

McGREGOR LEGERE & STEVENS

ATTORNEYS AT LAW, P.C.

15 COURT SQUARE – SUITE 660
BOSTON, MASSACHUSETTS 02108
(617) 338-6464
FAX (617) 338-0737

LUKE H. LEGERE, ESQ.
E-mail: llegere@mcgregorlaw.com
(617) 338-6464 ext. 126

November 7, 2022

Kevin A. Gaspar, Sr., Chair
Acushnet Soil Conservation Board
Parting Ways Building
130 Main Street
Acushnet, MA 02743

**RE: P.J. Keating Company / 72 South Main Street, Acushnet
Earth Removal Permit Application**

Dear Chairman Gaspar and Members of the Soil Conservation Board:

This firm represents P.J. Keating Company (“PJK”) with respect to its approximately 381-acre parcel of land at 72 South Main Street in Acushnet (the “Property”). Enclosed herewith, please find PJK’s application for an Earth Removal Permit (the “Application”) from the Soil Conservation Board (the “Board”) for PJK’s operations at the Property. The Application is filed under the Town of Acushnet Soil Conservation Bylaw, Article VI of the Town of Acushnet General Bylaws (the “Bylaw”), as revised by Acushnet Town Meeting in 2021.

As you know, the undersigned submitted a letter to the Board, dated September 20, 2022, requesting guidance on numerous administrative questions regarding application under the Bylaw. Those questions arose as a result of ambiguities in the amended Bylaw and/or conflicting information on the Town’s website. It is PJK’s understanding that the Board has never received an application, or issued a permit, under the current iteration of the Bylaw, so PJK has been unable to rely on past experience, review filings by other property owners or look to past decisions of the Board for direction in preparing its Application.

To date, we have received neither a response to our September 20 letter, nor any indication as to when (or whether) PJK might expect a response.¹ Consequently, PJK and its consultants have completed the Application without the benefit of any guidance or input from the Board or its staff.

We trust that the Application will be accepted and a hearing scheduled without delay, but wish to highlight a few issues at the outset.

¹ A copy of our September 20, 2022 letter is attached hereto for your convenience. On October 6, 2022, the undersigned followed up with an e-mail to ask when PJK might expect a response to that September 20 letter, to no avail.



McGREGOR LEGERE & STEVENS

PJK is unaware of any filing fee for applications submitted under the Bylaw, and so has not included one with this Application. As noted in our September 20 letter, the Bylaw indicates that fees may be established, but to PJK's knowledge the Board has not developed a fee schedule or promulgated any regulations governing fees and explaining how they should be calculated.

Due to the size of this Application and supporting materials, it is being filed electronically. Should the Board wish, PJK will be more than happy to provide hard copies of the Application, too (again, we sought guidance on this question in our September 20 letter).

PJK has proposed a performance bond in the amount of \$1,000,000. The Bylaw provides that any bond would be calculated at a rate of \$10,000 per acre, and as explained in our September 20 letter, PJK understands that the acreage in this calculation is based upon the active face of PJK's quarry during the permit year (in other words, \$10,000 per acre of land for which an Earth Removal Permit is sought, as opposed to the total acreage of the Property). The \$1,000,000 performance bond is based upon this calculation.

As detailed in the Application and supporting materials, the amended Bylaw establishes numerous standards which are impractical, if not impossible, for PJK's quarry operation to meet. Therefore, PJK is requesting waivers from the following sections of the Bylaw:

- Section 3 (A), which includes, among other things, an arbitrary 80,000-pound limit on truck weight, which is below the Massachusetts Department of Transportation's standard limit of 99,000 pounds;
- Section 3(B)(k), which requires that the vertical bank be caved-in to a slope no greater than a 2:1 vertical slope, a standard which is not practical (or necessary) to meet for a hard rock quarry;
- Section 5(A), requiring an 18-inch-deep drainage layer and 4-inch-deep topsoil layer which, among other issues, does not fit with PJK's proposed reclamation plan;
- Section 5(B), limiting earth removal permits to a period of one year which – due to the extraordinary effort and expenditure of resources required for PJK to meet the Bylaw's application process and submittal requirements – would require PJK to operate in a perpetual state of preparing an application and applying for an earth removal permit for its as-of-right use of the Property and, from a business perspective, would make planning and committing resources for maintenance, upgrades and other improvements impossible as lending institutions disfavor loans for long-term expenditures with no guarantee of continued operation;
- Section 6(B), which would require a setback of approximately 1,000 feet from the quarry to allow its continued operation, does not account for existing conditions on the Property and would not fit with PJK's proposed reclamation plan;
- Section 9(A), vesting complete and total authority in the Board's Enforcement Officer to single-handedly halt PJK's operations, would render any permit issued by the Board hypothetical and unreliable; and
- Section 10, which includes numerous standards and requirements that do not make sense in the context of a rock quarry operation, and cannot be met in



McGREGOR LEGERE & STEVENS

continuing the operation of PJK's historic, legal quarry.

Please let us know as soon as a hearing date is selected, so that PJK may plan accordingly. Do not hesitate to contact me with any questions in the meantime.

We look forward to working with the Board as it considers PJK's Application.

Sincerely,



Luke H. Legere

cc: Pamela Labonte, Acushnet Town Clerk
Jeffrey T. Blake, Esq.
Jaime Kelly, Acushnet Town Administrator





Application Pursuant to

Town of Acushnet By-Law Article VI

Soil Conservation for the Town of Acushnet

Submitted to:

Town of Acushnet
Soil Conservation Board
122 Main Street
Acushnet, MA 02743

Submitted for:

P.J. Keating Acushnet Quarry
72 South Main Street
Acushnet, MA 02743

Submitted by:

P.J. Keating Company
998 Reservoir Road
Lunenburg, MA 01462



The COMMONWEALTH OF MASSACHUSETTS
TOWN OF ACUSHNET
122 MAIN STREET, ACUSHNET, MA 02743

SOIL CONSERVATION BOARD

508-998-0200 Ext:4202

Required Earth Removal Application Information

In approving the issuance of a permit, the Board may impose reasonable conditions, designed to protect public health, safety and welfare, which may include but not be limited to the following:

1. Location

The location of the proposed excavation, including Assessors' Plat and Lot numbers: **Parcel ID 15-15, 16, 17 and 18**

2. Initial information required

- (a) The legal name and address of the owner of the property involved. **Tilcon, Inc. (c/o P.J. Keating Company) 998 Reservoir Road Lunenburg, MA 01462**
- (b) The legal name and address of the petitioner, which address shall be used by the Board for all correspondence hereunder. **P.J. Keating Company 998 Reservoir Road Lunenburg, MA 01462**
- (c) Names and addresses of all abutting property owners, including those across any streets. **See attached Reclamation Plan Appendix A**
- (d) The proposed method of performance security to be used or a performance bond of \$10,000.00 per acre to secure a permit: **Bond**
- (e) A plan and representative profiles of the area covering the permit prepared by a Registered Professional Engineer, from which final grades may be established: **See attached Reclamation Plan, Figures 14-19 and Sheets 1-4**
- (f) Topographical plans depicting existing and proposed grades. A reclamation plan prepared by a Professional Engineer with all associated costs and requirements to complete the reclamation of the entire property: **See attached Reclamation Plan**
- (g) The finished leveling and grading shall be indicated on approved plans indicated and submitted to the Board: **See attached Reclamation Plan**
- (h) The duration of the completed removal operation: **Approximately 50± years depending on production and demand**
- (i) Method of removal: **Drilling, Blasting, Excavator, Front End Loader, Haul Truck**
- (j) Hours of operation: **6:30 AM – 9:00 PM Monday through Saturday**
- (k) Routes of travel and number of trips for transportation of material both inbound and outbound: **The facility will be accessed from South Main Street (state owned) in Acushnet. At peak operation, averaging years 2016-2018 (average 260 operating days/year) equates to approximately 525 round trips/day (i.e., in and out of facility) for aggregates. At peak operation, averaging years 2016-2018 (average 225 operating days/year) equates to approximately 440 round trips/day (i.e., in and out of facility) for HMA operations. Total average daily trips (ADT) when in full operation is approximately 965.**
- (l) Control of temporary or permanent drainage, discharge and compliance with Article IX of the Town Bylaws. **See attached Reclamation Plan, Section 6.1 and Appendix B.**

(m) A plan to comply with all Town bylaws and regulations: **See attached Reclamation Plan, Appendix D.**

(n) Provide a plan to comply with Section 10 of the Soil Conservation Bylaw: **See attached Reclamation Plan**

(o) The quantity of earth to be removed each year in tons: **Up to 1.2M tons**

Upon receipt of a completed application and payment of applicable fees, the Board may conduct a public hearing on the application. Notice of said hearing shall be provided, at the applicant's expense, to all abutters, owners of land directly opposite on any public or private street or way, and abutters to abutters within three hundred feet, and by publication in a newspaper of general circulation in the Town once, at least seven days prior to the hearing.

The Board may adopt, and may from time-to-time revise, regulations to implement the provisions of this bylaw relative to conducting public hearings and establishing criteria for determining whether a project is likely to result in a nuisance or that it will otherwise create a risk of harm to public health, safety and welfare.

