The Plan states that "(a)reas designated for Mining/Excavation are intended for continued mining or excavation use. This designation recognizes the economic value of natural rock products, including sand and gravel." In its Policies and Recommended Actions section of the Comprehensive Plan the Town of Barre recognizes the importance of mining and states that it is a goal to "(w)ork with existing sand, gravel and limestone mines to allow future expansion to extract natural resources with environmentally responsible practices."
2. There will be no noise impacts as a result of the proposal. The Noise Impact Assessment determined that quarry proposal will not impact the closest neighbors, therefore there will be no regional noise impacts. Additional information on the potential for noise impacts can found in Section 4.6.1 and Appendix 9.
3. There will be no visual impacts as a result of the proposal for the following reasons:
   - No change to the nearly 50-year use of the site as a mine is proposed.
   - The proposed consolidated mining operations will occur much further away from nearby residences than is already approved for sand and gravel mining under the existing permit.
   - A perimeter berm is proposed to be constructed around the consolidated bedrock excavation boundary. This proposed berm will mitigate any potential for noise, visual and dust impacts from mining activities.
   - The increased depth of excavation will, in effect, create taller barriers out of the mine faces and berms thereby enhancing their visual mitigation abilities above and beyond current levels.
4. There will be no transportation impacts as a result of the quarry. No increase in truck traffic is expected and mitigation measures are proposed that thoroughly address the potential for dust, tracking of material onto the road and safety issues. Additional information on the potential for transportation impact can be found in Section 4.5.

5. Mining preserves open space (Albany Law School, 1998) and this proposal preserves and permanently increases open recreational space as part of its reclamation objective. Additional information on open space is included in Section 4.7.

4.8.3 Mitigation Measures

The EHS&G proposal, as designed, does not have the potential to impact the community character of the Town of Barre or of Orleans County. The potential impacts related to noise, visual, and truck traffic are thoroughly addressed with mitigation measures (see Section 4.8.2) and additional mitigation measures specifically addressing community character are not necessary.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

This section of the DEIS provides an analysis of reasonable alternatives to the proposed action, in accordance with the SEQR regulations at 6 NYCRRR § 617.9 (b) (5)(v).

5.1 NO ACTION

Under the no action alternative, the project site would not be developed as a quarry. The no action alternative would not fulfill the project purpose, market demand and state-wide objectives outlined in Section 3.3. Those objectives include, among other things, ensuring a reliable source of local aggregates to meet increasingly critical infrastructure demands in a manner that is consistent with smart growth objectives. The no action alternative thus is not considered viable as it does not meet the project purpose or the applicant's needs.

5.2 ALTERNATIVE SITES

The current proposal to mine stone within an existing mine site offers the best opportunity for the stone resource to be mined with minimal impact to natural and human resources, while meeting the stated goals of the Town's comprehensive plan and complying with the zoning regulations. Placement of the mine at alternative locations nearby would more severely impact community, cultural and environmental resources.

Mines must be located where the stone reserves are. As previously discussed, (see Section 4.1.1.1.3), the Lockport dolostone is not uniformly deep or accessible throughout the Town, from both a physical and economic standpoint.

5.2.1 Alternative Sites Under Applicant's Control

Gray Road Mine

The applicant controls one additional local mine site that also happens to overlie the Lockport dolostone (**Figure 26**). This site is located in the Town of Barre on the north side of Gray Road, approximately one mile south of the Eagle Harbor Mine. It is a NYSDEC permitted sand and gravel mine (Mine ID #80442) with a life of mine area of area of 29.7 acres on a 36-acre parcel controlled by EHS&G. Review of the published bedrock geology maps indicates the Lockport dolostone occurs under the sand and gravel deposit at an unknown depth.

Access to the market from this site would be from Gray Road to Eagle Harbor Road to the east, Pine Hill Road to the west and north or Hemlock Ridge Road to the west.

Benefits:

- This alternative site is an existing NYSDEC permitted mine.
- This property is identified in the Comprehensive Plan as Mining/Excavation (**Figure 23**).

Disadvantages:

- Small parcel size. The 36-acre parcel is 1/8th (12%) the size of the Eagle Harbor mine parcel. The smaller parcel size restricts potential future expansion options and buffer zones.
- Proximity and location of neighbors. There are neighbors within 500 feet on all sides of the Gray Road Mine except to the northeast.
- Small operating area. The dolostone reserves that could be extracted from the 29.7-acre Life of Mine would be substantially less than could be realized at the Eagle Harbor Mine. This small area will shrink even more once you factor in buffers that would be necessary to mitigate noise and groundwater impacts to nearby receptors.
- Access onto Town Road is less desirable than onto a County Highway like at the Eagle Harbor Mine.
- The Gray Road Mine is a run of bank operation with a single land dirt access road and no infrastructure in place. Converting to a quarry would require substantial infrastructure investment for a scale house, shop, processing plant, access road improvements etc... All of these improvements take up space, would increase the potential for environmental impact and would further reduce the amount of dolostone that could be accessed.

Conclusion:

While the Gray Road Mine is a permitted sand and gravel mine that does appear to lie over the Lockport dolostone, the limited benefits of potentially being able to access superior quality rock here are heavily outweighed by the disadvantages.

Pask Road Site

EHS&G's sister company, Shelby Crushed Stone, controls one other local property in the vicinity of the Eagle Harbor Mine (**Figure 27**). This 138-acre property is located in the Town of Barre on the north and south sides of Pask Road, approximately one mile west of the Eagle Harbor Mine.

Access to the market from this site would be from Pask Road to Townline Road to the west, Pine Hill Road to the east or Wilkens Road to the north.

Benefits:

- This alternative site is significantly larger than the Gray Road Mine property (but still roughly 1/3 the size of the Eagle Harbor property).
- This property is remotely located with only a few scattered residences, mainly along Townline Road to the west.

Disadvantages:

- Greenfield property. This property is a mix of agricultural and open space wetland areas and there is no mining permit. Any application to mine would need a NYSDEC Mined Land Reclamation Permit and a Town Special Use Permit.
- Odd shape would impact operating efficiency. While the property is large, it is flag shaped with a narrow western 'pole' that may or may not be mineable once you factor in setbacks. Also, Pask Road bisects the northeastern corner, which makes that part too small to mine.
- Wetlands are present throughout property. As shown on Figure 28, there are numerous wetlands present on this property, significantly limiting the open contiguous areas that could be mined without impacting wetland resources.
- Property purchased for the intent to use as wetland mitigation for sister company. This property was acquired specifically to construct wetlands for mitigation at the Shelby Crushed Stone Quarry. As such, mining this property would not be an option when that plan is implemented.
- Access onto Town Road is less desirable than onto a County Highway like at the Eagle Harbor Mine.

Conclusion:

While the Pask Road property is larger than the Gray Road Mine property and does also appear to lie over the Lockport dolostone, the limited benefits of potentially being able to access superior quality rock here are heavily outweighed by the disadvantages.

5.3 ALTERNATIVE DESIGN AND TECHNOLOGIES

5.3.1 Site Design and Layout

The geology of the site determines where the usable materials exist. The Bedrock Geology Map (**Figure 8**) summarizes the geology at and in the vicinity of the site. The bedrock in the modification area is comprised of dolostones of the Goat Island and Gasport Members of the Lockport Dolostone Formation and the Decew Dolostone. The dolostones are underlain by the Rochester Shale, which is not proposed to be mined due to its poor quality.

The availability of geologic materials suitable for use as construction materials determines the portions of the site that may be mined. Mining can only occur where the resource exists. South of the project site the Lockport is overlain by unusable shale bedrock and north of the project site the Lockport becomes increasingly thin and uneconomical to mine.

5.3.1.1 Alternative Layout

The layout of the mine is based on several parameters. These include property boundaries, distance to receptors, distance to wetlands, noise impact and pumpout/stormwater considerations. These factors are balanced against the economics of developing and operating an economically viable quarry. As demonstrated in this DEIS, the proposed quarry excavation area is centrally located within the middle of the property and is significantly smaller than the current Life of Mine area. The smaller area and increased buffers provide the best design for adequate mitigation of impacts while still meeting the project goals.

5.3.1.2 Alternative Mining Depths

Alternative mining depths are not viable options because reducing the depth of mining will reduce minable aggregate reserves without any reduction in impacts. As indicated in the Hydrogeologic Assessment, the water bearing fractures in the bedrock aquifer are concentrated near the top of the dolostone so reducing the depth of quarry excavation mining would not fundamentally reduce the potential groundwater impacts.

Increasing the depth of mining is not a feasible alternative as the rock below the Lockport Dolomite is of inferior quality and is not suitable for NYSDOT aggregate.

5.3.1.3 Alternative Reclamation Design

Alternatives in reclamation design which would prepare the site for secondary land use are few. Open space for possible future recreational uses is one of the only possible land-uses for open water reclamation. Therefore, a different grading plan, both above and below the proposed water table is the only feasible alternative.

The current reclamation plan calls for disturbed perimeter areas to be smooth graded to blend with existing surrounding topography and excess unsaleable fine sand and silt will be placed in the excavated quarry area to create shallow shoaling areas within the reclamation lake area. These shoaling areas will provide habitat and shallow safety access points. Grading/slope treatment within the excavation area is shown on the Typical Cross-Sections included in the Mined Land-Use Plan (Appendix 3) and included as (**Figure**

5). The quarry perimeter treatment involves grading the overlying sand at 2:1 (horizontal to vertical) down to the top of the bedrock. Alternatives to this would be either gentler slopes or steeper slopes as discussed below:

5.3.1.3.1 Gentler Slopes

The fine sand overlying the bedrock could be excavated and graded to create less steep slopes leading into the water down to the top of rock, 4:1 (horizontal to vertical) for example. The existing proposal incorporates 2:1 slopes, a ramp and shoaling areas for safety and access in the plan, there does not appear to be any compelling advantage to a less steep slope, for safety or other reasons. Less steep slopes would also require additional mining and grading and result in a larger overall footprint without providing significant advantages to potential environmental impacts.

5.3.1.3.2 Steeper Slopes

Under this scenario, the sand overlying the bedrock would be excavated and graded to create steeper slopes of 1.5:1 (horizontal to vertical), the maximum allowed by the NYSDEC for unconsolidated mining. This would require less mining and grading to achieve, and ultimately result in a smaller footprint, but such a plan has potential to create safety and stability issues due to the fine nature of the sand. As such, steeper slopes do not offer significant advantages to potential environmental impacts.

5.3.2 Alternative Technology

Construction aggregate is produced by conventional, industry-standard techniques: drilling and blasting, removing the shot rock by front-end loader or excavator, crushing, screening and stockpiling. These methods are routine, and no alternatives are available for these basic operations.

5.4 ALTERNATIVE SIZE

Alternative size impacts the duration at which the mine operates in the one location. The larger the area permitted for reserves, the longer the mine can operate at one site. Some of the potential environmental impacts associated with this project, such as air, traffic and noise, are not directly related to project size. Impacts from operations are largely driven by market demand. Potential environmental impacts that are dependent on size include visual impacts and impacts on water resources, vegetation and wildlife. The significance of the impacts that are dependent on size must be weighed against the loss of reserves, and, thus, the objective of the proposed project. If decreasing the size of the project does not significantly decrease the impacts created by the project, or if the impacts can be effectively mitigated then the decrease in size would not be warranted.

For the purpose of this discussion, an alternative mining plan consideration with a 50 percent reduction in the modified quarry excavation area will be assessed. The alternative plan would have a bedrock excavation area of approximately 50 acres as shown on the Alternative Mining Plan Map (**Figure 29**). Market demand for the product is assumed to be the same as for the proposed project. Impacts associated with this alternate size excavation area are expected to include the following:

Earth and Natural Resources

The change in impacts to the earth and natural resources would be a 50 percent reduction in removal of bedrock. Therefore, there would be a 50 percent reduction in area affecting the topography and soils. These changes are not significant since the impacts in the proposed and the alternative scenarios would be within areas already permitted for sand and gravel extraction and do not affect the environment off-site.

However, this reduction does have socio-economic impacts. That is, the long-term supply of necessary building materials, i.e., the high-quality construction aggregate, would be artificially constrained, resulting in accelerated upward price pressure for such materials over the long term. The Town of Barre recognizes the importance of natural rock products and in their Comprehensive Plan identified the EHS&G Mine property as one of only a few "(a)reas designated for Mining/Excavation are intended for continued mining or excavation use. This designation recognizes the economic value of natural rock products, including sand and gravel."

Regardless of size alternatives to the project, the market demand will continue and need to be fulfilled.

Groundwater Resources

A size reduction would mean that less land would be excavated and that the potential to affect any subsurface groundwater conditions would be lessened. The size reduction would decrease the cone of influence created by dewatering the quarry. A quarry size reduction would logically occur along the west and northern portions of the quarry modification area and therefore would lessen but not eliminate drawdown impact upon that area. However, since public water lines service all but one of the nearby residents, and that the existing proposed setbacks were established to limit the cone of depression anyway, this alternative appears less beneficial. Further, any impacts to wells will be mitigated by the Residential Water Supply Agreement.

Surface Water

A reduced size does not impact the water drainage characteristics or regime. The area has effectively only one drainage ditch off-site at present. In terms of discharge water, a

reduced mine area would create less quarry drainage that will go off-site. Previous discussions have elaborated on the subject of discharge and the proposed mitigation measures (larger culvert(s)) would have to be implemented in either scenario to address the pre-existing flooding condition. Controlled quarry pump-out would also be utilized to mitigate impacts for both the proposed and alternative scenarios.

Air Emissions

A reduction in project size will not result in a change to the impact on air quality. The amount of disturbed area annually needed to meet any assumed level of annual demand for rock will be fairly constant for any sized quarry as mining advances through the years.

Secondly, air emissions from the equipment will also be the same. The rate at which these are operated is driven by market demand, not long-term volume of reserves.

The only change to impacts will be the duration over which the mine is in operation. All other impacts will remain the same.

Agricultural Resources

Reducing the overall size of the quarry would increase the amount of land that would be reclaimed to agriculture instead of open water. This change however is insignificant and would amount to an increase of approximately one quarter of one percent of agricultural land in the Town of Barre and less than four one-hundredths of a percent in Orleans County.

Traffic

The amount of traffic generated is dependent on market demand, independent of project size. The only change to impacts will be the duration over which the mine is in operation. All other impacts will remain the same.

Noise

Reducing the overall size of the quarry would potentially reduce the sound levels heard by receptors from excavation equipment operating near property lines. However, the current proposal does not increase the sound levels from the currently operating conditions so a further reduction in sound levels is not necessary.

Blasting

Reducing the overall size of the quarry would potentially reduce the ground vibration levels and airblast levels at nearby receptors over the current quarry excavation proposal when it is operating closer to property lines. However, the setbacks incorporated into the current proposal are already sufficient to mitigate any blasting impacts so a further reduction in blasting vibrations and airblast levels is not necessary.

Open Space and Recreation

Reducing the overall size of the quarry would result in a reduction in the amount of open space after mining is completed.

Community Character

Reducing the size of the quarry area will not result in a change to the community character because, as discussed in Section 4.8 and summarized below, the current proposal does not have the potential to impact the community character of the Town of Barre or of Orleans County for the following reasons:

- This location has been actively mine since the 1970's and the existing land-use (mining) will not change.
- Mining as a land use is consistent with the Town of Barre Comprehensive Plan
- As stated in their Comprehensive Plan, the Town of Barre recognizes the importance of mining and states that it is a goal to "(w)ork with existing sand, gravel and limestone mines to allow future expansion to extract natural resources with environmentally responsible practices."
- The EHS&G mine property is classified as a Mining/Excavation land-use in the Comprehensive Plan. The Plan states that "(a)reas designated for Mining/Excavation are intended for continued mining or excavation use. This designation recognizes the economic value of natural rock products, including sand and gravel."
- There will be no noise impacts as a result of the quarry.
- There will be no transportation impacts as a result of the quarry.
- Mining preserves open space (Albany Law School, 1998) and this proposal preserves and increases open recreational space as part of its reclamation objective.

Summary

Many of the potential environmental impacts associated with the project, such as air, traffic and community character, are not associated with project size. Impacts from these items are driven by market demand and will occur regardless of the life-of-mine size. The impacts are not based on how many acres are available 10 years hence. In terms of impact experiences in any given year of the project, the ultimate area available for excavation is irrelevant. However, a project size reduction will result in a reduction in the length of time any impact will be experienced. A size reduction will decrease the amount of agricultural land that will be converted to open space/water and potentially decrease the groundwater drawdown impacts compared with the proposal but not necessarily with all reductions in size. Many potential environmental impacts depend on location of excavation area relative to receptors rather than overall size of the operation.

5.5 ALTERNATIVE SCHEDULE

A change in the development schedule may not be realistic because the rate at which mining operations occur is generally determined by market demand. If the product cannot be sold, it is not economical to increase the rate of production. The anticipated production rate represents the best possible assumption as to future conditions and aggregate demand. A reduction in development rate will not necessarily reduce or mitigate the potential environmental impacts. It may instead prolong the period during which any potential impacts may be experienced prior to reclamation of the site.