Owners Signature: *Derrick Hill, President*

Applicant (if different):

Date: November 7, 2022



Mining and Reclamation Plan

Acushnet Quarry

November 2022



Prepared For:

P.J Keating Company Acushnet, MA Facility
72 South Main Street
Acushnet, MA 02743

Prepared By:

TRC
650 Suffolk Street
Lowell, MA 01854

Submitted to:

Town of Acushnet
Soil Conservation Board
122 Main Street
Acushnet, MA 02743



TABLE OF CONTENTS

1.0	PLAN SUMMARY	1
2.0	PURPOSE AND OBJECTIVES.....	4
3.0	SITE DESCRIPTION AND ENVIRONMENTAL SETTING	5
3.1	Site Location and Size	5
3.2	Surface Mining	5
3.2.1	Site History.....	5
3.2.2	Existing Land Uses	5
3.3	Access and Infrastructure	9
3.4	Geology.....	9
3.5	Hydrology.....	13
3.5.1	Climate and Rainfall.....	13
3.5.2	Surface Waters	13
3.5.3	Groundwater	14
3.5.4	Jurisdictional Waters	15
3.6	Vegetation and Wildlife	15
3.6.1	Vegetation	15
3.6.2	Wildlife.....	16
3.6.3	Soils	16
4.0	PLANNED MINING OPERATIONS.....	20
4.1	Quantity and Type of Materials	20
4.2	Initiation and Termination Dates	20
4.3	Description of Existing and Planned Mine	20
4.3.1	Vegetation, Topsoil, and Overburden Removal.....	28
4.3.2	Excavation and Blasting.....	28
5.0	SECOND LAND USE PLAN	30
5.1	Potential Second Land Use	30
5.2	Areas Available for Concurrent Reclamation.....	30
6.0	RECLAMATION PRACTICES AND ACTIONS	33
6.1	Drainage, Stormwater, and Erosion Control	33
6.1.1	Stormwater Runoff Control and Management	36
6.1.2	Erosion Control	37
6.1.3	Dust Control	38
6.2	Protection of Fish and Wildlife	42
6.2.1	Wildlife.....	42
6.3	Site Facility Reuse	42
6.3.1	Building, Structure, and Equipment Removal	42

6.4	Revegetation During Reclamation	42
6.4.1	Topsoil Salvage, Maintenance, and Redistribution.....	43
6.4.2	Test Plots	43
6.4.3	Site Preparation	43
6.4.4	Revegetation Species, Actions, and Success Criteria.....	43
6.4.5	Estimated Costs of Reclamation.....	44
6.4.6	Monitoring and Maintenance.....	44
6.5	Geotechnical Requirements.....	45
6.6	Public Safety/Closure.....	46
6.7	Town Bylaws	46
7.0	REFERENCES.....	50

TABLES

Table 1.	Estimated Costs of Reclamation	44
----------	--------------------------------------	----

FIGURES

Figure 1.	Regional Location	3
Figure 2.	Site Location	6
Figure 3.	Zoning Designations	7
Figure 4.	Annotated Map of Site Showing Operational Areas.....	8
Figure 5.	Surficial Geologic Deposits near the PJK Quarry	10
Figure 6.	Bedrock Geology near the PJK Quarry	12
Figure 7.	Wildlife Potential Habitat Areas	17
Figure 8.	Soils Map for the PJK Quarry Area	18
Figure 9.	Quarry Plan.....	21
Figure 10.	Quarry Cross-Sections.....	22
Figure 11.	Quarry Slope Detail.....	23
Figure 12.	Conceptual Phasing Plan.....	24
Figure 13.	Reclamation Plan View	25
Figure 14.	Reclamation Plan Cross-Sections.....	26
Figure 15.	Topsoil and Overburden Stockpile Locations	27
Figure 16.	Blast Pattern Setup	29
Figure 17.	View of Quarry from Biogen Headquarters.....	31
Figure 18.	Biogen Headquarters at Former Quarry Site in Weston MA in Plan View.....	32

SHEETS

Sheet 1	Existing Conditions Aerial Photograph
Sheet 2	Quarry Plan and Cross-Sections
Sheet 3	Reclamation Plan and Cross-Sections
Sheet 4	Proposed Conditions Aerial Photograph

APPENDICES

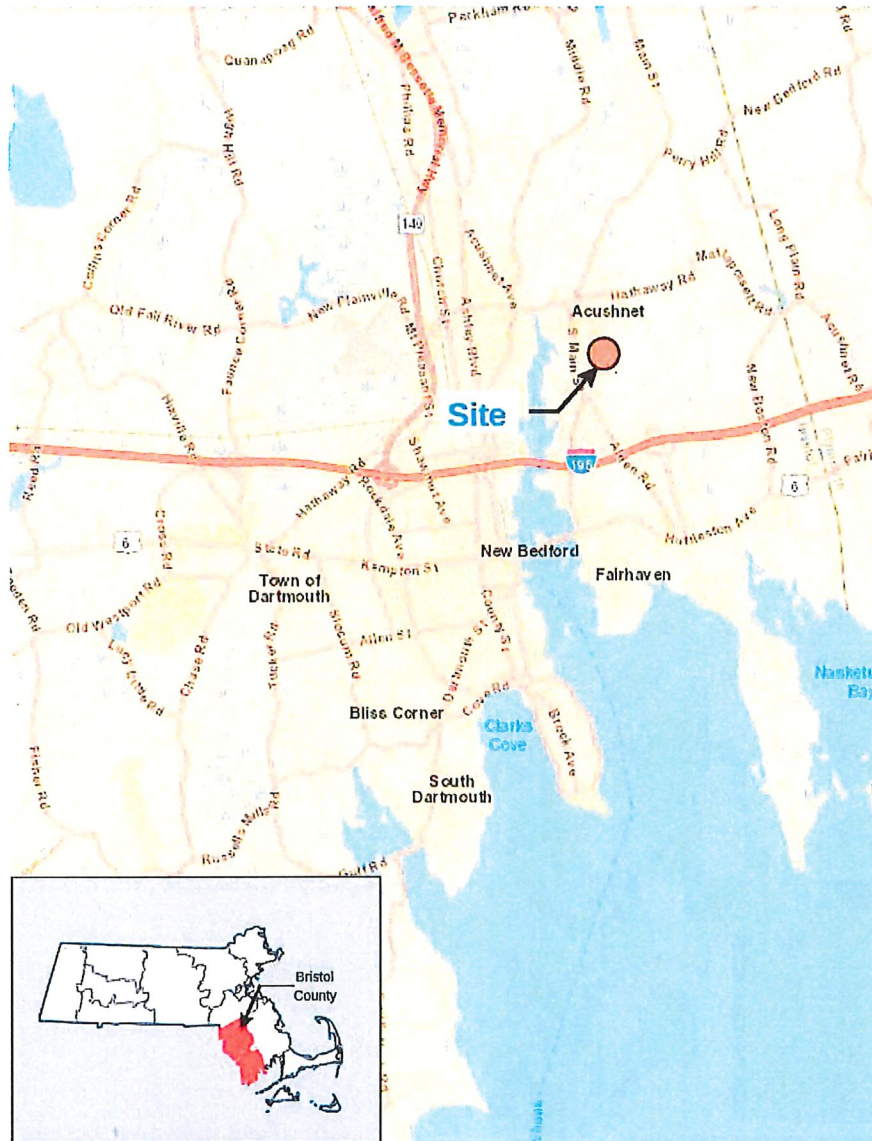
- Appendix A Adjacent Parcels/Owners within 300 feet
- Appendix B Slope Stability Evaluation
- Appendix C Bylaw Applicability and Assessment



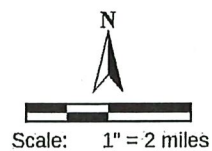
1.0 Plan Summary

Name:	P.J. Keating Acushnet Quarry
Mine Operator/Petitioner:	P.J. Keating Company, A CRH Company
Street Address or P.O. Box:	998 Reservoir Road
City, State, Zip Code:	Lunenburg, MA 01462
Telephone Number:	978-732-3761
Contact Name:	Doug Vigneau,
Contact Email:	douglas.vigneau@pjkeating.com
Property Owner:	Tilcon Inc. (c/o P.J. Keating Company) 998 Reservoir Road Lunenburg, MA 01426
Abutting Property Owners:	See Appendix A
Proposed Method of Performance Bond:	Bonding at \$1,000,000
Location of Proposed Excavation:	72 South Main Street Acushnet, MA 02743 (see Figure 1, "Regional Location")
Assessor's Parcel Information:	Book/Page 70/151; Parcel ID 15-15,16,17 and 18, Location ID M-249472-824941, LUC Description: Quarry
Reclamation Plan and Representative Profiles:	Included in this Reclamation Plan
Latitude and Longitude (at Center of Site):	41° 40' 25" North, 70° 54' 7" West Latitude: 41.67477 Longitude: -70.89373
Directions to the Site:	From Boston Follow I-95, MA-24/State Route 24 and MA-140 to Ashley Blvd in New Bedford. Take exit 6 from MA-140 S. Follow Ashley Blvd, Acushnet Avenue and Main Street to your destination in Acushnet. From Providence RI via I-195 E and Main Street. Transporters make their own decisions on best routes for them and is beyond the control of PJK.
Total Parcel Size(s):	± 381 acres
Total Area to Be Mined:	± 113 acres (2023-2073)
Maximum Depth Mined	± 467 feet below mean sea level

Limits of Surface Disturbance	±139 acres (2023-2073)
Total Area to Be Reclaimed:	±139 acres
Quantity and Type of Materials to Be Mined:	±57 million tons of rock and gravel (including overburden and washed-stone fines). (2023-2073)
Proposed Start Date and Termination Date:	Existing operation; mining of expansion to start after approval, approximately spring 2023. Anticipated Termination: 50 years from approval of expansion, approximately December 31, 2073.
Potential Land Use after Reclamation:	Highest and best use as determined at end of quarry life. As examples, basin suitable for water storage, commercial/industrial redevelopment, public park and/or open space.



SOURCE: USGS National Map 2021



Regional Location
P.J. Keating Company Quarry
Figure 1

2.0 Purpose and Objectives

The purpose and objectives of this Mining and Reclamation Plan application is to obtain an Earth Removal Permit for P.J. Keating Company's Acushnet facility per Town of Acushnet (Town) Soil Conservation By-law, Article VI dated 8/11/2021 (Bylaw), and more specifically to fulfill the permit application requirements at Bylaw Section 3(B) to be filed with the Town Clerk for the Town of Acushnet. The Mining and Reclamation Plan intends to describe a process addressing the following:

- **Erosion Mitigation.** Minimize erosion of disturbed soils through a variety of control mechanisms including those specified in the Stormwater Pollution Prevention Plan (attached);
- **Contamination Prevention.** Maintaining and controlling equipment and associated fuels and oils to prevent contamination of soils and surface waters;
- **Stability.** Providing long-term stability of reclaimed slopes based on recommendations of a geotechnical specialist;
- **Revegetation.** Providing a revegetation plan for use of the site as a basin suitable for water storage, commercial/industrial operations, public park and/or open space and to limit erosion;
- **Permitting.** Permitting the expansion of a known, high-quality aggregate resource in an industrial-zoned area designated in Acushnet for quarry activity;
- **Safety.** Incorporating safety measures, including fences and signage, to preclude public access; and,
- **Earth Removal.** Addressing Town Earth Removal Application requirements recently instituted for 2022 in the Bylaw as amended in 2021.

3.0 Site Description and Environmental Setting

3.1 Site Location and Size

The site is approximately 381-acres in size, including an approximately 113-acre quarry, located in the southeastern portion of Bristol County, Massachusetts, and is approximately 50 miles south of Boston and 30 miles east of Providence, Rhode Island (see Figure 1). The site lies in the New Bedford North, 7.5-minute United States Geological Survey (USGS) quadrangle. Figure 2 shows the local area immediately surrounding the site. Figure 3 shows the local zoning for the site and properties in its vicinity.

3.2 Surface Mining

3.2.1 Site History

P.J. Keating's (PJK's) Acushnet quarry has been operating prior to 1919, and likely as early as the 1890s, as documented in historical town reports. The quarry has been referred to as the Old Bluestone Quarry, Bluestone Quarry, Warren Brothers Quarry, Tilcon Capaldi Quarry and (since 2003) as the P.J. Keating Quarry. It is a large, crushed stone quarry built into/from late proterozoic granite bedrock. PJK and its predecessors have been making asphalt at its Acushnet facility since the 1950's.

3.2.2 Existing Land Uses

Existing site conditions and uses are shown in Figure 4.

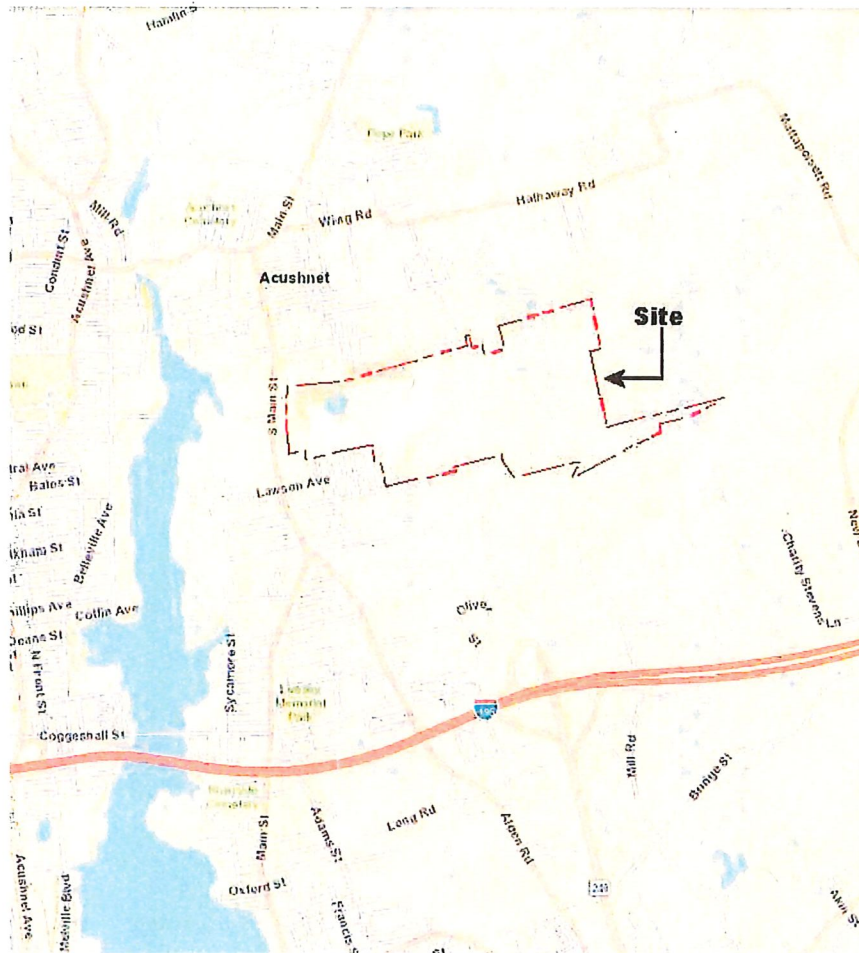
Of the 381 acres, facility operations are located within approximately 207 acres which abuts South Main Street. On the west side of the site are the facility administrative buildings, parking lots, warehouse, maintenance building, asphalt plant and a separate company that operates a cement plant (L&S Concrete (L&S) a sublease to Boston Sand & Gravel). L&S leases a portion of PJK's property and operates an on-site ready-mix concrete batch processing facility independent of PJK's facility.

Quarry operations have been conducted continuously at the site since the turn of the 20th century. Residential neighborhoods grew around the quarry during the mid-20th century, and now surround the site to the west, north and south.

The operational areas of the site are generally surrounded by vegetated earthen or gravel berms to create a buffer from the neighboring properties. A vegetated berm, approximately 10 feet high, is located along the southern and northern portions of the site.

Quarry

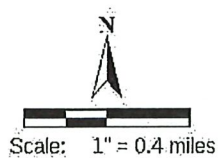
The quarry is in the central portion of the site. Drilling and blasting are used to generate the raw material from the quarry walls. The stone is transported from the quarry by truck to the aggregate processing area. Stone removed from the quarry is processed through the primary, secondary and tertiary crushers, where it is crushed and sorted into various sized grades. The materials removed from the quarry are used on-site in the production of asphalt and concrete. The stone and recycled materials are utilized by PJK and supplied to customers.

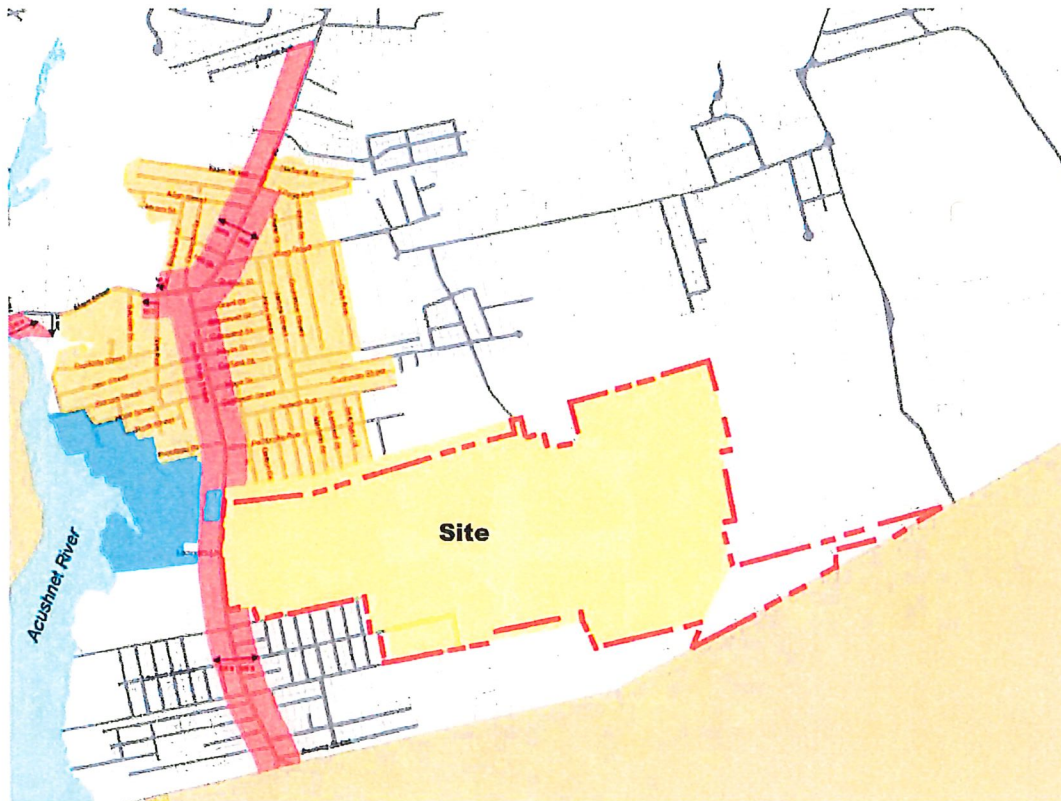


SOURCE: USGS National Map 2021

LEGEND

— Site Boundary

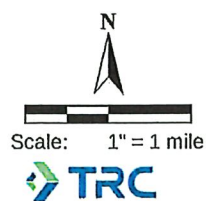




SOURCE: Town of Acushnet, Mass GIS, Buzzards Bay National Estuary Program 2015

LEGEND

	Business Commercial		Site Boundary
	Business Village		
	Residential Village		
	Industrial		
	Residential Area		



Zoning Designations
P.J. Keating Company Quarry
Figure 3



Source: Figure 5 – NAR, 2018

Annotated Map of Site Showing Operation
PJ Keating Quarry
Figure 4

Recycling and Sustainability - Shingles and RAP Stockpile Area

Shingles, Recycled Asphalt Shingles (RAS), and Recycled Asphalt Pavement (RAP) are stockpiled in the easternmost portion of the active site. RAP and shingle crushing is performed by an independent contractor in the area of these stockpiles. The crushed material is recycled for product sales and admixture to the HMA plant on site.

Acushnet Land Use Designations

The entire PJK site is located within the I-1 Industrial District under the Acushnet Zoning Bylaw (Figure 3), and all of PJK's operations thereon qualify as allowed uses. Specifically, mining and quarry operations, rock crushing, and hot mix asphalt operations are allowed uses under the Zoning Bylaw. To the west of PJK's site are the Business Village and Business Commercial zoning districts. To the northwest of PJK's site is an area of Residential Village zoning, with most of the remaining portions of the site surrounded by Residential Area zoning.

3.3 Access and Infrastructure

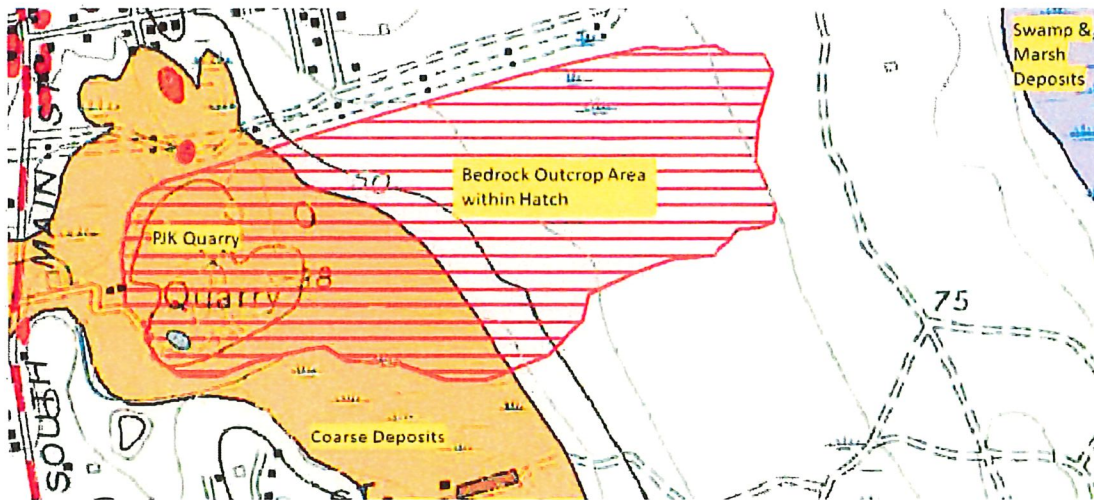
The site is located about three (3) miles northeast of the Route 140 and Interstate 195 intersect. The site is solely accessible through an entrance on South Main Street (a state jurisdictional roadway). Electrical power is supplied by Eversource, which also has a power transmission line that bisects the eastern third of the site. Natural gas is supplied by Eversource. Potable water is supplied by the Town water department. The facility bathroom wastewater is treated through on-site septic systems.