6.0 SHORT-TERM AND LONG-TERM IMPACTS, CUMULATIVE IMPACTS AND OTHER ASSOCIATED ENVIRONMENTAL IMPACTS

6.1 SHORT-TERM IMPACTS

"Short-term impacts are the immediate and temporary results of an action, for example, noise, dust, and truck traffic during construction of a building." (The SEQR Handbook, 2020).

Potential short-term impacts from the project are limited to erosion and sedimentation issues related to stripping, berm construction and stormwater control construction and maintenance. EHS&G is applying for coverage under a SPDES multi-sector permit which addresses these impacts.

6.2 LONG-TERM IMPACTS

"Long-term impacts are the continuing impacts from an action over time; for example, impacts to community health from the long-term operation of an industrial plant with substantial air emissions or the commuting traffic resulting from the completion of a new office building. In identifying and evaluating long-term impacts, it is important to understand that some impacts may have to be assessed in terms of significance over time. For example, while local water supply may be adequate to support the initial stages of a residential development, the supply may be inadequate to support that development at full build-out." (The SEQR Handbook, 2020).

For the identified potential impacts that have a potential for long-term impacts, such as groundwater, noise and blasting, the impact assessment factored in a worst-case scenario of full-buildout conditions and addresses long-term impacts.

6.3 CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment that "...occur when multiple actions affect the same resource(s). These impacts can occur when the incremental or increased impacts of an action, or actions, are added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from a single action or from two or more individually minor but collectively significant actions taking place over time. Cumulative impacts do not have to all be associated with one sponsor or applicant. They may include indirect or secondary impacts, long-term impacts, and synergistic effects." (The SEQR Handbook, 2020).

In the case of the proposed project, the action is not part of a larger action, it is not interdependent of anything, and the proposal will not incrementally be significant to any other related action.

For these reasons, the proposed project will have no significant cumulative impacts.

6.4 POTENTIAL BENEFICIAL IMPACTS

Need for Aggregate

The primary benefit to the community is to make available long term economical source of high-quality construction aggregate. As previously stated in Section 3.3, demand for high-grade construction aggregate in New York State is increasing and the number of permitted mines in New York State is decreasing.

Shortages of crushed stone are being experienced and will continue to increase around some urban and industrialized areas due to zoning restrictions and land development alternatives. The loss of an available deposit would mean that the aggregate and agricultural lime would have to be purchased from other producers, requiring importation of these products. Trucking remains the primary means to transport stone, and as the trucking distance increases the more overall product costs, impacts to infrastructure, and environmental impacts will increase.

For a property to be suitable for excavation there must be a sufficient quantity of high-quality material available. Similarly, the site must be accessible to major transportation networks and relatively close to the market. In addition, the operations must have minimal or no impact to both natural and community/cultural resources of the area. The characteristics of the existing EHS&G Mine provide an ideal location for continued mining operations within the Town, with minimal impacts to natural and cultural resources.

Establishment of Open Space

The reclamation plan will establish a permanent open-space area, with potential recreational opportunities. If the project site was not mined or farmed, the only alternative would be residential development, which would permanently render a high-quality aggregate resource unavailable. Development of the exiting mine to residential also would also not be consistent with the Town's Comprehensive Plan.

The Town of Barre is situated upon a significant source of Lockport Formation stone, although it is not uniform in depth and accessibility. Placement of the mine in the proposed location, within an existing mine, will make this natural resource available, minimizing impacts that would occur if the operations were located in other areas within the Town.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

When this proposal is implemented, a nonrenewable resource, dolostone for use as crushed stone aggregate, will be irreversibly and irretrievably committed. However, the demand for construction aggregates and other stone products has historically remained at a uniformly high level. It is assumed the demand will remain at a similar, if not higher level in the future. If the materials within the project area are not utilized, construction aggregates and other stone products will be obtained from other, more distant sites to meet local demand.

Construction aggregates are a high weight, low-cost product. Transportation costs are a substantial part of the overall cost of aggregate. Hauling aggregate less than 20 miles can more than double the cost to the public. In addition, increased hauling distances result in increased traffic, increased potential environmental impacts associated with the increased energy usage and additional wear and tear on the infrastructure.

8.0 GROWTH INDUCING ASPECTS

The growth inducing aspects of this project will be the anticipated increase from four to eight full-time and seasonal employees as outlined in Section 3.3.2. The project will serve as a source to meet the existing demand and future needs for construction aggregate in this market area. This source is more environmentally friendly and cost-effective than more distant sources, thereby reducing overall transportation related impacts and costs to the consumer.

The proposal will require the addition of a portable processing plant for crushing and the installation of a pump and drainage improvements for quarry dewatering. The remaining facilities (such as roads, waste disposal, electricity, etc.) are adequate to meet the needs of the project.

The project will not directly result in the growth of the community. However, the materials supplied by the project will contribute to the maintenance and construction of highways and structures that will help maintain the general growth and infrastructure of the community.

The continued use and development of construction aggregate sources in close proximity to the market areas will create a competitive market and reduce costs to the consumer. This decrease in cost may be reflected in an increase in affordable construction activity.

9.0 EFFECT ON THE USE AND CONSERVATION OF ENERGY

The effect on the use and conservation of energy will be negligible as the proposal is a continuation of an existing operation. While the project will change the type of aggregate being mined, no increase in production is proposed. The mobile equipment, such as front-end loaders and haul trucks, utilize diesel fuel and will continue to do so. This type of equipment does not use substantial amounts of diesel fuel since their primary operating time during a production season (April through November) is limited. The applicant will conduct business in a practical, responsible manner to conserve energy.

As the population continues to expand and people continue to want safe roads, new schools, stores and warm homes, the overall market demand for aggregates will continue to go up. If the materials within the project area are not utilized, construction aggregates and other stone products will have to be obtained from other, more distant sites to meet local demand. Construction aggregates are a high weight, low-cost product. Transportation costs are a substantial part of the overall cost of aggregate. Hauling aggregate about 20 miles roughly doubles the cost to the public and results in an overall increased energy use.

10.0 TABLES AND FIGURES

State Agencies		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
NYSDEC	Mined Land Reclamation	ECL 23-2701
NYSDEC	Water Withdrawal Permit	6 NYCRR Part 601
NYSDEC	SPDES Multi-Sector General Permit for Stormwater	6 NYCRR Part 750
NYSDEC	Air Facility Registration	
NYSDEC	Freshwater Wetlands	6 NYCRR Part 663, Part 664, and Part 665
Federal Agencies		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
NA	NA	NA
Local Government		
Agency	**Permit/Interest**	**Applicable Law/Regulation**
Town of Barre	Special Use Permit	Local

Table 1. involved Agencies and Associated Permits

SEQR Timing			
Steps	**Completion Date**	**Calendar Days**	**Citation**
Establish Lead Agency	9/10/2021	30	617.6(b)(3)(i)
Resolve a Lead Agency Dispute	NA	20	617.6(b)(5)(iv)
Determine Significance	9/10/2021	20	617.6(b)(3)(ii)
Scoping	4/22/2022	60	617.8(f)
Determine Adequacy of a Submitted draft EIS	TBD	45	617.9(a)(2)
Determine Adequacy of a Re-submitted draft EIS	TBD	30	617.9(a)(2)(ii)
Draft EIS Public Comment Period	TBD	Minimum 30	617.9(a)(3)
SEQR Hearing (optional)	TBD	Minimum 15, maximum 60, after filing of draft EIS	617.9(a)(4)(ii)
Prepare final EIS (no SEQR hearing)	TBD	60 after filing of draft EIS	617.9(a)(5)
Prepare final EIS (SEQR hearing)	TBD	45 days after close of hearing	617.9(a)(5)
Prepare findings by Lead Agency (if the action involves an applicant)	TBD	Minimum 10 days, maximum 30 days, after the filing of final EIS	617.11(a) 617.11(b)
Prepare Findings by Involved Agency	TBD	Minimum 10 days after the filing of final EIS	617.11(c)
Conditioned Negative Declaration public comment period	TBD	30 days after date of publication in the ENB	617.7(d)(1)(iv)
Prepare final EIS (SEQR hearing)	TBD	45 days after close of hearing	617.9(a)(5)

Table 2. NYSDEC SEQR Timeframes and Project History

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ArB	Arkport very fine sandy loam, 0 to 6 percent slopes	4.6	1.8%
BoB	Bombay fine sandy loam, 3 to 8 percent slopes	8.2	3.3%
CoC	Colonie loamy fine sand, 6 to 12 percent slopes	14.8	5.9%
GaA	Galen very fine sandy loam, 0 to 2 percent slopes	2.4	1.0%
GP	Gravel pits	31.1	12.4%
HoB	Howard gravelly loam, 3 to 8 percent slopes	87.0	34.7%
HpC	Howard soils, 8 to 25 percent slopes	73.5	29.3%
Ln	Lamson soils	0.0	0.0%
Pm	Palms muck	22.1	8.8%
W	Water	6.8	2.7%
Totals for Area of Interest		**250.6**	**100.0%**

Table 3. Soil Summary

Annual Proposed Capping Limits
Emission Unit 1-Eagle

Emission Source	Fuel Use	Annual Prod.	Hours of Op.	PM2.5	PM10	NOx	VOC's	SO2	CO	HAPs
Quarry - Wash Plant	NA	462,000	2,800	81	756	NA	NA	NA	NA	NA
Quarry - Portable Plant	NA	840,000	2,800	160	12,188	NA	NA	NA	NA	NA
Lokotrack ST2.8 Plant Genset	11,200	NA	2,800	83	825	11,631	927	385	2,506	2
Lokotrack 1213 Plant Genset	56,000	NA	2,800	256	2,556	36,022	2,870	1,191	7,762	11
TOTALS (in pounds)				**579**	**16,326**	**47,653**	**3,797**	**1,576**	**10,268**	**14**
TOTALS (in tons)				**0.29**	**8.16**	**23.83**	**1.90**	**0.79**	**5.13**	**0.01**

Table 4. Emission Inventory Calculations

Path-Length Difference, ft	Insertion Loss, dB Octave Band Center Frequency, Hz							
	31	63	125	250	500	1000	2000	4000
0.01	5	5	5	5	5	6	7	8
0.02	5	5	5	5	5	6	8	9
0.05	5	5	5	5	6	7	9	10
0.1	5	5	5	6	7	9	11	13
0.2	5	5	6	8	9	11	13	16
0.5	6	7	9	10	12	15	18	20
1.0	7	8	10	12	14	17	20	22
2.0	8	10	12	14	17	20	22	23
5.0	10	12	14	17	20	22	23	24
10.0	12	15	17	20	22	23	24	24
20.0	15	18	20	22	23	24	24	24
50.0	18	20	23	24	24	24	24	24

Table 5. Barrier Attenuation by Path-Length Difference

Existing Sound Level Summary					
	R1	**R2**	**R3**	**R4**	**R5**
Mining Noise - (M1-5)	45.6 dB(A)	68.5 dB(A)	43.4 dB(A)	41.0 dB(A)	57.9 dB(A)
Processing Noise - (P)	53.0 dB(A)	56.0 dB(A)	54.9 dB(A)	58.2 dB(A)	45.1 dB(A)
Total Permitted Sound Level of Operation at Receptor	**53.7 dB(A)**	**68.7 dB(A)**	**55.2 dB(A)**	**58.3 dB(A)**	**58.1 dB(A)**

Table 6. Existing Mining Noise Sound Levels

Proposed Sound Level Summary					
	R1	R2	R3	R4	R5
(QE) Quarry Excavation: portable crusher, loader and haul truck	34.0 dB(A)	33.9 dB(A)	25.4 dB(A)	22.5 dB(A)	30.7 dB(A)
(RD) Drilling: Rock drill	44.7 dB(A)	43.8 dB(A)	31.0 dB(A)	28.3 dB(A)	36.8 dB(A)
(PCP) Portable Crushing Plant	52.3 dB(A)	54.0 dB(A)	42.4 dB(A)	45.9 dB(A)	45.3 dB(A)
(P) Processing: Main processing plant, loader and dump truck	53.0 dB(A)	56.0 dB(A)	54.9 dB(A)	58.2 dB(A)	45.1 dB(A)
Total Sound Level of Operation at Receptor	**56.0 dB(A)**	**58.3 dB(A)**	**55.2 dB(A)**	**58.5 dB(A)**	**48.6 dB(A)**

Table 7. Proposed Mine Noise Sound Levels

Comparison of Worst-Case Sound Levels at Receptor Locations					
	R1	**R2**	**R3**	**R4**	**R5**
Total Current Potential Sound Level of Operation at Receptor	53.7 dB(A)	68.7 dB(A)	55.2 dB(A)	58.3 dB(A)	58.1 dB(A)
Total Potential Sound Level of Operation at Receptor Under Proposed Scenario	56.0 dB(A)	58.3 dB(A)	55.2 dB(A)	58.5 dB(A)	48.6 dB(A)
Projected Increase Over Current Conditions	+2.7 dB(A)	-9.4 dB(A)	0 dB(A)	+0.2 dB(A)	-9.5 dB(A)

Table 8. Comparison of Existing to Proposed Mining Noise Sound Levels

Assessor's Property Classification	Number Parcels	Approximate Area (Acres)	% Total Land Area (Acres)
Agricultural	415	19505.39	56.43
Residential	764	10233.43	29.61
Vacant	231	4271.60	12.36
Commercial	22	264.42	0.77
Recreational	2	10.16	0.03
Community Services	15	22.19	0.06
Industrial	2	114.73	0.33
Public Service	4	25.30	0.07
Park and Forest Land	3	116.36	0.34
TOTAL:	1458	34563.58	