3.4 Geology

Surficial geologic sediments on and near the site are very limited as the bedrock either outcrops at the site or is very near the surface as shown in Figure 5. There are some thin deposits of coarse materials to the west side of the site.

More prevalent is a veneer of glacial ablation till overlying the bedrock. Till is composed of heterogeneous, unsorted sediments deposited by glacial ice with relatively no influence of meltwater. Borings at the site (Clean Harbors, 2020) have identified the native soils above bedrock as an ablation till characterized as seven feet of dry, dense light brown, silt, sand, gravel, and cobbles. In some operational areas there is earthen fill and asphalt paving present above the till.

According to a study conducted by Stone, et al. (2011) and presented in their surficial geologic map, coarse deposits (shown as orangish brown in Figure 5) include gravel deposits composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand occur within gravel beds, and sand comprises few separate layers. That mapping identifies the hatched red area as bedrock outcrops; areas of abundant outcrop or shallow bedrock with the solid color shows the extent of individual bedrock outcrops; and the line hatch pattern indicates areas of shallow bedrock or areas where small outcrops are too numerous to map individually (in areas of shallow bedrock, surficial materials are less than 5 to 10 ft thick).



Source: NAR, 2018

Surficial Geologic Deposits near the PJK Quarry
Figure 5

Bedrock at the site is composed of igneous intrusive granodiorite and porphyritic granite which consists of inequigranular to porphyritic, gray, to, dark gray granite and quartz monzonite typically containing phenocrysts or augen of raicrocline, accessory sphene, and a color index as high as 15 increasingly gneissic from north to south. Granite is an intrusive igneous rock and as such crystallized below Earth's surface, and the slow cooling that occurs there allows large crystals to form. The PJK quarry is noted for its Alpine cleft type mineralization which allowed large crystals to form. Figure 6 show an annotated bedrock geology map using the USGS bedrock base map (Goldsmith, 1978). Below and intermixed with the granodiorite and porphyritic granite in some places are metamorphically intruded gneiss.

NAR (2018) noted that the Acushnet Quarry lies in a region of large-scale tectonics that is predominantly composed of meta-igneous rocks of intermediate composition, dominated by plutonic rocks that range from unaltered granites to granitoids and intermediate diorites.

According to the USGS, the site lies between two primary units, the Lowndesville and the Charlotte Terrane¹, and consists of:

- Porphyritic granite consisting of gray-to-gray green, seriate to porphyritic biotite granite containing clots and streaks of biotite, epidote, and sphene. Mafic inclusions are common.
- Diorite consisting of medium-grained hornblende diorite metamorphosed in part to amphibolite and hornblende gneiss.

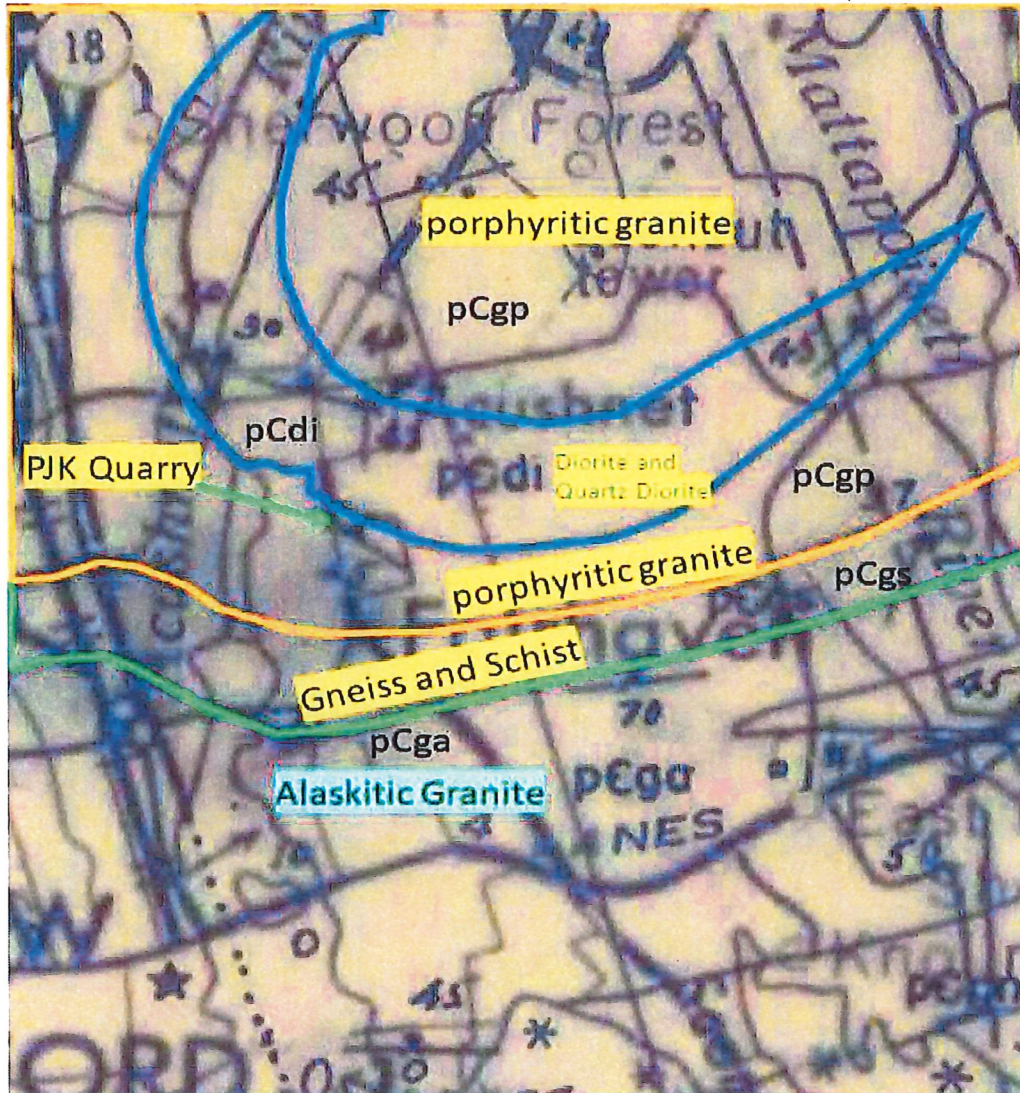
TRC has updated this reserve estimate for the full buildout to -467 ft msl and estimated at reserve of about 57 MM tons per current mining techniques. At this rate of mining of approximately 1.2 MM tons per year the quarry has a minimum of 50 years of remaining capacity.

Drilling in December 2020 and January 2021 (RESPEC, 2022) confirmed the presence of granodiorite-diorite and some porphyritic granite grading into gneiss. Drilling also indicated that the overburden consisting of cover soils and loose rock averaged approximately 33 feet deep, except for where the overburden and silt has been stored, in which case the additional thickness ranges from 20 to 50 feet.

Core samples were collected, photographed, and tested according to AASHTO T-104², which pertains to the testing of aggregates to estimate their soundness when subjected to weathering action in concrete or other applications. This testing is accomplished by repeated immersion in saturated solutions of sodium or magnesium sulfate followed by oven drying to partially or completely dehydrate the salt precipitated in permeable pore spaces. The internal expansive force, derived from the rehydration of the salt upon re-immersion, simulates the expansion of water upon freezing. This test method furnishes information helpful in judging the soundness of aggregates when adequate information is not available from service records of the material exposed to actual weathering conditions. Sulfate soundness testing was performed on select samples from all four cores because most of the aggregate appeared uniform from visual inspection. All the samples submitted passed the Massachusetts Department of Transportation (MassDOT) standard of 10-percent for crushed quarry rock with an average of 1-percent meaning

¹ A terrane is defined as a fault-bounded block containing rocks that have a distinct geologic history compared with contiguous blocks.

² Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
Mining and Reclamation Plan



Source: Goldsmith, 1978.

Bedrock Geology near the PJK Quarry
Figure 6

that the rock does not easily weather. The Rock Quality Designation (RQD) averaged over 85-percent throughout the total borehole length and greater than 91-percent overall but the top 20 feet of bedrock. The RQD is a rough measure of the degree of jointing and fracturing. "High quality" rock has an RQD of more than 75-percent and "excellent rock" has a RQD of 91-percent or more. In other words, the bedrock at the site is very competent with little overall fracturing.

An inspection of the quarry at the site in August 2022 showed stable quarry walls with little detritus/rockfall at the base. The rock was fractured in places either naturally or caused by the explosive shots used for blasting to mine the quarry. Locations of apparent groundwater seepage were very limited and obvious as the rock fractures in those places were iron stained. Very little water was observed entering the quarry even when observed on the quarry wall as it percolated into the quarry floor. The groundwater flow was in drips rather than a constant flow.

3.5 Hydrology

3.5.1 Climate and Rainfall

The climate of the study area is characterized by warm summers and relatively mild, wet winters, with the precipitation in the area evenly distributed throughout the year. The average yearly precipitation measured in Acushnet is 51 inches of rain and 35 inches of snow per year. Temperature ranges from a January average low of 20 degrees and average July high of 82 degrees Fahrenheit (Bestplaces.net). The pan evaporation rate for the Acushnet area is 25.66 inches per year (NOAA, 1982).

The average hourly wind speed in Acushnet experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 6.4 months, from October 12 to April 23, with average wind speeds of more than 10.1 miles per hour. The windiest month of the year in Acushnet is January, with an average hourly wind speed of 12.3 miles per hour. The calmer time of year lasts for 5.6 months, from April 23 to October 12. The calmest month of the year in Acushnet is July, with an average hourly wind speed of 7.9 miles per hour. The wind is most often from the south for 2.1 months, from July 17 to September 20, with a peak percentage of 39-percent on July 28. The wind is most often from the west for 9.9 months, from September 20 to July 17, with a peak percentage of 49-percent on January 1 (Weatherspark).

3.5.2 Surface Waters

Water Bodies, Rivers, and Streams

The Acushnet River is located in Bristol County, Massachusetts and encompasses an area of 18.8 square miles with a total stream length (including all tributaries) of 42.2 square miles and a mean annual flow (D50) of 19.0 cubic feet per second (Shepard, 2014). The Acushnet River is salt water and tidal in the area where the site's discharge enters the river. Due to the industrial history of the area and the manufacturing of polychlorinated biphenyl (PCB) containing equipment in the New Bedford area, the Acushnet River has become contaminated by PCBs and is undergoing restoration under the United States Environmental Protection Agency (EPA) Superfund program.