Table 9. 2014 Land Use by Tax Parcel from Town of Barre Comprehensive Plan

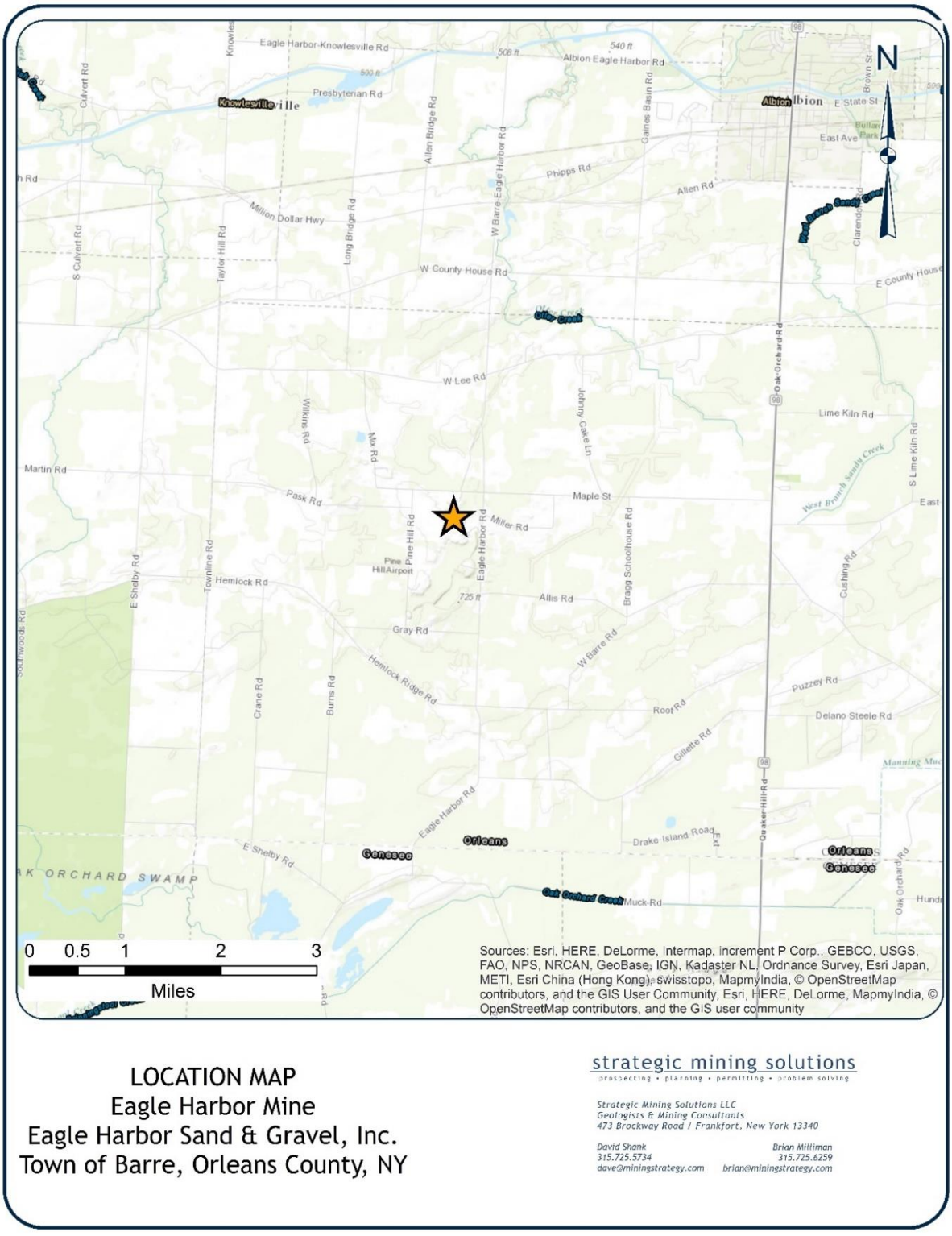


Figure 1. Location Map

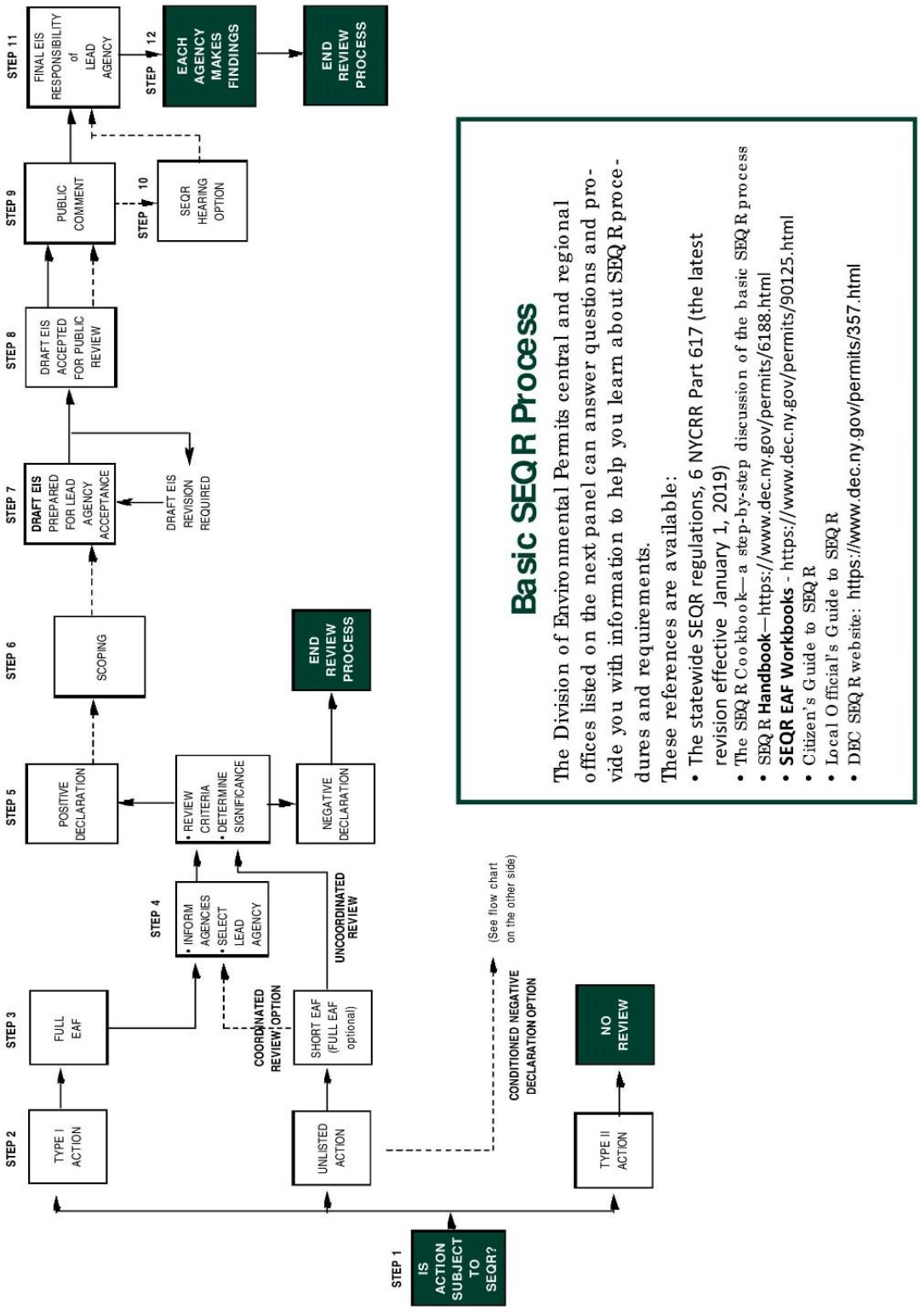


Figure 2. NYSDEC Flow Chart

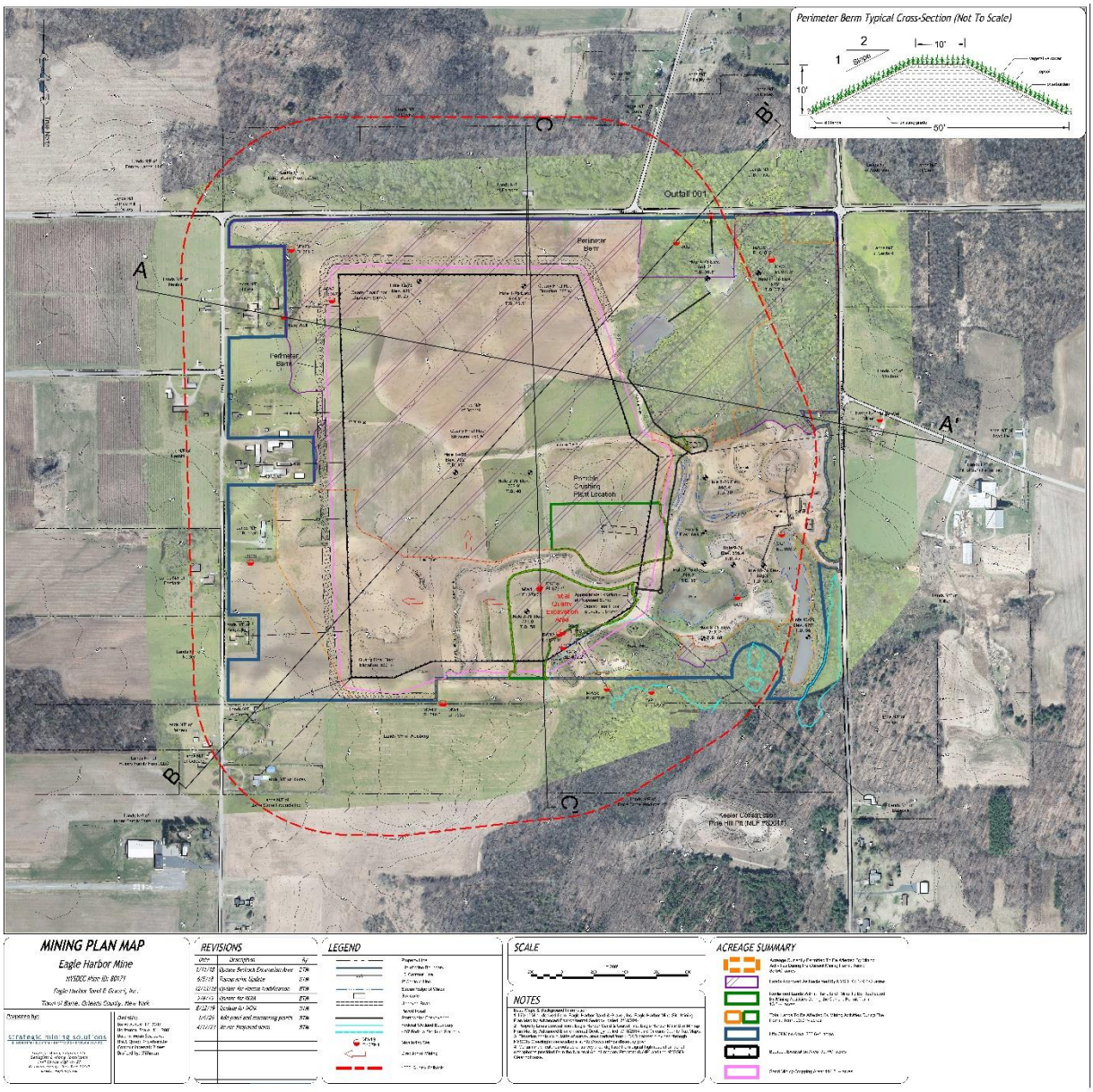


Figure 3. Mining Plan Map

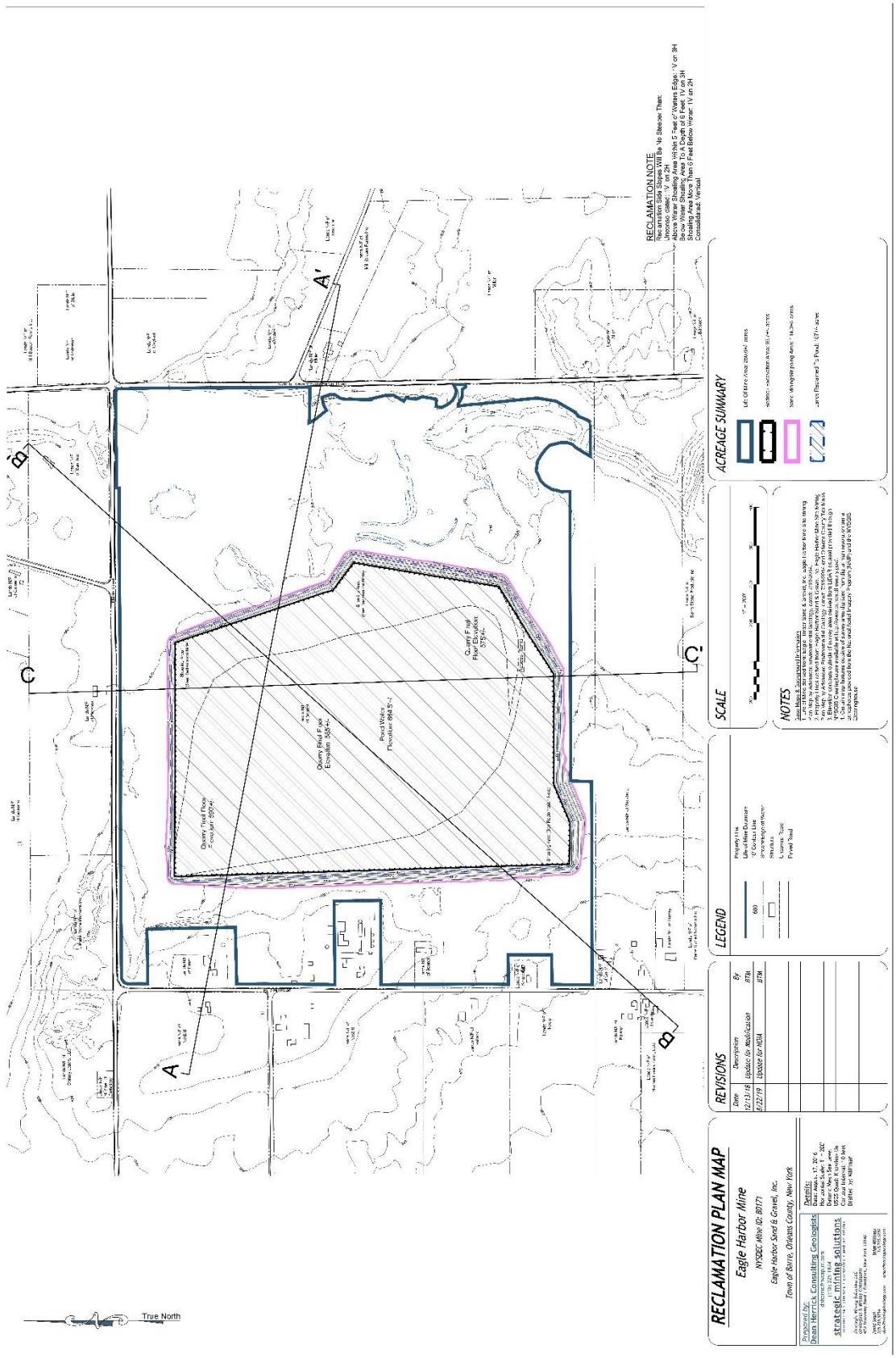


Figure 4. Reclamation Plan Map

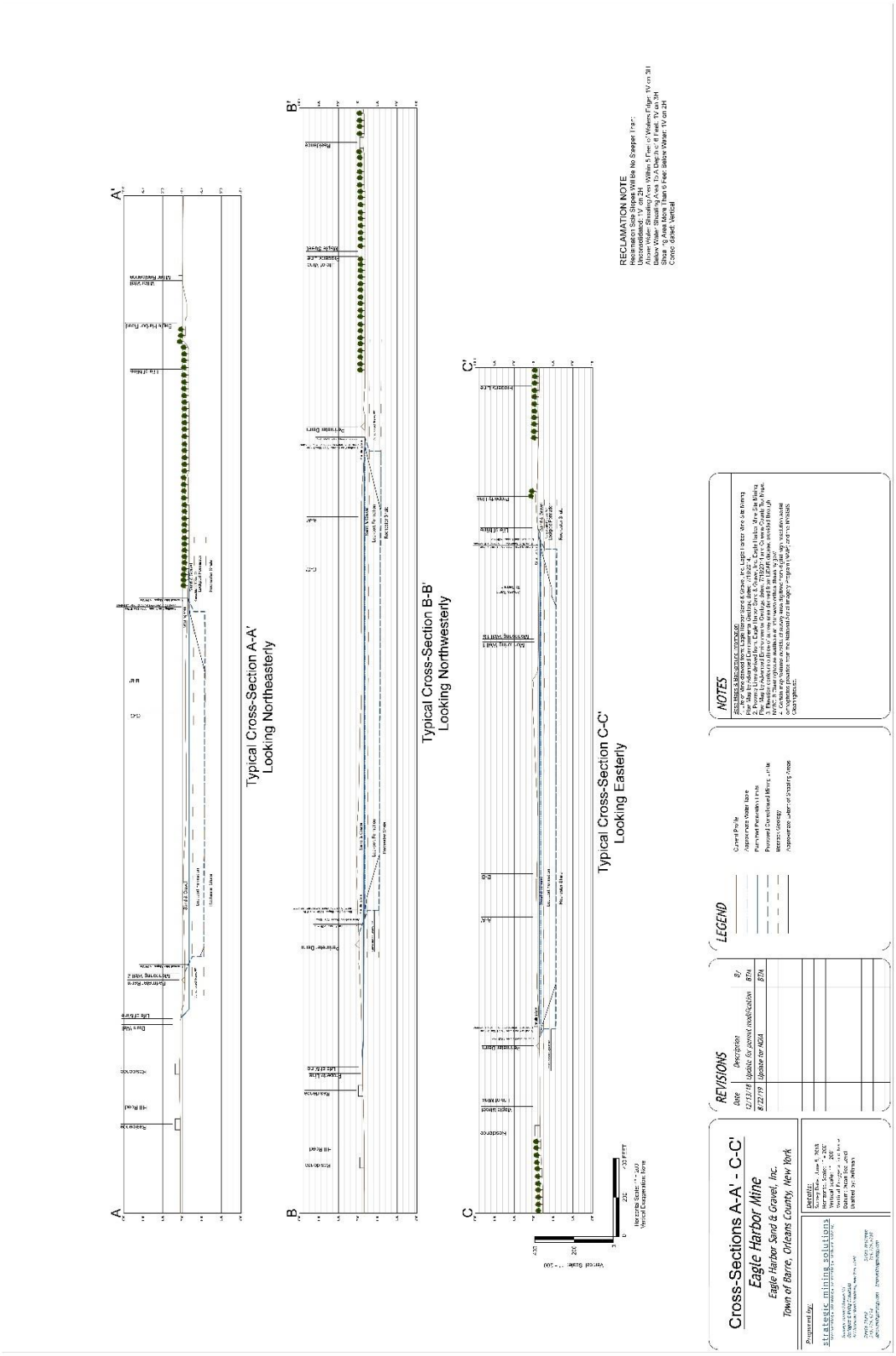