The Acushnet River is located about 1,500 feet west of the site and receives natural stormwater drainage from wetlands on the south and east side of the site that is intercepted by PJK using a buried conduit and transferred to a drainage channel just below National Pollutant Discharge

Elimination System (NPDES) outfall 001. The water discharge from the site flows to a manmade channel approximately 790 feet to the Acushnet River.

The PJK facility has several settling basins onsite to remove suspended sediments from the surface water. Additionally, there is a wetland area to the south and east of the site, the flows from which pass diagonally through the site in an underground conduit. The offsite water discharges just below outfall 001 from the facility and eventually reaches the Acushnet River through an unnamed tributary.

Surface Water Drainage

The area surrounding the site is characterized by a mix of wooded land, residential, and commercial properties to the north, south, and west. The eastern boundary of the developed portion of the site (i.e., aggregate stockpiling) is bordered by an approximately ten-foot-high vegetated berm which opens to approximately 174 acres of wooded land owned by PJK.

The site consists of one large drainage area (Drainage Area 001) for the entire developed portion with several sub basins. In general, drainage onsite collects in the quarry sediment detention area, and is pumped to Basin 1A, or drains to Basin 1A through the site drainage system (i.e., catch basins and/or settling basins or overflow weirs for larger storm events) although most of this water is planned to be intercepted and diverted to the quarry sedimentation ponds. There is only one discharge point from the site (Outfall 001 through Basin 1C) in the northwest portion of the site, pursuant to PJK's NPDES Individual Permit (MA0029297). The discharge point and drainage area are shown in the Stormwater Pollution Prevention Plan (SWPPP).

Facility surface water discharges are permitted through an EPA issued NPDES Individual Permit, and frequent water quality monitoring is required. The site's discharge water is of excellent quality and meets all USEPA-mandated discharge requirements. In appearance the water is very clear. There is additional discussion on the Acushnet Stormwater Bylaw in Section 6.

3.5.3 Groundwater

Groundwater at the site is very limited. Environmental studies at the site have shown that there is a small amount of perched groundwater in fill sediments (where present) on top of till and bedrock (which acts as a confining zone). Inspections of the quarry walls show very little inflow despite the large depth of excavation. During summer months the facility rarely discharges as evaporation exceeds groundwater and precipitation inflow.

The rate of precipitation infiltration to groundwater is very low at the site relative to those areas in the glacial outwash deposits in the Buzzards Bay Drainage Basin. Hydrologists have estimated a rate of 6.8 inches per year for till and bedrock deposits that was used in groundwater models in the Mattapoissett River study (Olimpio and deLima et al, 1984) and the Plymouth-Carver aquifer study (Hansen and Lapham, 1992), both of which studied areas are in Buzzards Bay Basin.

The hydraulic conductivity of the till has been tested nearby, revealing hydraulic conductivities ranging from 1.2×10^{-3} to 1.6×10^{-4} centimeters per second (cm/sec) (Melvin, 1992). Representative hydraulic conductivity values for granitic rock range from 2×10^{-8} to 3×10^{-12} cm/sec for unfractured rock and 8×10^{-7} to 3×10^{-2} cm/sec for fractured rock (Duffield, 1992). The USGS has assessed granite hydraulic conductivity through an extensive testing program of testing 12 bedrock wells in

similar granite and found a median value of 0.1 feet per day (feet/day) for hydraulic conductivity (Lyford et al 1999).

3.5.4 Jurisdictional Waters

Potentially jurisdictional wetland resource areas occur within the site, including wooded swamp, freshwater emergent wetland, and a portion of an unnamed stream. Multiple wooded swamp wetland areas appear to exist on the southern edge of the site, with what may be a much larger mixed wooded swamp in the eastern portion of the area extending from the northern edge to the southern edge, as mapped by the Massachusetts Department of Environmental Protection (MassDEP) and the National Wetlands Inventory (NWI).

Freshwater emergent wetlands also may be located on the site in the northwestern corner and along the southern edge, with the northwestern area draining west towards the Acushnet River via an unnamed stream. All potential wetlands occurring onsite, as well as the unnamed stream, are presumed for the purposes of this filing to be jurisdictional under the Clean Water Act (CWA) Section 404 (administered by the U.S. Army Corps of Engineers (USACE)), as well as the Massachusetts Wetlands Protection Act (WPA). While several settling ponds exist within the site, these are not jurisdictional waters as they are man-made and used to remove suspended sediments from the surface water.

3.6 Vegetation and Wildlife

3.6.1 Vegetation

The reclamation area within the site is nearly entirely disturbed by mining activities, with very small areas of vegetation present. Surrounding the mining area are haul roads, settling ponds, gravel stockpile and material storage areas, a stone crushing, sorting, and washing area, a cement plant, an asphalt area, and other warehouses and buildings (Figure 4). Most of the site is mapped as bare land cover in the MassGIS Land Cover and Land Use data set, with land use for the entire site mapped as industrial (Figure 3). Other land covers mapped within the site boundaries include grassland, scrub shrub, deciduous forest, evergreen forest, impervious surface, and open water. The mining area is bounded by grassland, scrub shrub land and deciduous forest. The man-made containment basin in the northwest corner of the site is surrounded by a narrow strip of deciduous trees and areas of scrub shrub cover mixed in with grassland. Another strip of deciduous trees, scrub shrub cover and grassland, interrupted periodically by haul roads, separates the southwestern gravel stockpile area from the mining area. Small areas of vegetation continue towards the eastern portion of the site between mining roads. The northern edge of the site contains a mix of grassland and scrub shrub cover types bordering the mining area between mining roads. A power line corridor dominated by deciduous trees and grassland separates the eastern recycle material storage areas from the rest of the site, where mining takes place.

The eastern edge of the site is bordered by both mixed and deciduous wooded swamp wetland areas, with the southern edge bordering a small area of wooded swamp as well.

3.6.2 Wildlife

There is no mapped habitat for rare or state-listed species located within the active or proposed future disturbance areas of the site. A portion of the site in the northeast corner is mapped as Priority Habitat and Estimated Habitat for the Eastern Box Turtle (*Terrapene Carolina*), a species state listed as "Special Concern." This species and its habitats are protected pursuant to the Massachusetts Endangered Species Act (MESA), MGL c.131a, and implementing regulations (321 CMR 10.00). The special-status species that may occur within the region (Figure 7), as listed by MESA for the Town of Acushnet (not specific to the site), include eastern box turtle (*Terrapene carolina*) and the northern red-bellied cooter (*Pseudemys rubriventris*). Potential federally threatened or endangered species found in Acushnet generally (again, not specific to the site) include Northern Long Eared Bat (Threatened), Plymouth Redbelly Turtle and the Monarch Butterfly (Candidate) where found. The U.S. Fish & Wildlife Information for Planning and Consultation (IPAC) Mapping tool also list 17 species of migratory birds that of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention. No land disturbance will occur within any mapped habitat.

3.6.3 Soils

The characterization of site soils is based on a review of Countywide mapping by the U.S. Natural Resource Conservation Service (NRCS). See Figure 8. Based on the generalized NRCS mapping, soils present within the area include:

- Pits, quarry;
- Pits–Udorthents complex, gravelly;
- Paxton fine sandy loam, on 3 to 8-percent slopes;
- Udorthents, smoothed;
- Woodbridge fine sandy loam, on 0 to 8-percent slopes, extremely stony;
- Ridgebury fine sandy loam, on 0 to 3-percent slopes, extremely stony;
- Woodbridge fine sandy loam, on 3 to 8-percent slopes;
- Whitman fine sandy loam, on 0 to 3-percent slopes, extremely stony; and
- Paxton fine sandy loam, 3 to 8-percent slopes.

The most significant portion of the site is derived from igneous and metamorphic rock.



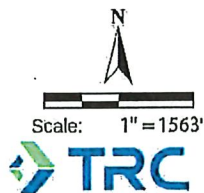


SOURCE: USDA NRCS WSS 2019

LEGEND

- | | |
|---|---|
| 31A - Walpole sandy loam, 0 to 3 percent slopes | 306B - Paxton fine sandy loam, 0 to 8 percent slopes, very stony |
| 38A - Pipestone loamy sand, 0 to 3 percent slopes | 307B - Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony |
| 39A - Scarborough mucky fine sandy loam, 0 to 3 percent slopes | 310A - Woodbridge fine sandy loam, 0 to 3 percent slopes |
| 51A - Swansea muck, 0 to 1 percent slopes | 310B - Woodbridge fine sandy loam, 3 to 8 percent slopes |
| 52A - Freetown muck, 0 to 1 percent slopes | 311B - Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony |
| 70A - Ridgebury fine sandy loam, 0 to 3 percent slopes | 312B - Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony |
| 70B - Ridgebury fine sandy loam, 3 to 8 percent slopes | 446B - Gloucester-Hinckley complex, 3 to 8 percent slopes, very stony |
| 71A - Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony | 601 - Pits, quarry |
| 71B - Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony | 602 - Urban land |
| 72A - Whitman fine sandy loam, 0 to 3 percent slopes | 617 - Pits - Udorthents complex, gravelly |
| 73A - Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony | 651 - Udorthents, smoothed |
| 242B - Hinckley loamy sand, 3 to 8 percent slopes | 656 - Udorthents - Urban land complex |
| 242C - Hinckley loamy sand, 8 to 15 percent slopes | 705C - Charlton-Paxton complex, 8 to 15 percent slopes, very rocky |
| 305A - Paxton fine sandy loam, 0 to 3 percent slopes | 706C - Charlton-Rock outcrop-Paxton complex, 3 to 15 percent slopes |
| 305B - Paxton fine sandy loam, 3 to 8 percent slopes | |

Site Boundary



Soils Map for the PJK Quarry Area
P.J. Keating Company Quarry

Figure 8

slopes, made of coarse-loamy lodgment till derived from gneiss, granite, and/or schist. This makes up roughly 4-percent of the site. Ridgebury fine sandy loam makes up 2-percent of the site and is extremely stony, existing in a flat area on 0 to 3-percent slopes in the southeastern portion of the site, which also consists of coarse-loamy lodgment till derived from gneiss, granite, and/or schist. The rest of the site is made up of less than 1-percent of Woodbridge fine sandy loam 3 to 8-percent slopes, Whitman fine sandy loam 0 to 3-percent slopes, extremely stony, and Paxton fine sandy loam 3 to 8-percent slopes. The differences in soil types are a result of varying topography and parent rock material; with the pits and Udorthents soil types existing from man-made alterations to the natural geology.

As identified by the NRCS, only Paxton fine sandy loam, 0 to 3 and 3 to 8-percent slopes, and Woodbridge fine sandy loam, 3 to 8-percent slopes, are prime farmland soils located within the boundaries of the site.

4.0 Planned Mining Operations

4.1 Quantity and Type of Materials

Depending on local weather conditions, full-scale processing operations typically extend from March 15th through December 31st. In general, major processing operations at the facility are conducted 6 days per week, 14.5 hours (of crushing operations per MasDEP Air Permit) per day during the spring, summer, and fall. Although the facility continues to function as a supplier of earth products from available stockpiles as well as concrete during the winter, major processing operations are significantly curtailed due to freezing temperatures. Operations typically suspended during the winter include quarrying, stone processing, and batch processing operations at the asphalt plant.

Maximum production levels are primarily determined by market demand. A total of approximately 57 MM tons of aggregate materials are planned to be mined from the quarry over the remaining approximately 50-year life of the operation.

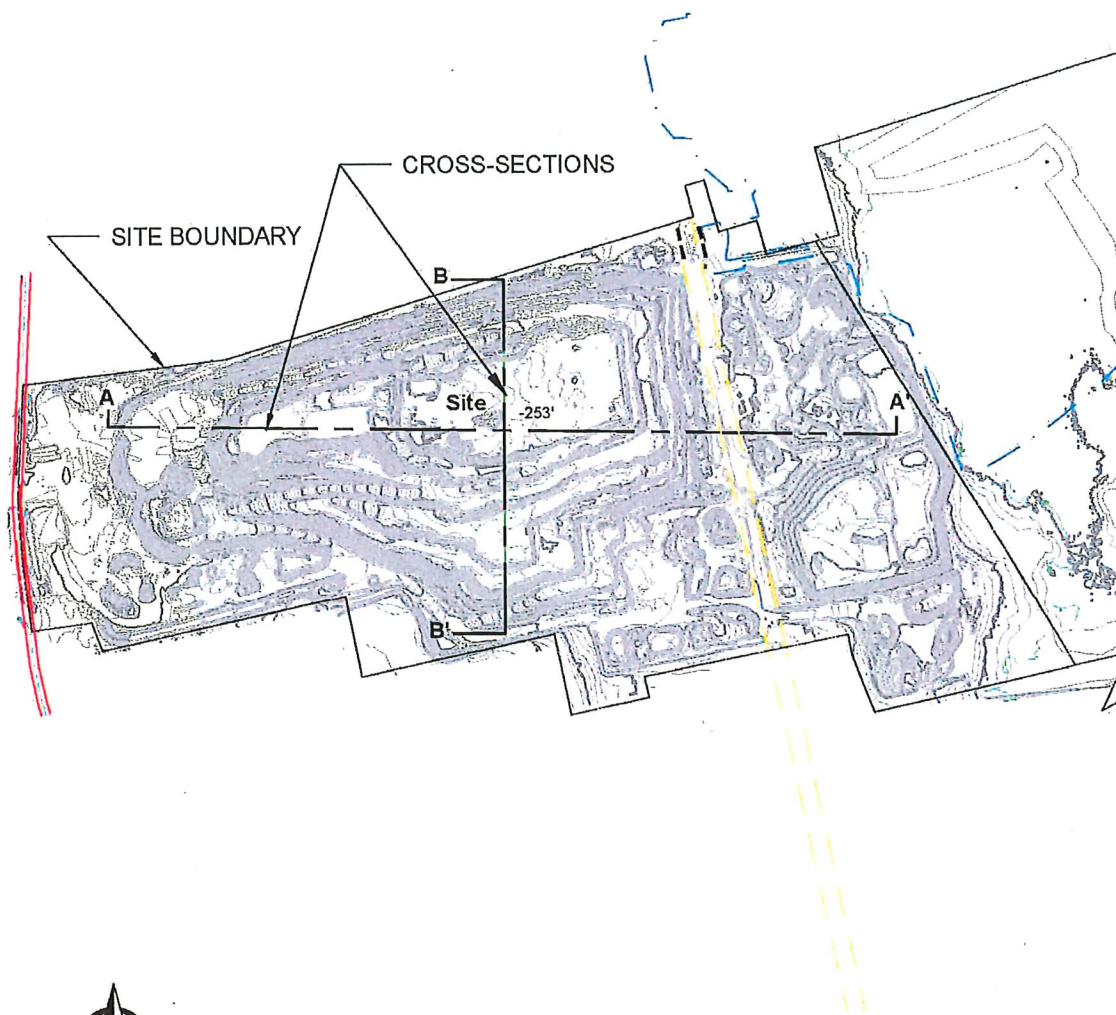
4.2 Initiation and Termination Dates

PJK's Acushnet quarry is an active mining operation with reasonably foreseeable operations planned for the next approximately 50 years at the current rate of extraction and future market demands.

4.3 Description of Existing and Planned Mine

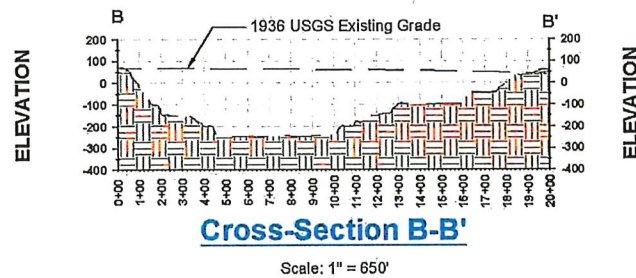
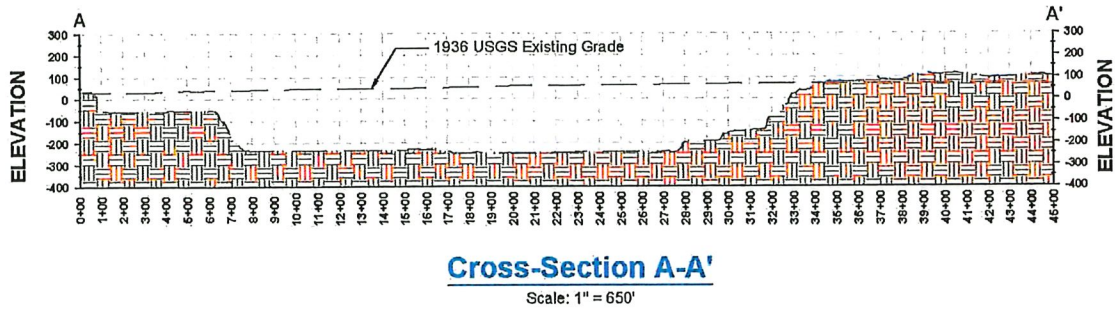
The site is developed. Quarry activities have been ongoing for more than a century. Approximately 112 acres of the 382-acre property have been quarried. Approximately 248 acres of the 382 acres have been disturbed and are being used to support the quarry and related activities. The disturbed areas include the office and operations facilities, material stockpiles, overburdened and tailings storage piles, and an asphalt plant. (See Figure 9, Quarry Plan; Figure 10, Quarry Plan Cross-Sections; Figure 11, Quarry Slope Detail; Sheet 1, Existing Conditions Aerial Photograph; and Sheet 2, Quarry Plan and Cross-Sections.)

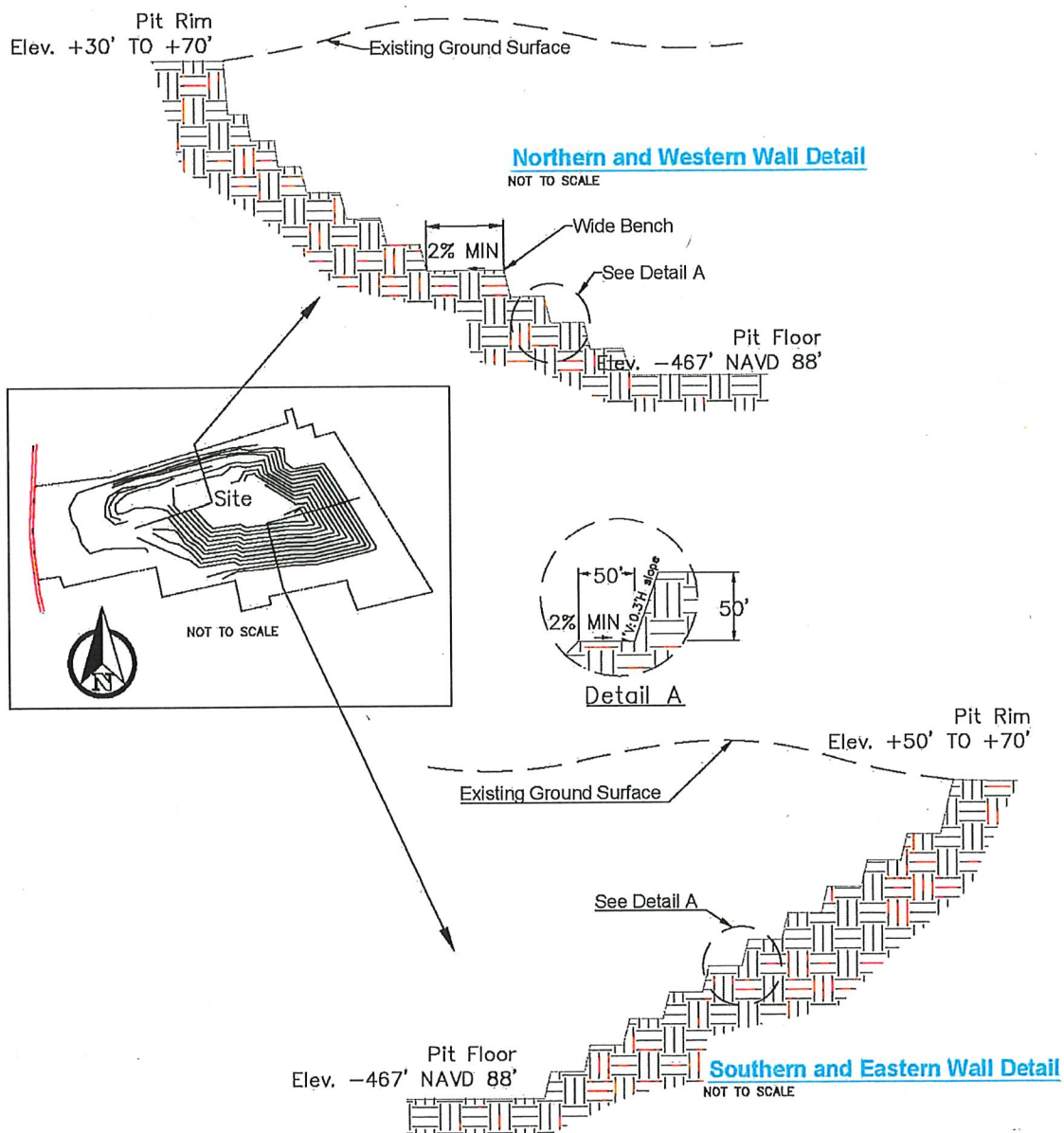
Figure 12 divides the site into three general phases of mining and reclamation. Phase I quarries rock from elevation +2 feet to elevation -253 feet along the southern and eastern quarry faces. Phase II quarries rock from elevation -253 feet to -467 feet. Phase III reclaims the quarry as a park for public use or an agreed alternative use. The quarry will be allowed to be filled with stormwater and groundwater to a final elevation of approximately 0 feet mean sea level. Figure 13 shows the plan view of the quarry with additional 36 acres mined, and the quarry excavated to a depth of -467 feet; the total rim surface area of the quarry is approximately 148 acres of the 248 acres disturbed. Figure 14 provide cross-sectional profiles. Figure 15 presents some locations and volume which the overburden and tailings may be placed (See Sheet 3, Reclamation Plan and Cross-Sections and Sheet 4 Proposed Conditions Aerial Photograph). Figure 15 show general locations where the overburden and tailings may be stockpiled while the site is being quarried.