Figure 5. Typical Cross-Sections

Figure 6. Soils Map

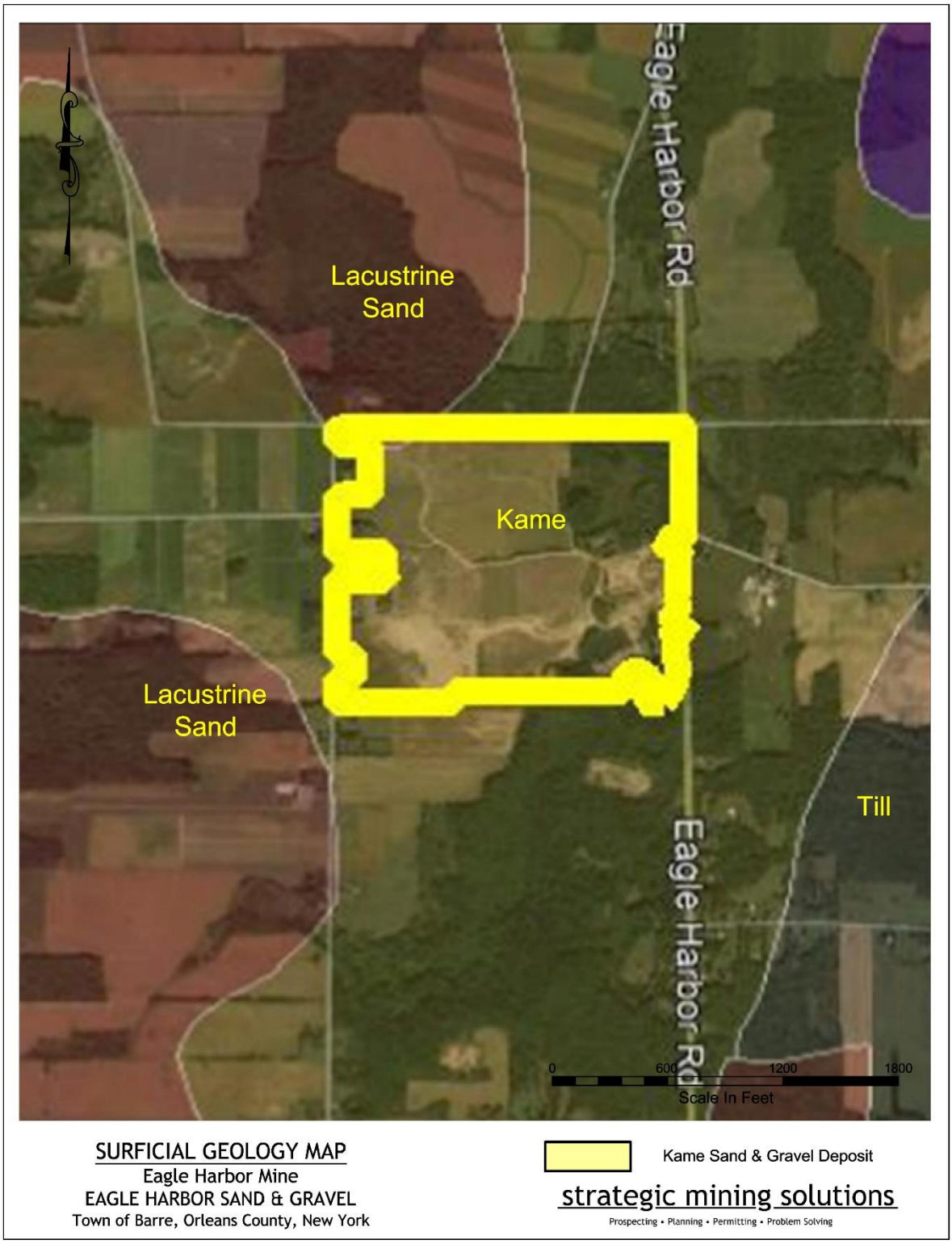


Figure 7. Surficial Geology Map

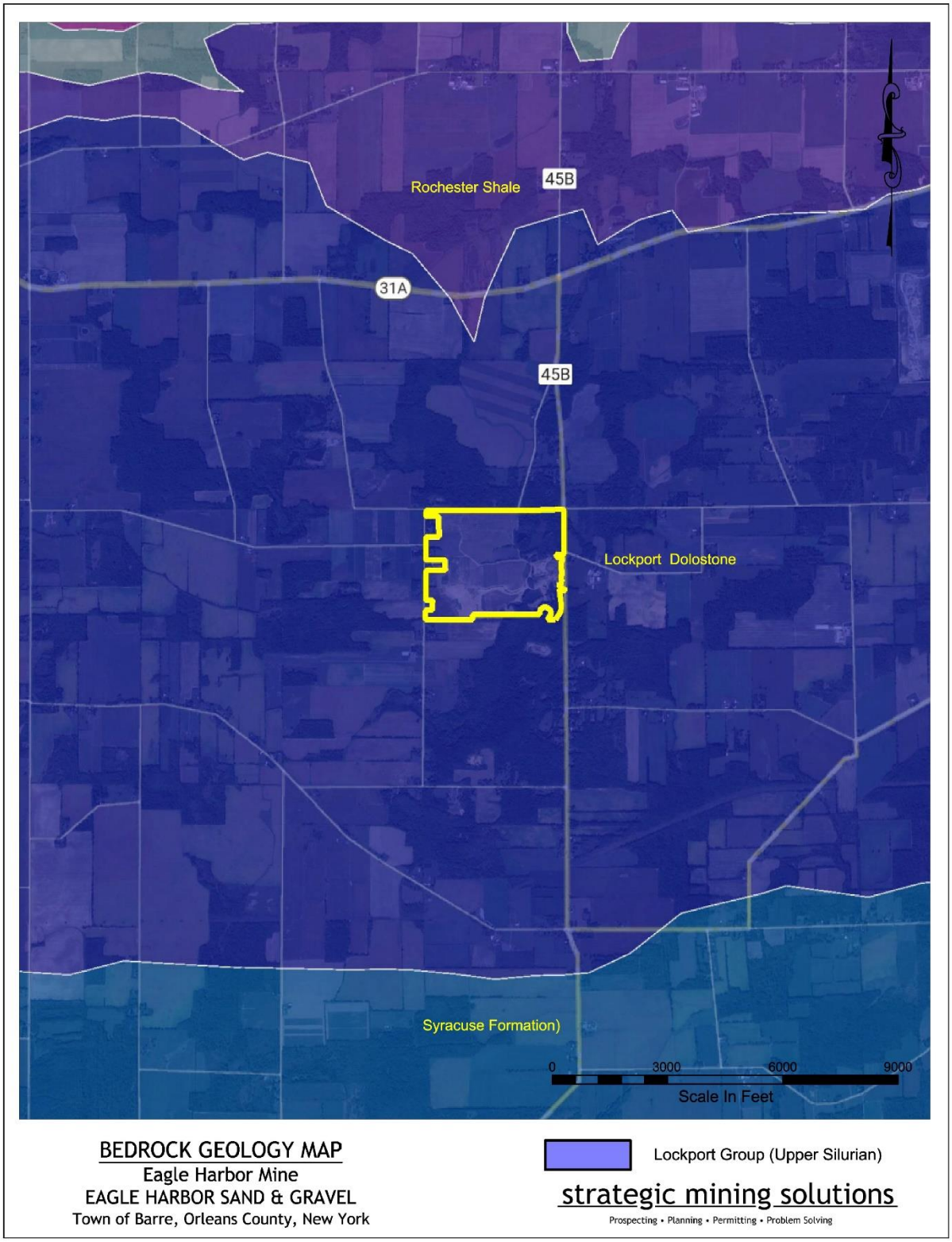


Figure 8. Bedrock Geology Map

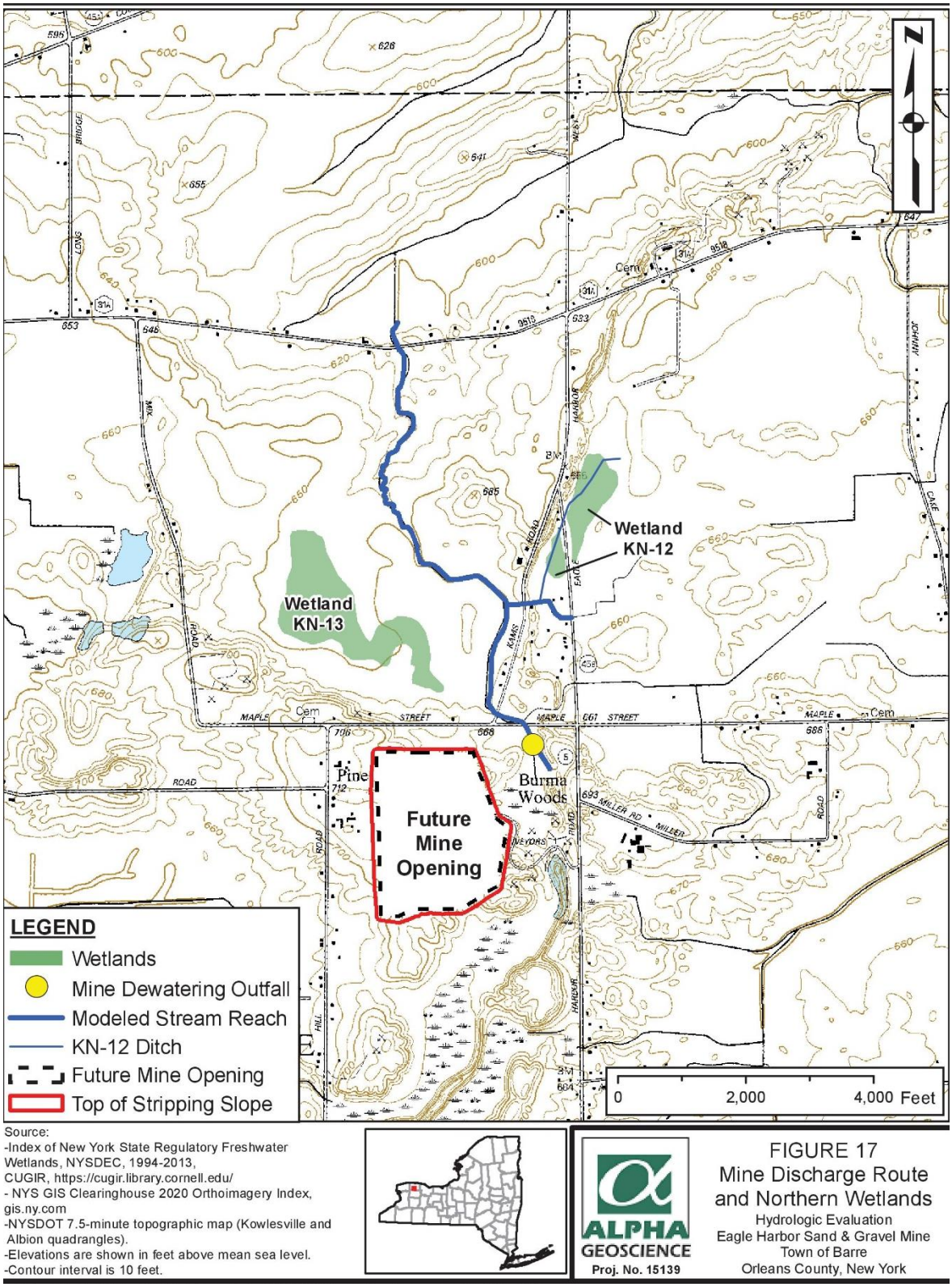


Figure 9. Drainage Route

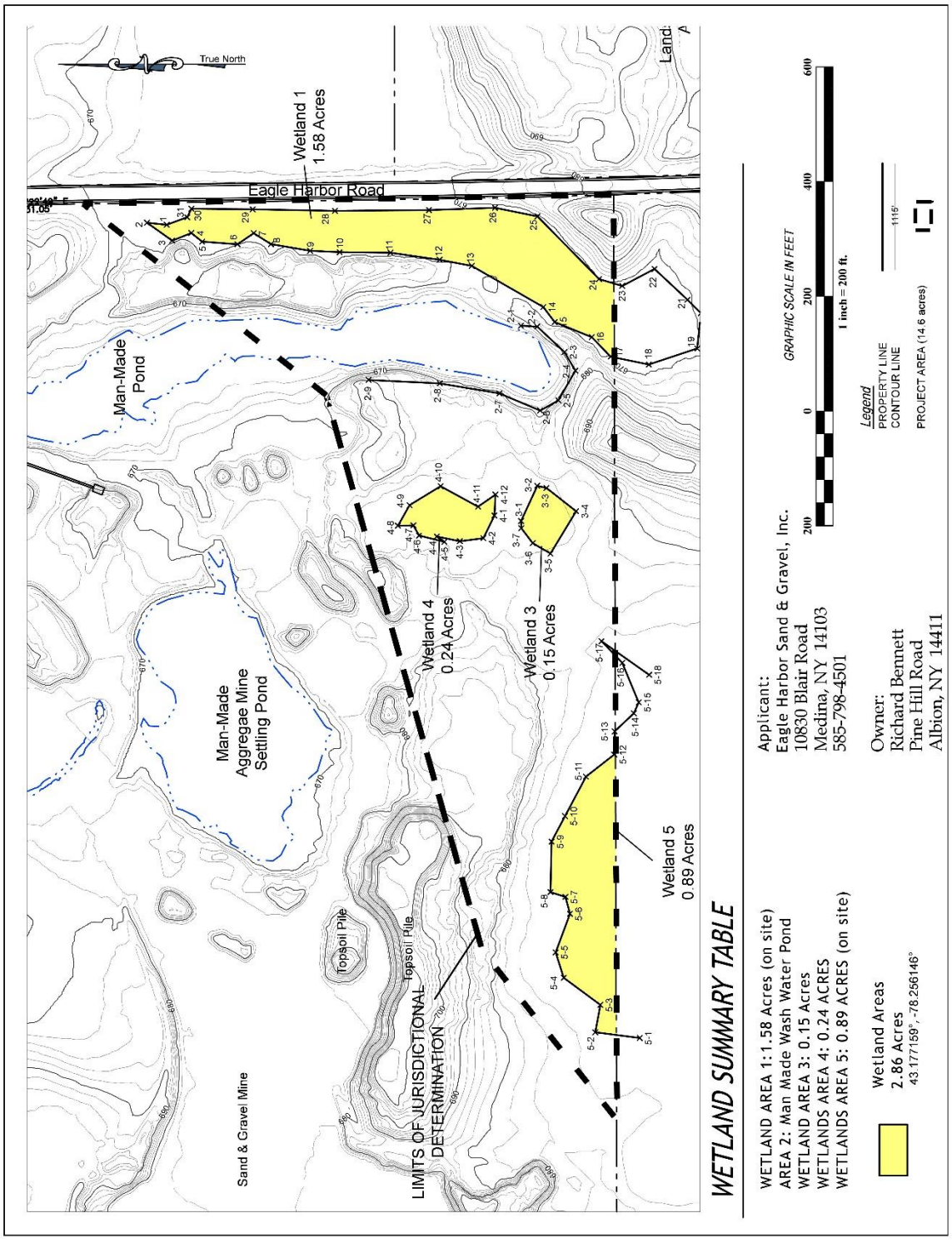


Figure 10. Wetland Map

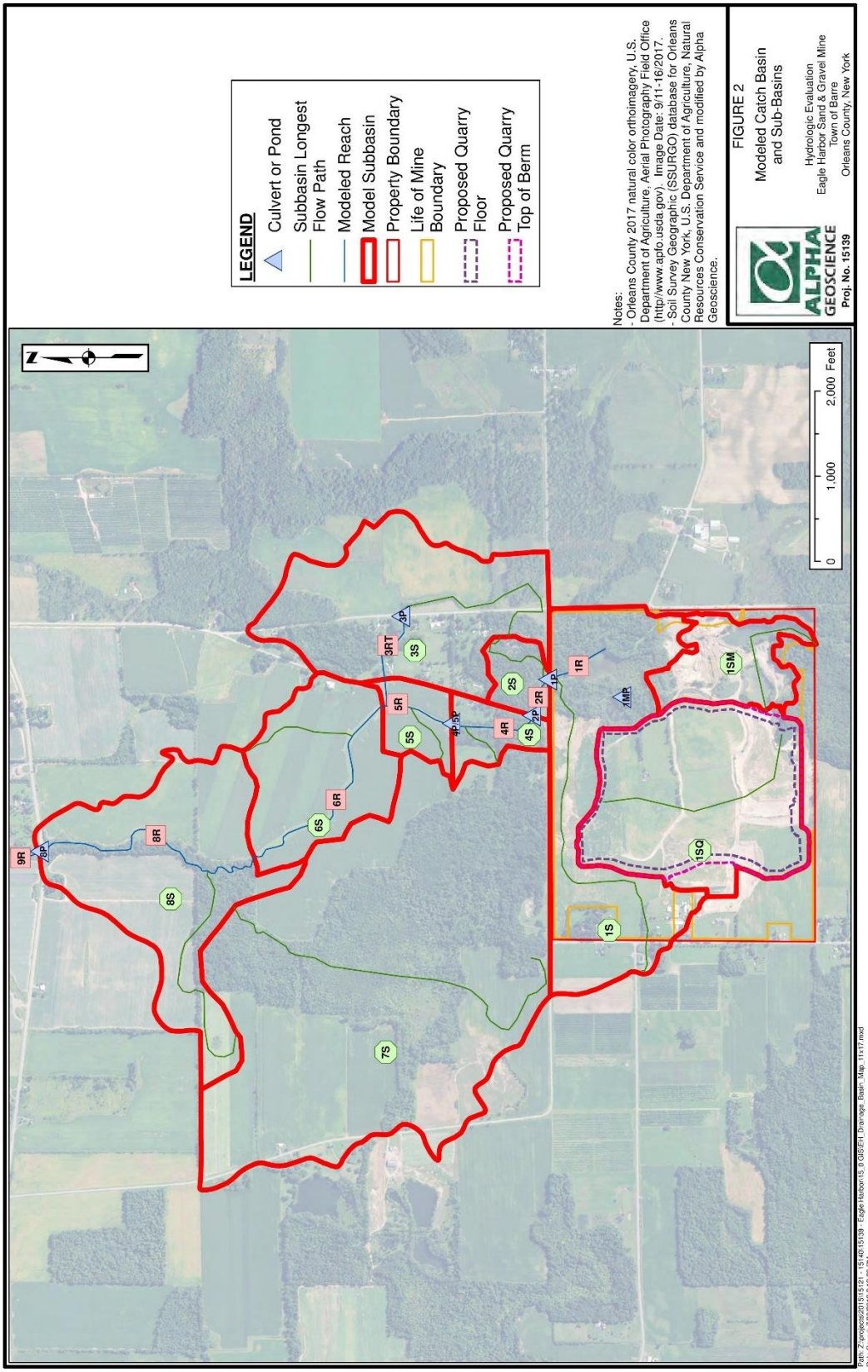


Figure 11. Catch Basins and Sub-Basins