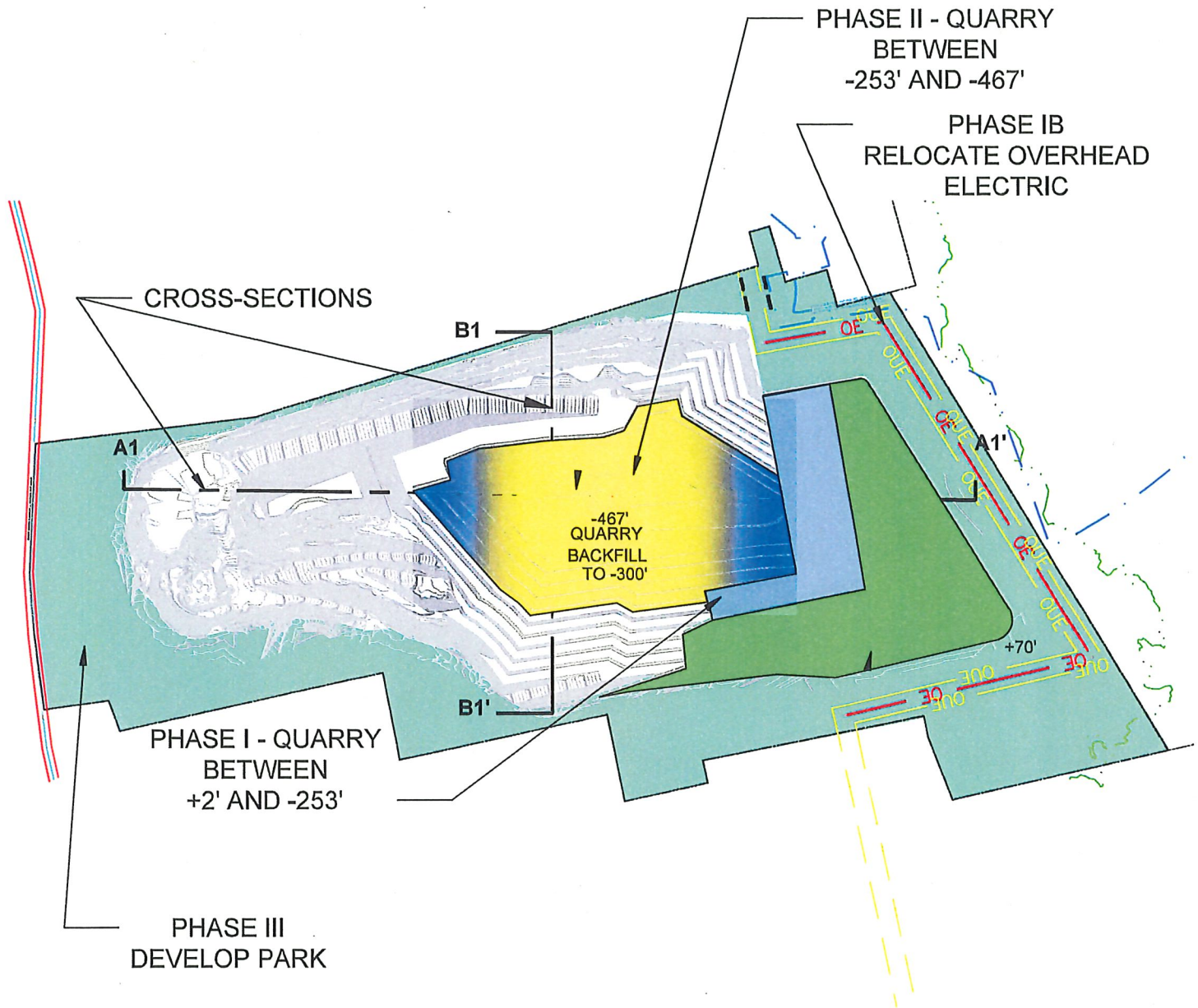


0 100 200 400 Feet

REF: BASE CAD FILE FROM PJK "20-156-SURVEY-BASE-PLAN-EXIST COND SET 12-23-2020.WG"
TWO FILE PJK QUARRY PLAN AND PROFILE 81422.DWG







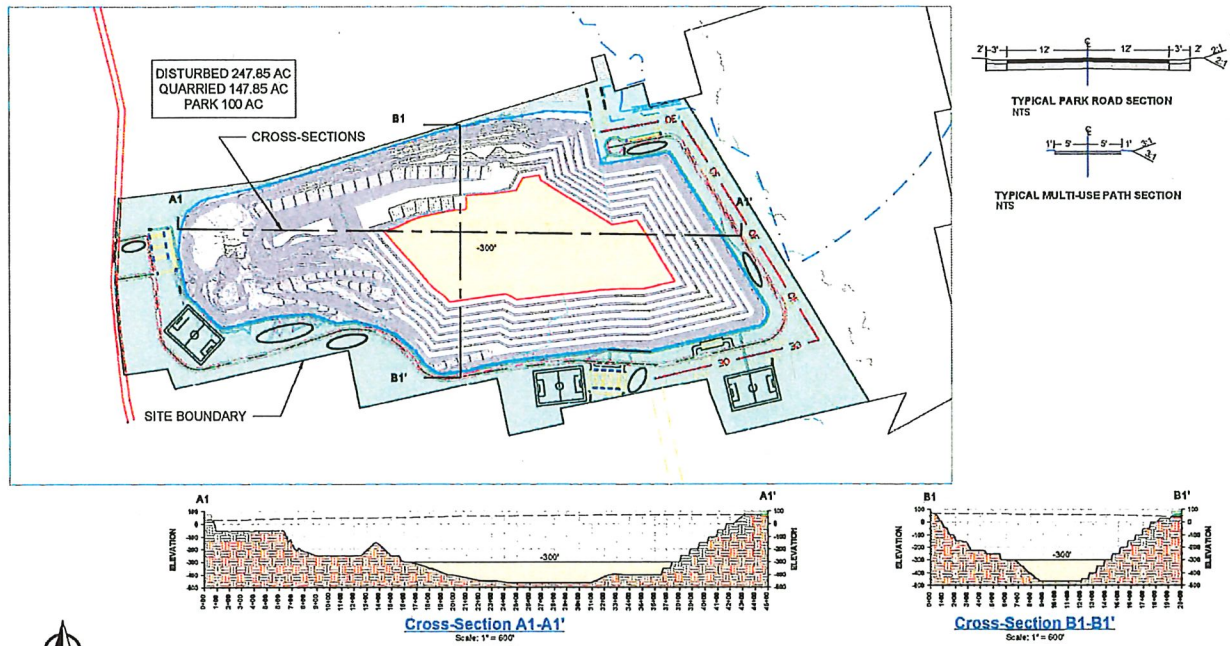
0 200 400 800
1"=800' Feet

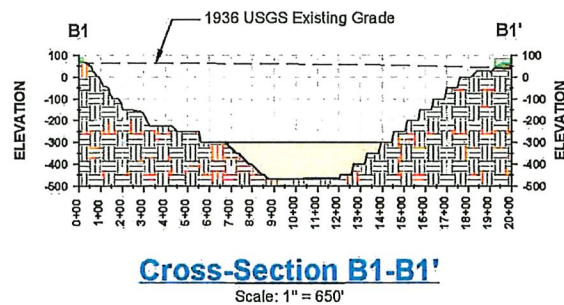
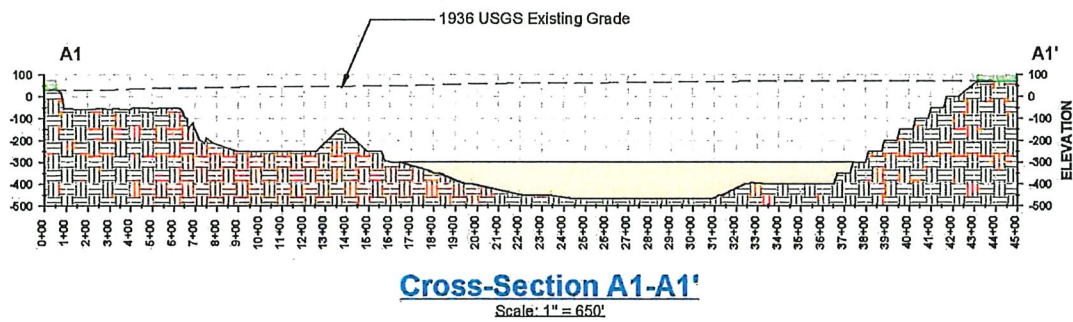
REF.: BASE CAD FILE FROM P.K. "20-156-SURVEY-BASE-PLAN-EXIST COND SET 12-23-20.DWG"
TRC FILE P.K. RECLAMATION PLAN AND PROFILE FIGURES 61422.DWG