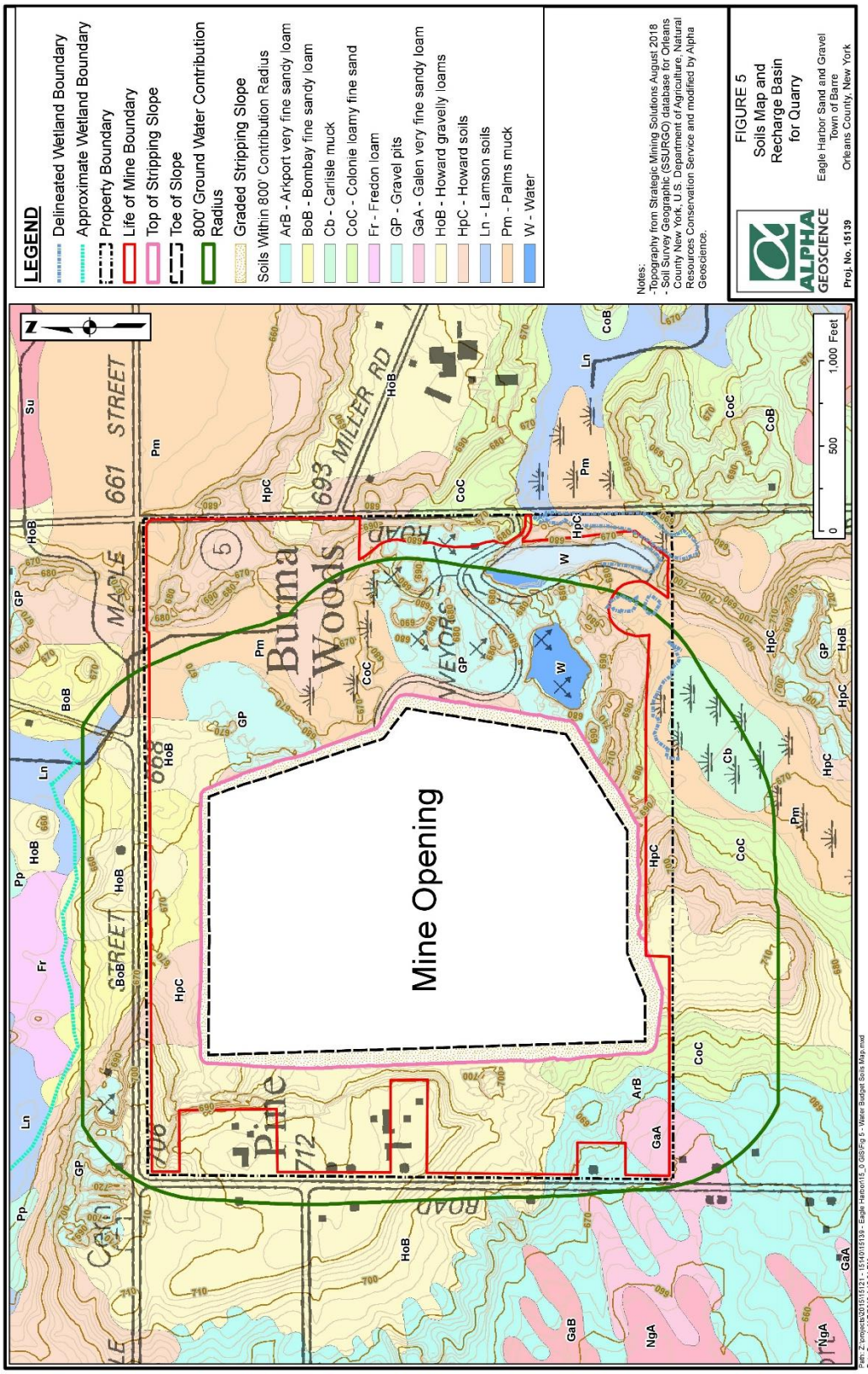


Figure 12. Soils Map of Quarry Recharge Basin

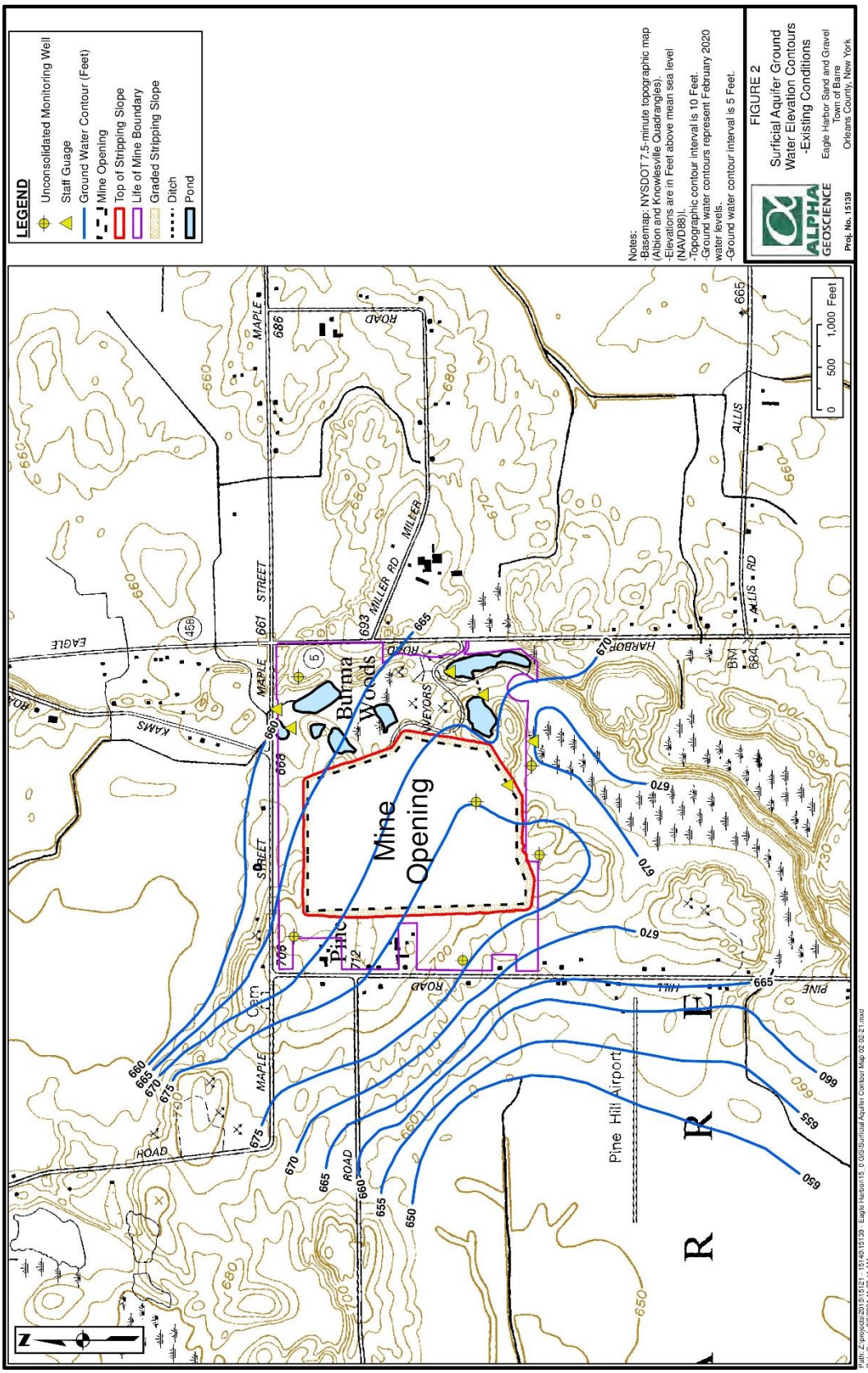


Figure 13. Surficial Aquifer – Existing Conditions

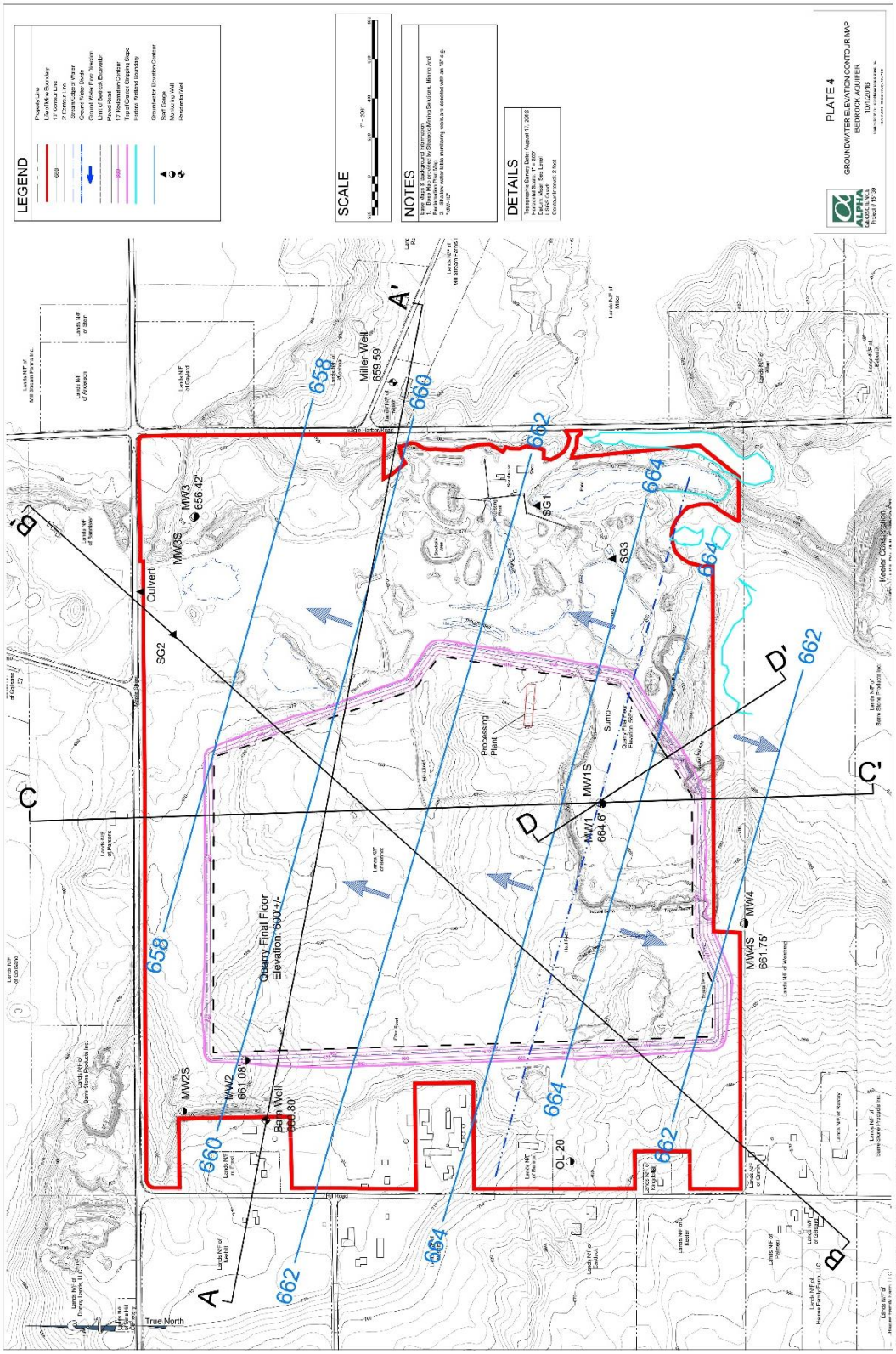


Figure 14. Bedrock Aquifer - Existing Conditions

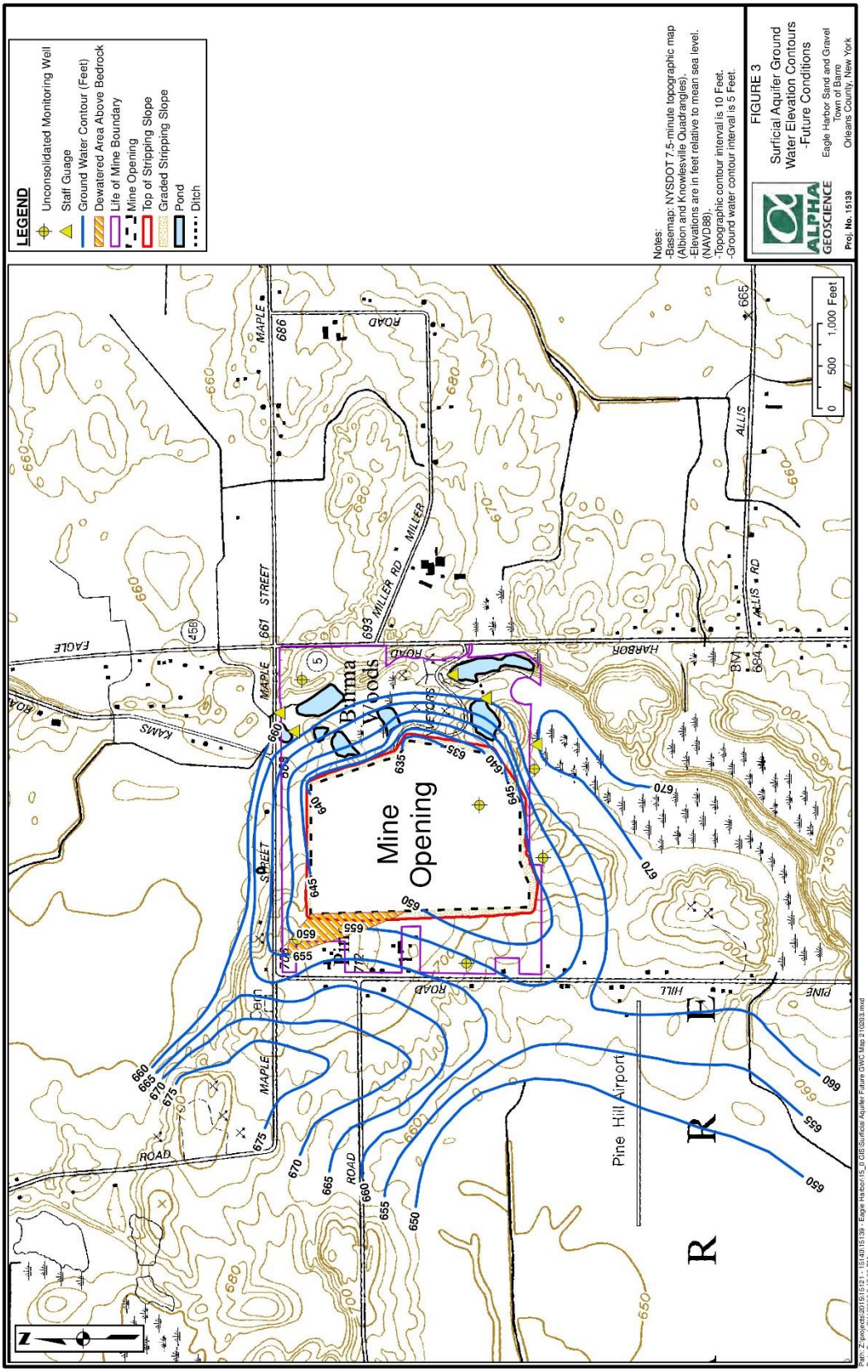


Figure 15. Surficial Aquifer – Full Buildout Conditions

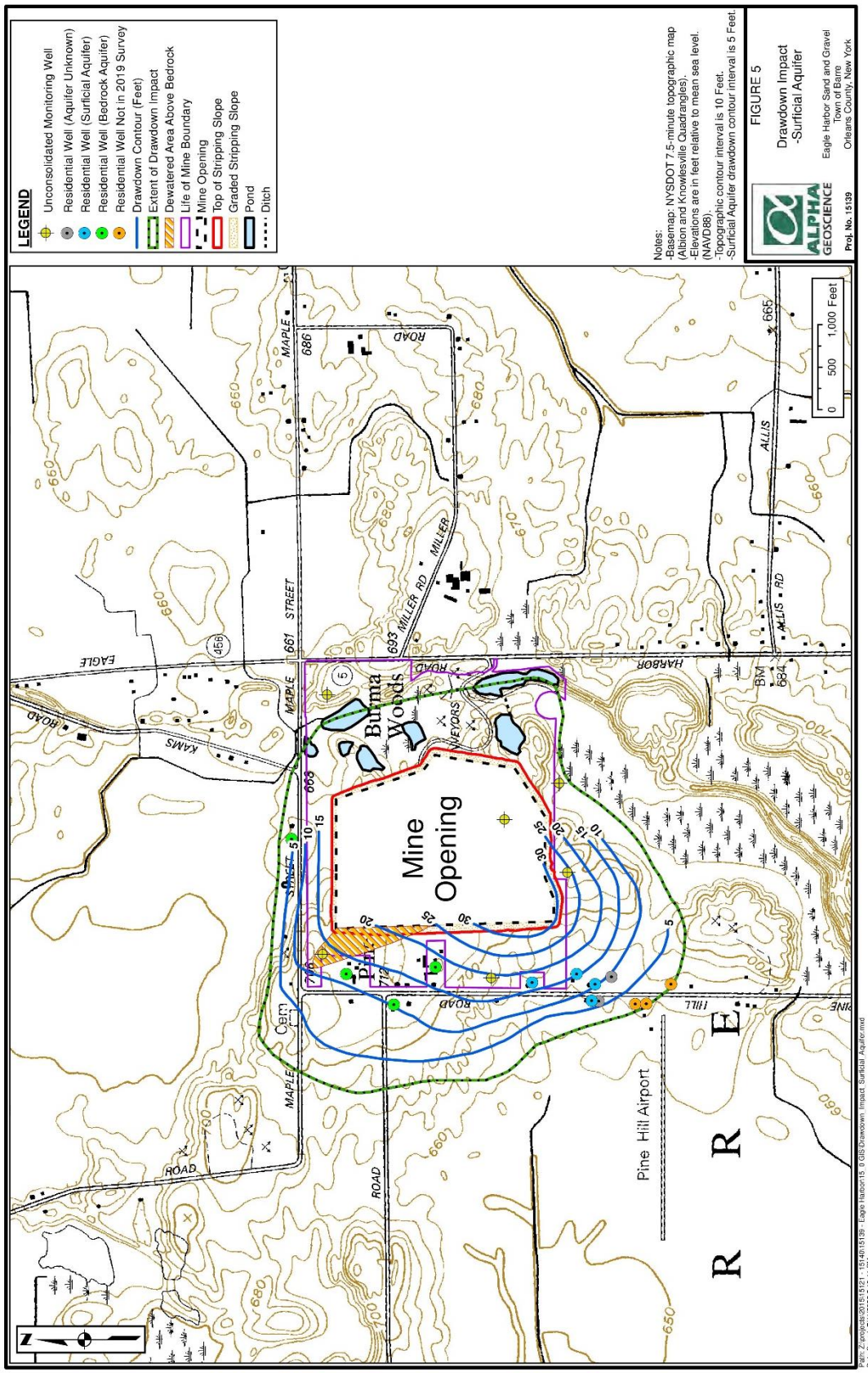


Figure 16. Surficial Aquifer – Drawdown Impact

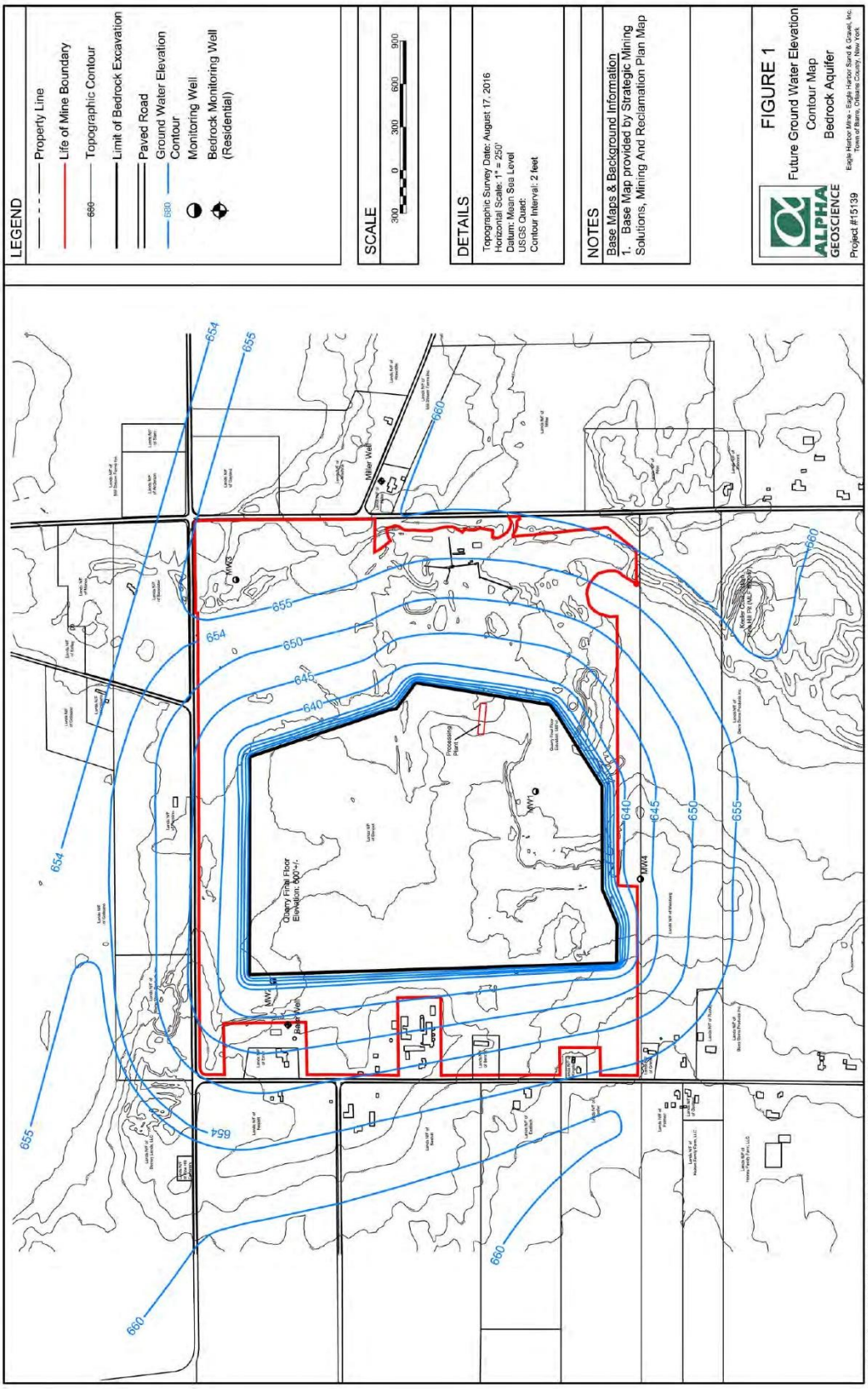


Figure 17. Bedrock Aquifer – Future Conditions

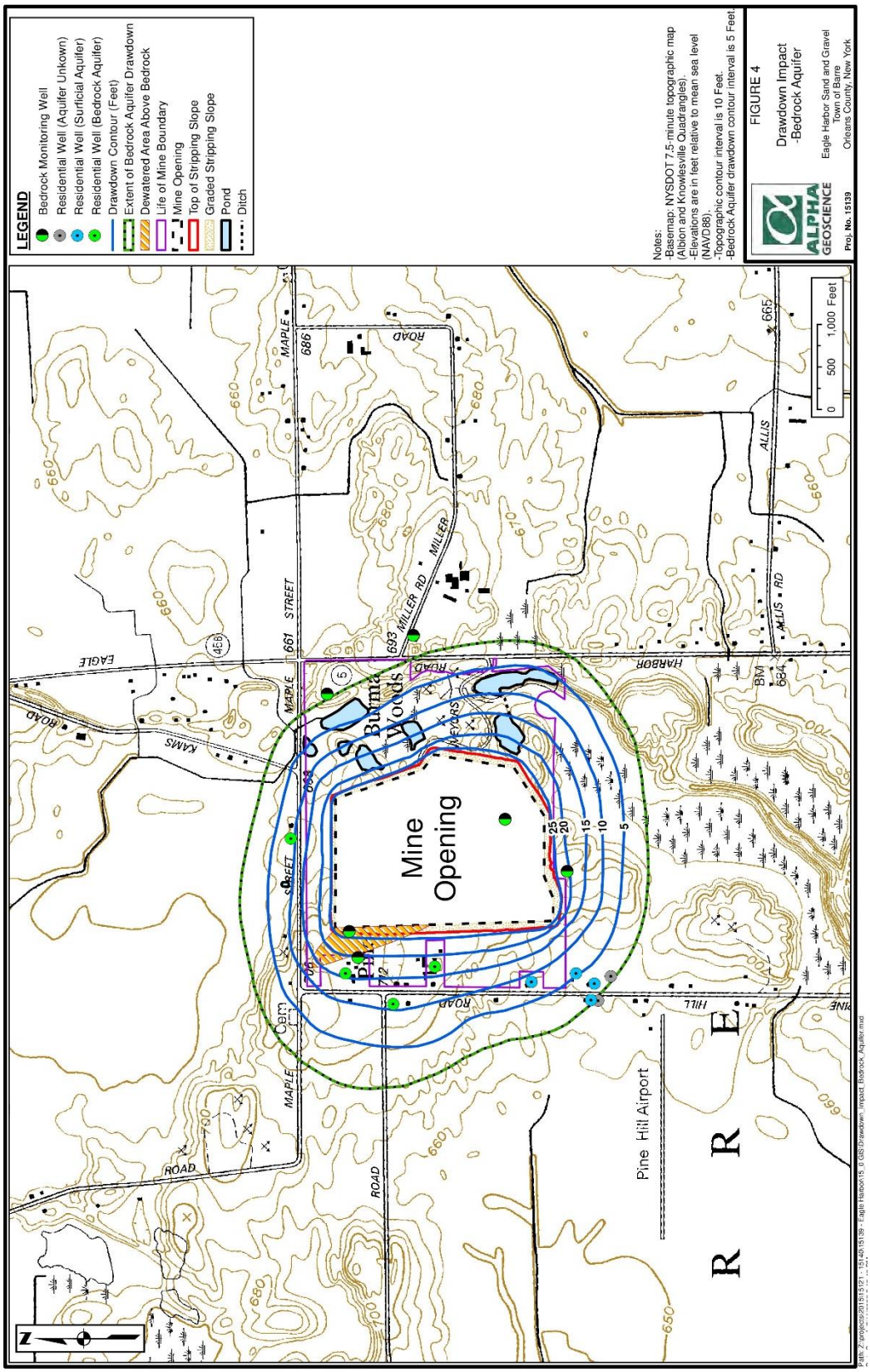


Figure 18. Bedrock Aquifer – Drawdown Impact

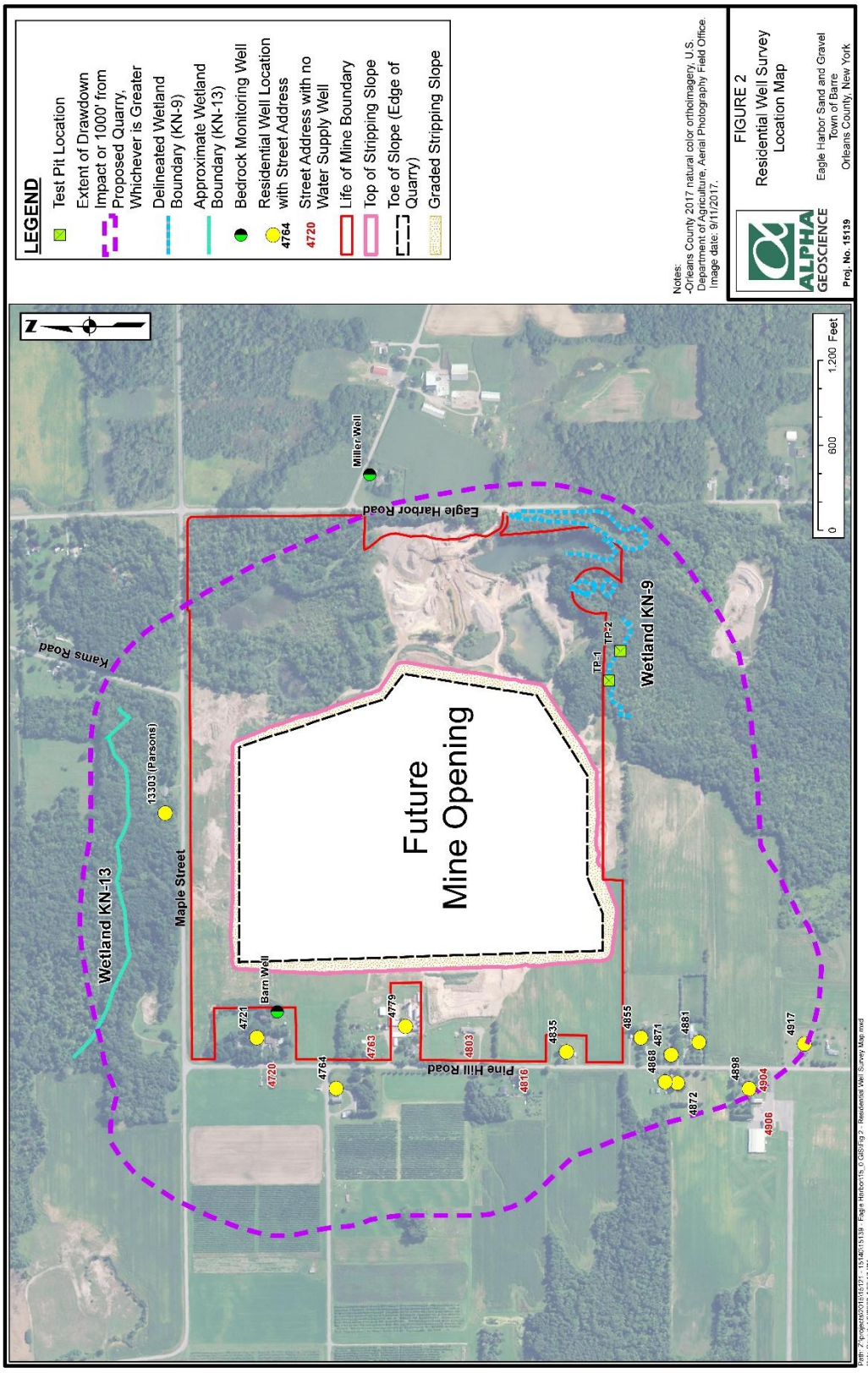


Figure 19. Well Survey Map

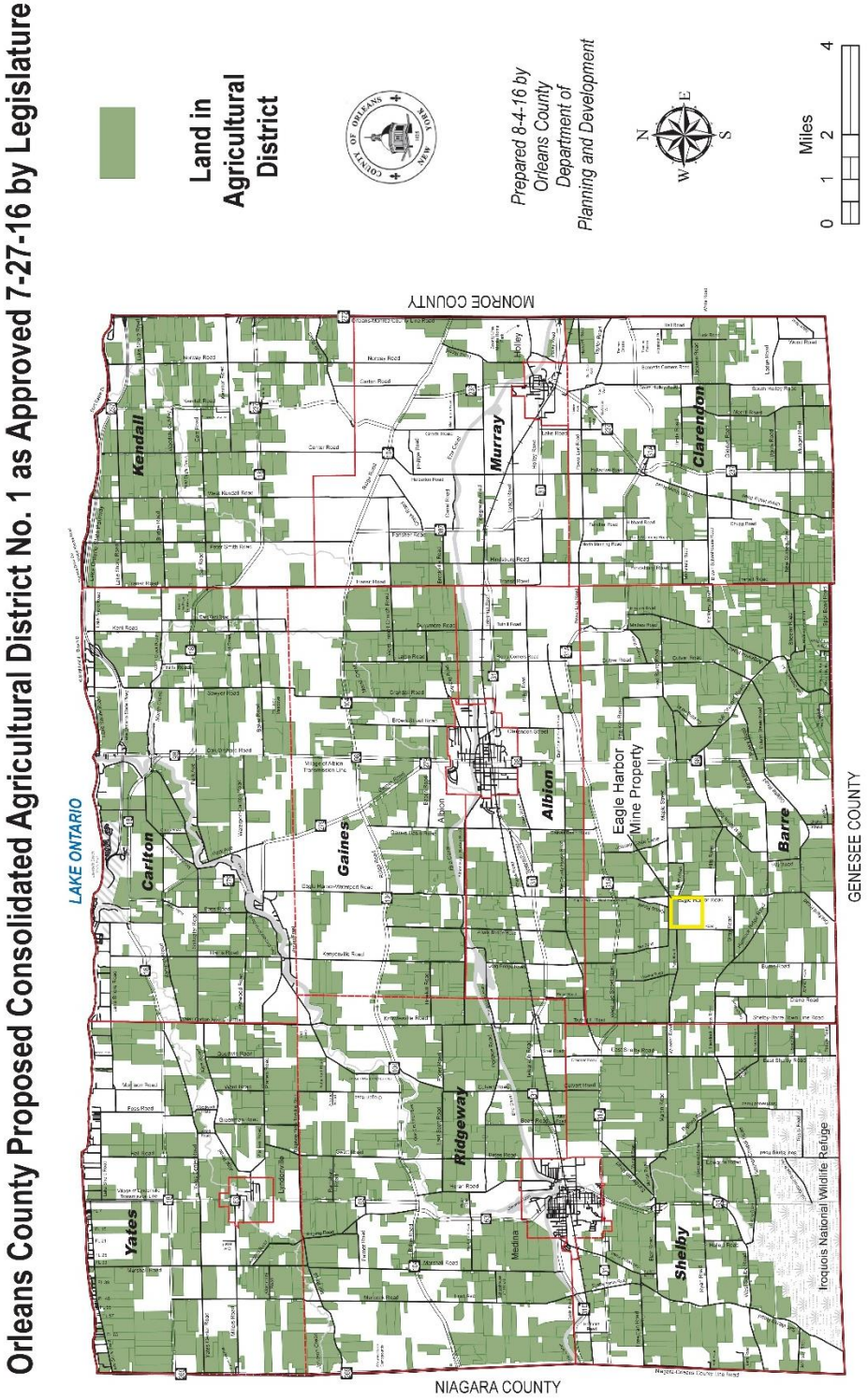
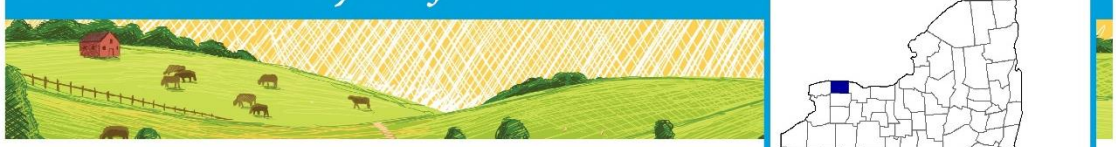
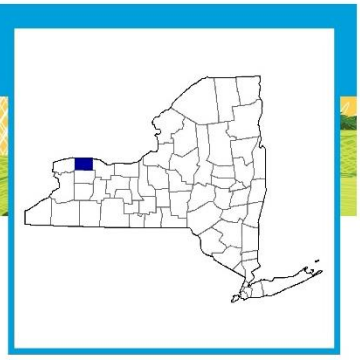


Figure 20. Orleans County Agricultural Districts

2017 CENSUS OF AGRICULTURE *County Profile*





Orleans County
New York

Total and Per Farm Overview, 2017 and change since 2012

	2017	% change since 2012
Number of farms	498	+2
Land in farms (acres)	129,573	-4
Average size of farm (acres)	260	-6
Total	($)	
Market value of products sold	155,282,000	+3
Government payments	3,323,000	+76
Farm-related income	6,482,000	+8
Total farm production expenses	119,008,000	-6
Net cash farm income	46,079,000	+48
Per farm average	($)	
Market value of products sold	311,811	+1
Government payments (average per farm receiving)	17,128	+75
Farm-related income	25,421	-7
Total farm production expenses	238,973	-8
Net cash farm income	92,527	+44

3 Percent of state agriculture sales

Share of Sales by Type (%)

Crops	86
Livestock, poultry, and products	14

Land in Farms by Use (%) [a]

Cropland	83
Pastureland	3
Woodland	9
Other	5

Acres irrigated: 3,228
2% of land in farms

Land Use Practices (% of farms)

No till	8
Reduced till	14
Intensive till	27
Cover crop	14

Farms by Value of Sales

	Number	Percent of Total [a]
Less than $2,500	181	36
$2,500 to $4,999	41	8
$5,000 to $9,999	44	9
$10,000 to $24,999	60	12
$25,000 to $49,999	40	8
$50,000 to $99,999	23	5
$100,000 or more	109	22

Farms by Size

	Number	Percent of Total [a]
1 to 9 acres	63	13
10 to 49 acres	153	31
50 to 179 acres	180	36
180 to 499 acres	53	11
500 to 999 acres	20	4
1,000 + acres	29	6

USDA United States Department of Agriculture
National Agricultural Statistics Service
www.nass.usda.gov/AgCensus

Figure 21. Orleans County USDA Agricultural Census Profile A

Orleans County
New York, 2017
Page 2

2017 CENSUS OF AGRICULTURE *County Profile*

Market Value of Agricultural Products Sold

	Sales ($1,000)	Rank in State [b]	Counties Producing Item	Rank in U.S. [b]	Counties Producing Item
Total	**155,282**	**14**	**61**	**733**	**3,077**
Crops	**133,165**	**3**	**61**	**363**	**3,073**
Grains, oilseeds, dry beans, dry peas	34,518	3	55	932	2,916
Tobacco	-	-	-	-	323
Cotton and cottonseed	-	-	-	-	647
Vegetables, melons, potatoes, sweet potatoes	39,850	2	60	82	2,821
Fruits, tree nuts, berries	36,649	3	60	73	2,748
Nursery, greenhouse, floriculture, sod	(D)	4	60	(D)	2,601
Cultivated Christmas trees, short rotation woody crops	53	39	53	374	1,384
Other crops and hay	(D)	48	55	(D)	3,040
Livestock, poultry, and products	**22,117**	**37**	**58**	**1,571**	**3,073**
Poultry and eggs	53	41	57	1,219	3,007
Cattle and calves	(D)	32	55	(D)	3,055
Milk from cows	16,754	37	51	340	1,892
Hogs and pigs	2	49	55	1,814	2,856
Sheep, goats, wool, mohair, milk	143	38	54	1,024	2,984
Horses, ponies, mules, burros, donkeys	259	26	55	805	2,970
Aquaculture	(D)	11	34	(D)	1,251
Other animals and animal products	45	42	58	1,036	2,878

Total Producers [c]	**829**
Sex	
Male	541
Female	288
Age	
<35	119
35 – 64	496
65 and older	214
Race	
American Indian/Alaska Native	6
Asian	1
Black or African American	-
Native Hawaiian/Pacific Islander	1
White	810
More than one race	11
Other characteristics	
Hispanic, Latino, Spanish origin	6
With military service	73
New and beginning farmers	214

Percent of farms that:

Have internet access	72
Farm organically	5
Sell directly to consumers	15
Hire farm labor	24
Are family farms	95

Top Crops in Acres [d]

Corn for grain	31,711
Soybeans for beans	21,614
Vegetables harvested, all	13,349
Forage (hay/haylage), all	13,011
Apples	5,792

Livestock Inventory (Dec 31, 2017)

Broilers and other meat-type chickens	310
Cattle and calves	9,815
Goats	150
Hogs and pigs	13
Horses and ponies	1,179
Layers	2,832
Pullets	368
Sheep and lambs	1,026
Turkeys	(D)

See 2017 Census of Agriculture, U.S. Summary and State Data, for complete footnotes, explanations, definitions, commodity descriptions, and methodology.
[a] May not add to 100% due to rounding. [b] Among counties whose rank can be displayed. [c] Data collected for a maximum of four producers per farm.
[d] Crop commodity names may be shortened; see full names at www.nass.usda.gov/go/cropnames.pdf. [e] Position below the line does not indicate rank.
(D) Withheld to avoid disclosing data for individual operations. (NA) Not available. (Z) Less than half of the unit shown. (-) Represents zero.

USDA is an equal opportunity provider, employer, and lender.

Figure 22. Orleans County USDA Agricultural Census Profile B

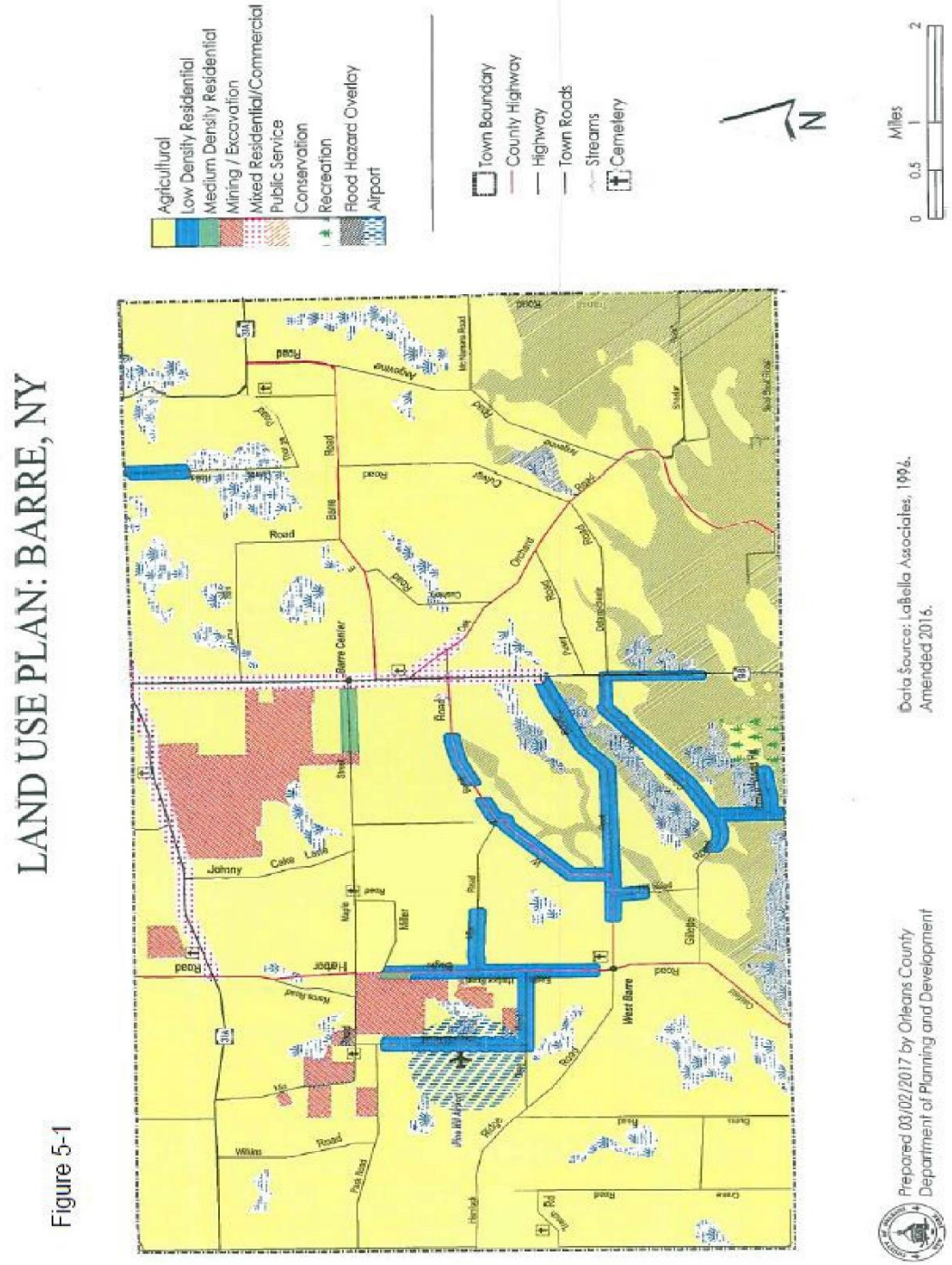


Figure 23. Land Use Plan from Town of Barre Comprehensive Plan

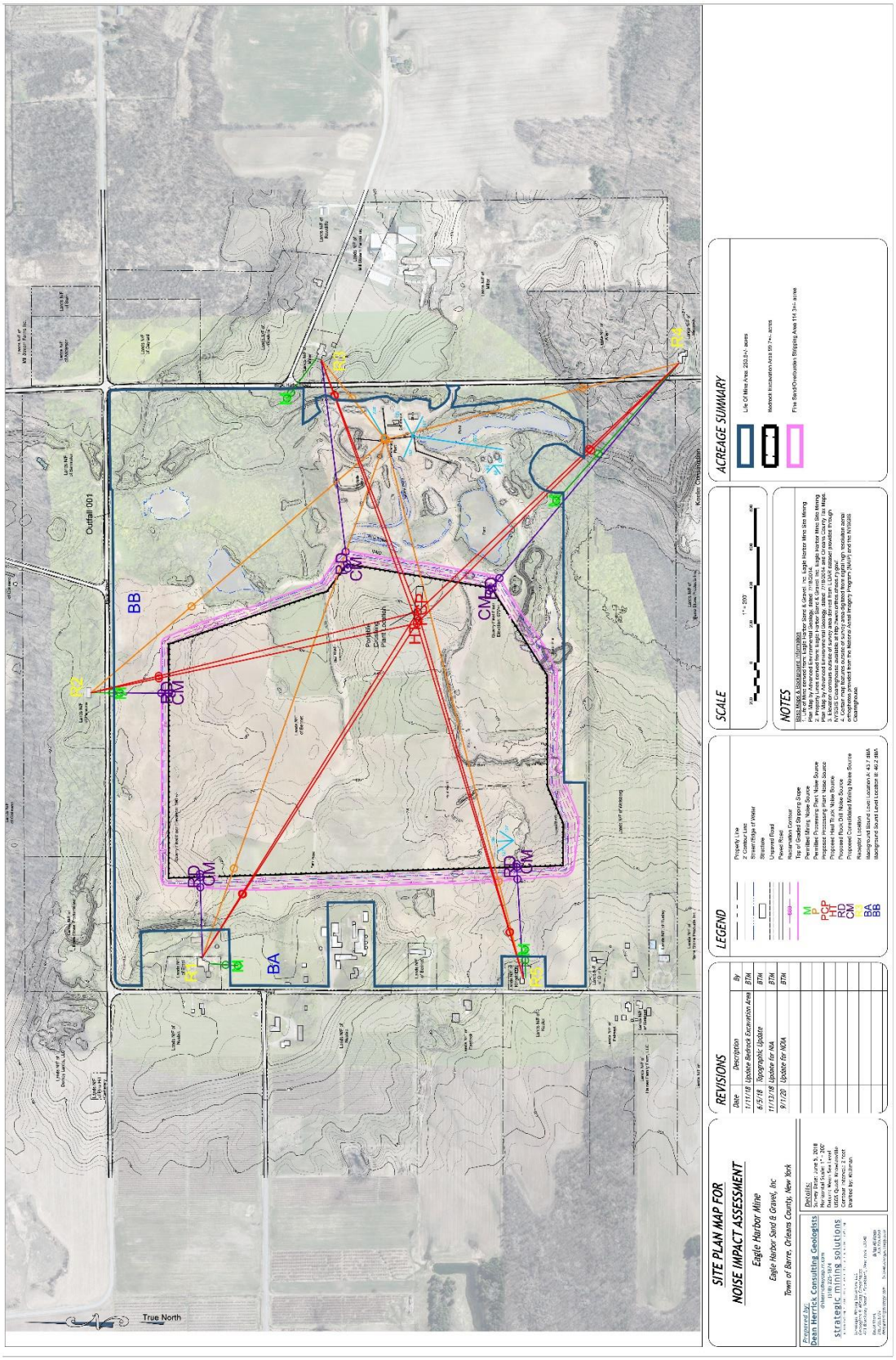


Figure 24. Site Plan Map for Noise Impact Assessment

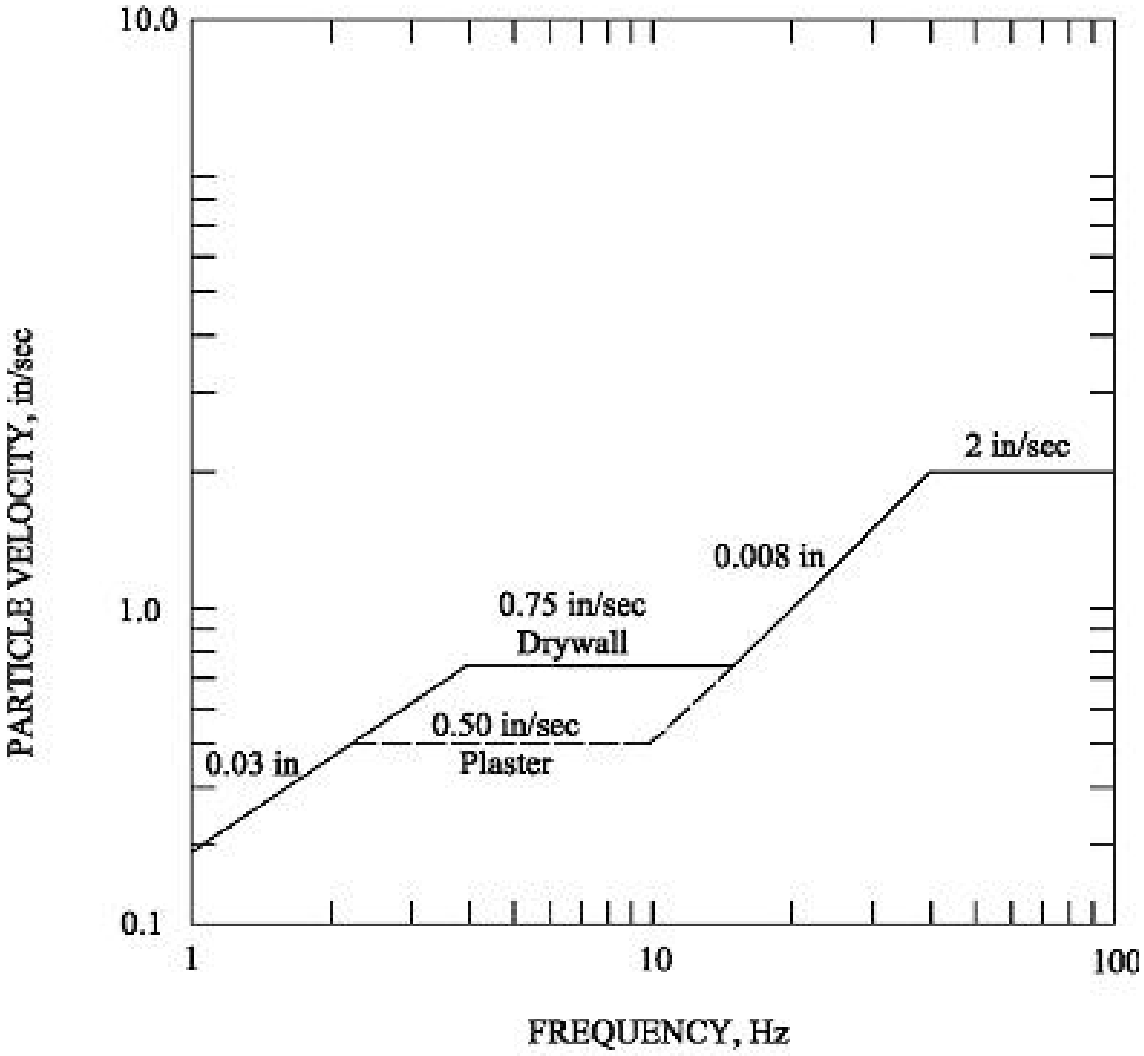


Figure 25. U.S. Bureau of Mines Vibration Guidelines

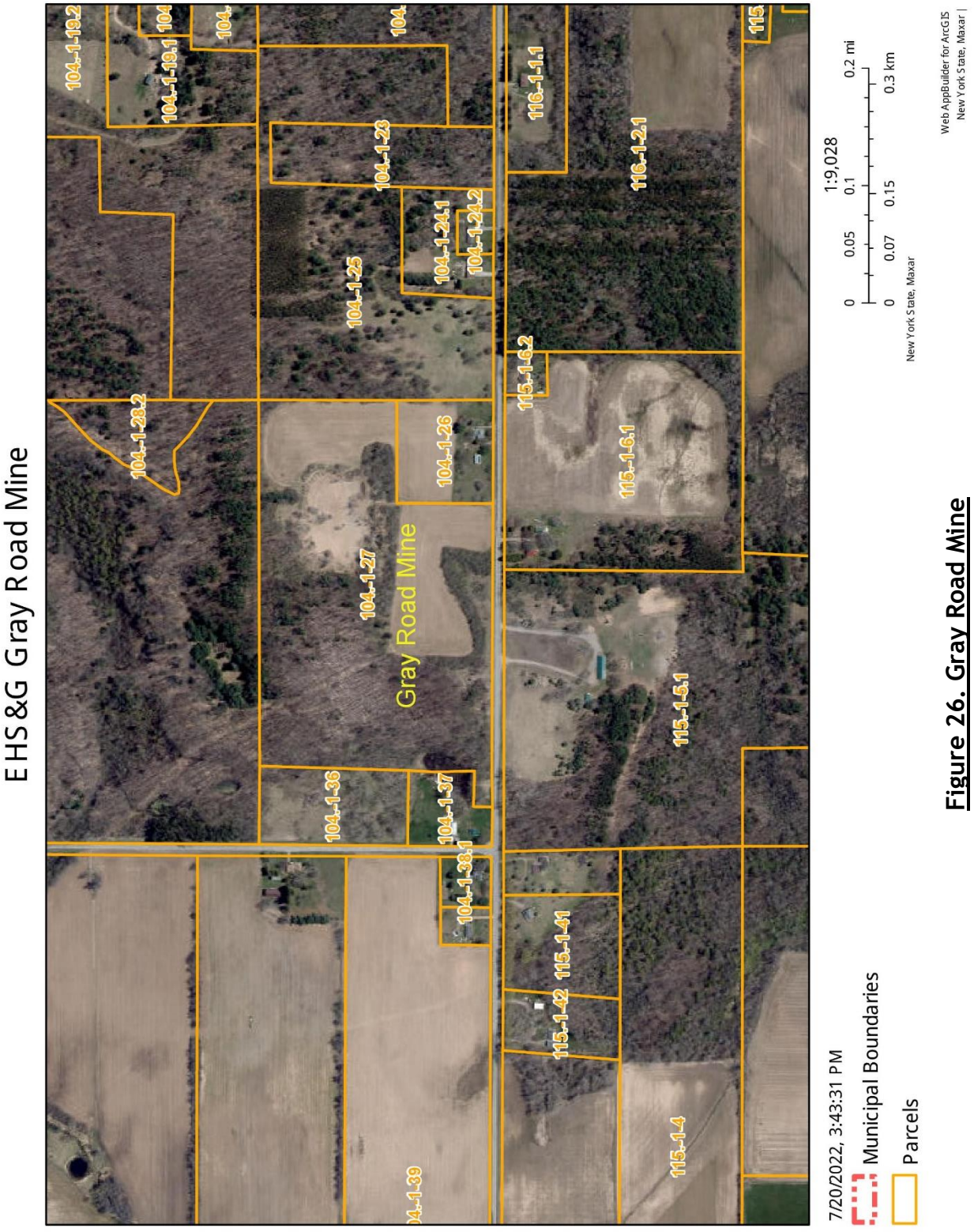


Figure 26. Gray Road Mine

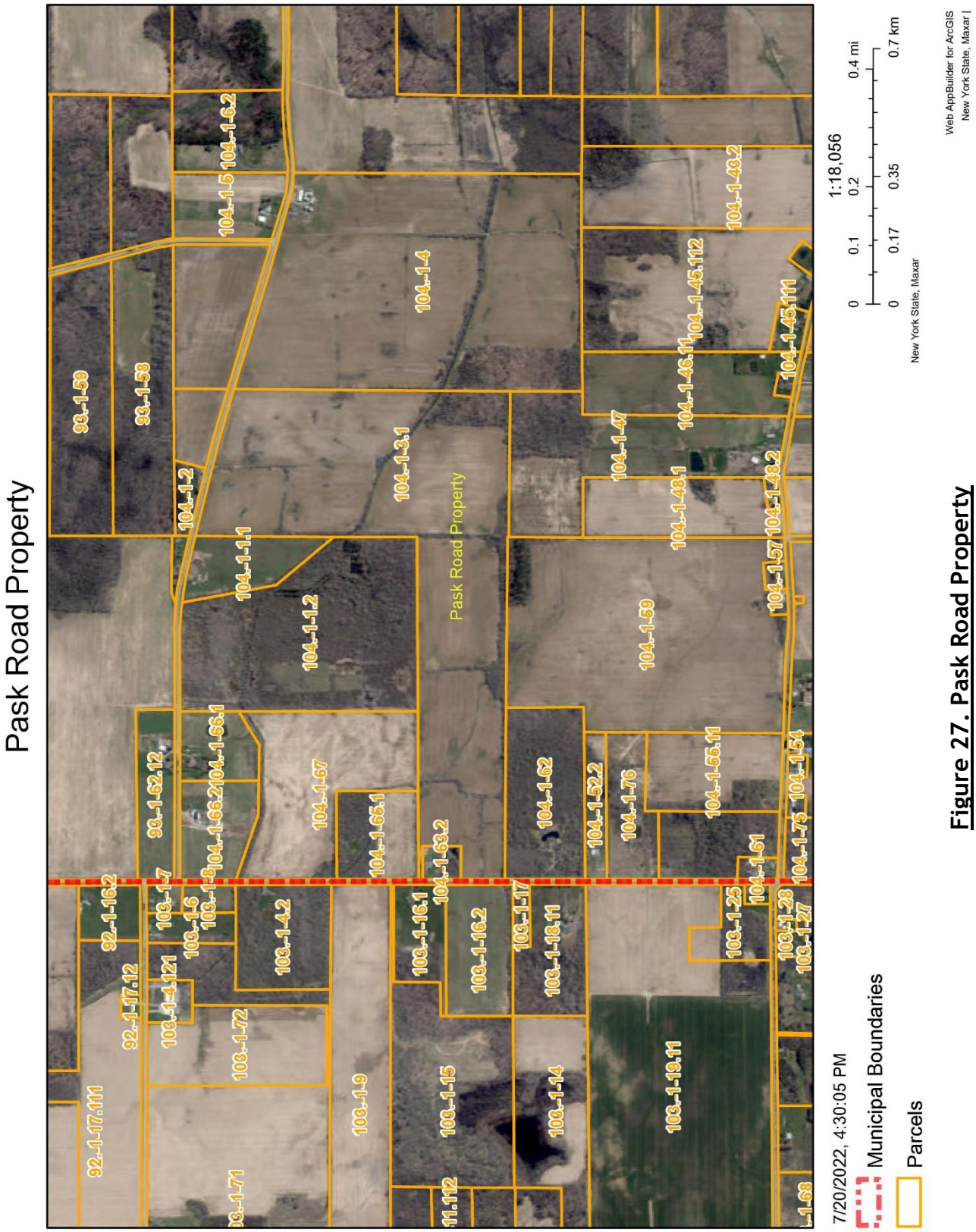


Figure 27. Pask Road Property

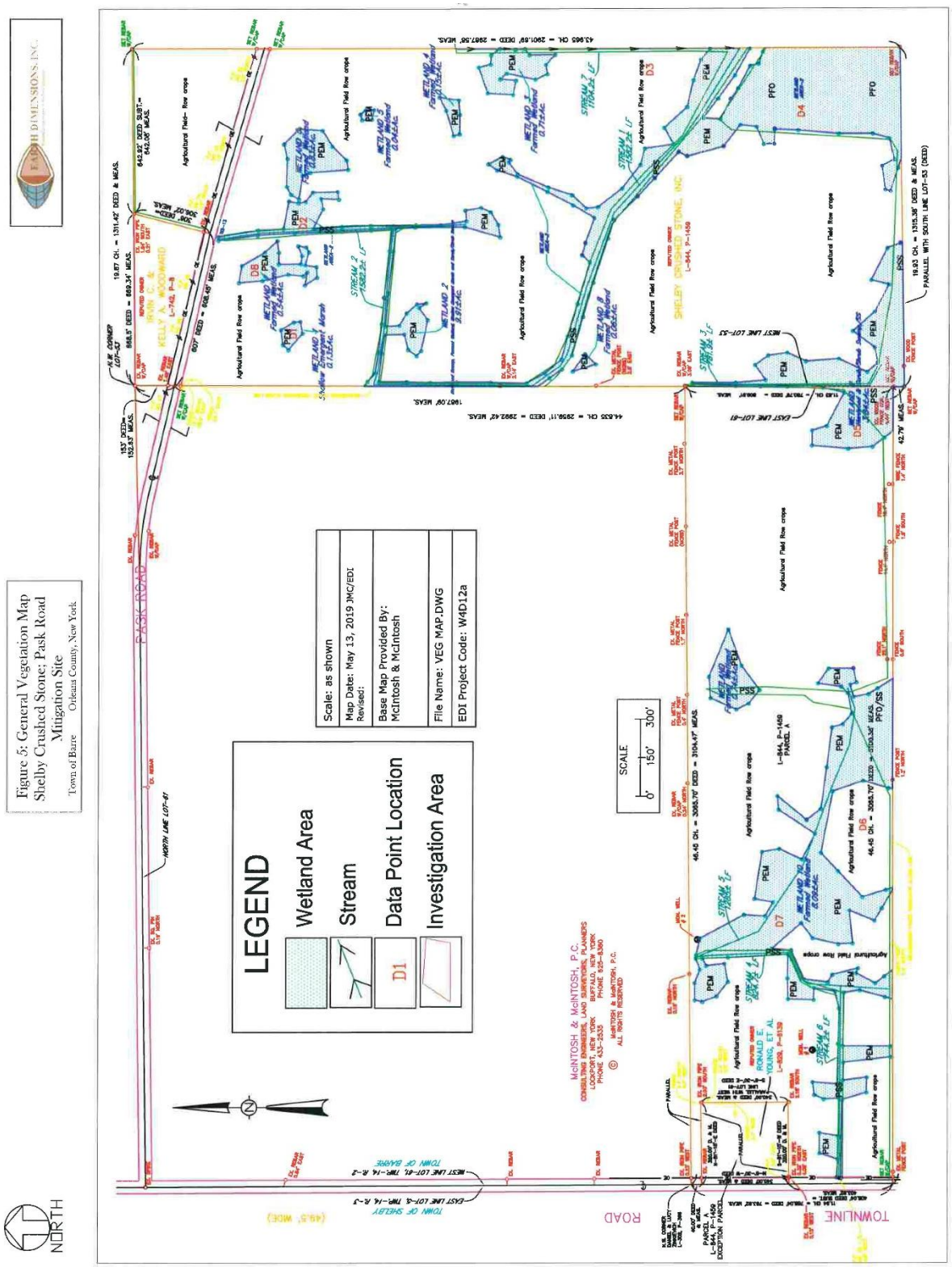


Figure 5: General Vegetation Map
Shelby Crushed Stone; Pask Road Mitigation Site
Town of Barre Orleans County, New York

Figure 28. Pask Road Wetland Map

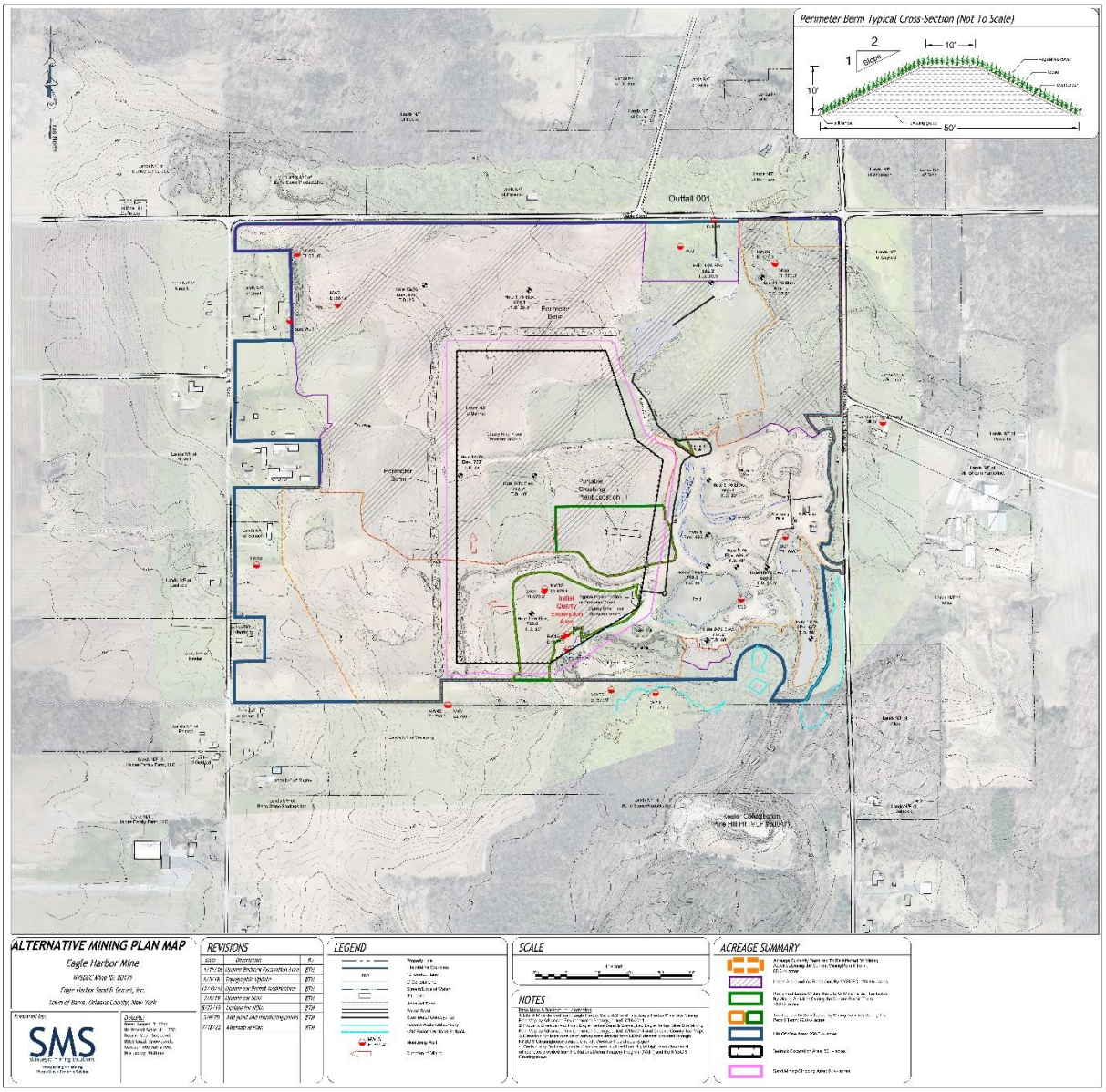


Figure 29. Alternative Mining Plan

11.0 REFERENCES

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12.0 APPENDICES