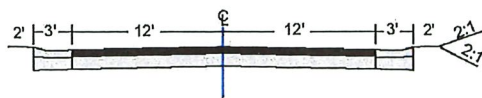


CONCEPTUAL PHASING PLAN
PJ Keating Quarry

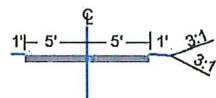
Figure 12



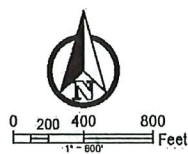
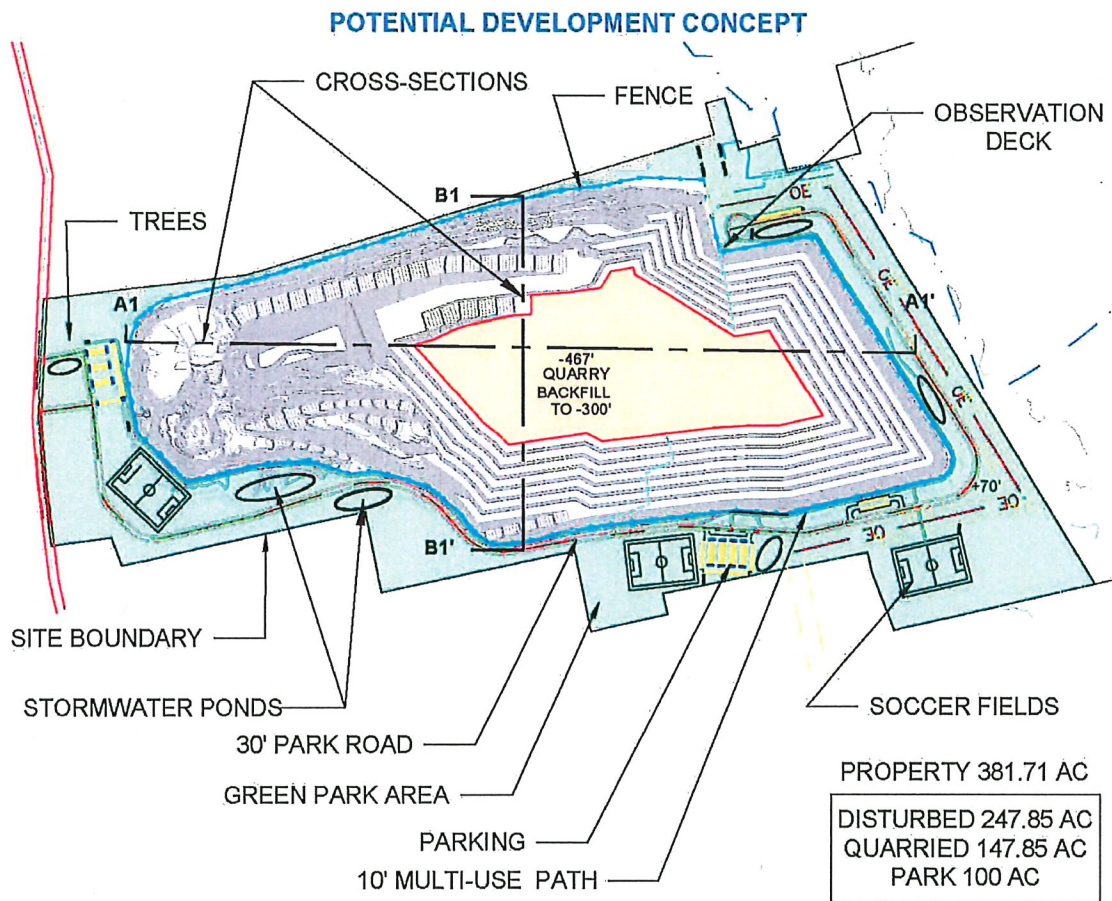




TYPICAL PARK ROAD SECTION
NTS



TYPICAL MULTI-USE PATH SECTION
NTS



REF: BASE CAD FILE FROM PJK "20-166-SURVEY-BASE-PLAN-EAST COND SET 12-23-20.DWG"
TRC FILE PJK RECLAMATION PLAN AND PROFILE FIGURES 01422.DWG

4.3.1 Vegetation, Topsoil, and Overburden Removal

Prior to aggregate removal, vegetation removal is required in the immediate working areas and will be managed on-site (e.g., mulched for erosion control) or transported off-site (e.g., green-waste facility, sold as product, cogeneration) depending on the type of vegetation removed and available uses. Available topsoil and overburden not mixed into product (when specifications allow) or used to create a berm along the boundary of the site will be stockpiled and then redistributed in the quarry after mining is complete. The end use of the excavated area within the site is a basin suitable for water storage, commercial/industrial development and/or public park/Conservation Lands.

Aggregate will be extracted after the vegetation, topsoil, and overburden is cleared for the active operations area.

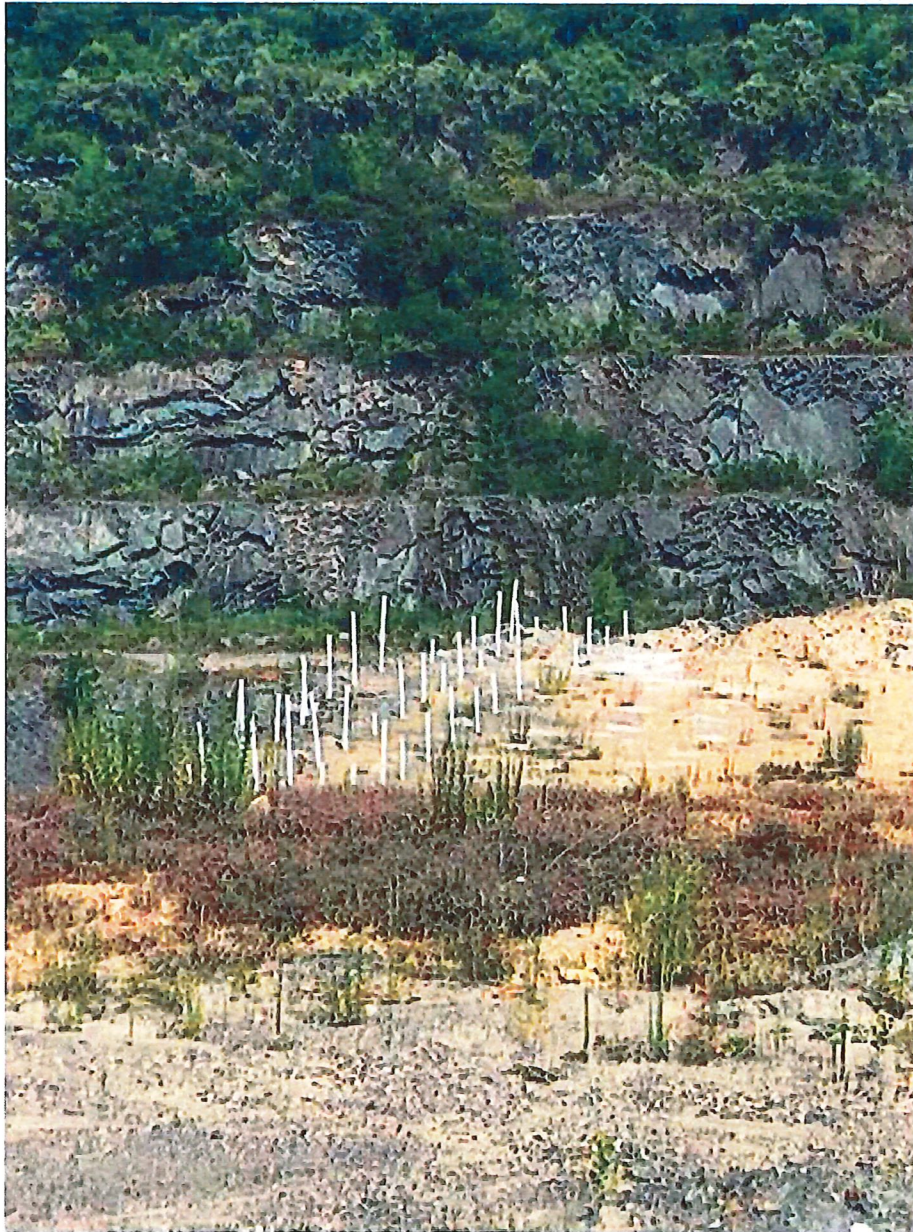
4.3.2 Excavation and Blasting

Operations at the site will use conventional mining practices common in the industry. Quarrying is initiated by establishing a working bench. A new bench is established as the bench is extended laterally along the quarry face. Bench areas are extended until the planned quarry backwall is reached; successive benches are developed as the quarry progresses. The maximum depth of excavation would be approximately 467 feet below mean sea level. Quarry roads are installed as mining proceeds to reach and remove the accumulated rock (Figure 16).

Rock reserves will be removed through a combination of drilling, blasting, and excavating equipment. All blasts will occur on regular business days (not on weekends or federal holidays) usually between 11 AM and 2 PM and when favorable weather conditions permit. The transportation, storage, and handling of explosives will be performed or supervised by a licensed explosives expert contracted by PJK. Explosive materials, typically ammonium nitrate and fuel oil (ANFO), will not be stored on-site. PJK's blasting consultant will comply with all federal (i.e., Bureau of Alcohol, Tobacco, Firearms, and Explosives) and local (i.e., Massachusetts Department of Fire Services and Acushnet Fire Department) regulations pertaining to transportation, use, and detonation of blasting materials. Perchlorate is not used as an explosive ingredient at the site. Safety considerations include employee training, clearing of landing area, blast videotape record review, use of safety barriers and monitoring for excessive energy and movement for floor control.

Each record of blasting, including video logs and seismic monitoring, is submitted to the Acushnet Fire Department, which oversees blasting at PJK's facility and has in the past posted this information at the Acushnet website. GeoSonics Incorporated conducts the seismic analysis and calculates a variety of seismic parameters including peak particle velocity (PPV) in inches per second and Frequency (Hz) charts with United States Bureau of Mines (USBM) Safe Blasting Yields levels plotted for comparison. In each case, blasting at PJK's facility has never exceeded USBM mandated levels. Velocity Waveform and Time are also plotted. Historical records of blasting at PJK's facility have shown no levels of blast movement that exceed regulatory limits.

Loaders or similar excavating equipment will remove aggregate for processing after blasting. Blasted rock will be loaded onto haul trucks and transported to the processing plant adjacent to the quarry area.



Blast Pattern Setup
PJ Keating Quarry
Figure 16

5.0 Second Land Use Plan

5.1 Potential Second Land Use

This Reclamation Plan has been developed to adapt final excavation design and surface conditions to provide conditions for a basin suitable for future uses including water storage, commercial/industrial redevelopment, Town Park and/or open space (see Figure 13, and Sheet 3, Reclamation Plan and Cross- Sections). In general, final site development will result in a large basin surrounded by 1.3:1 horizontal to vertical side slopes (see Figure 14 and Sheet 3). The maximum depth of excavation will be approximately -467 feet msl with a surrounding average bordering land elevation of about 66 feet msl.

The reclaimed quarry will be used for its highest and best use in consultation with the Town of Acushnet. Potential options include open space and a basin suitable for water storage, commercial/industrial redevelopment, a town park with athletic fields and/or other available uses. Specific operational parameters, agreements with water agencies, water diversion permits, and related actions are still decades away and have not been identified at this time. As an example, reuse of this facility could be similar to that for the Biogen headquarters building in Weston, Massachusetts (Figures 17 and 18) where the natural beauty, large space and access to cooling water benefit the tenant. Biogen, which leased the building on the former Mass Broken Stone Company quarry site in fall 2008 utilizes geothermal heat pumps in the quarry ponds to cool its building. In the pond's depths, the water remains at a consistent 41F degrees, which is ideal for consistent indoor temperature.

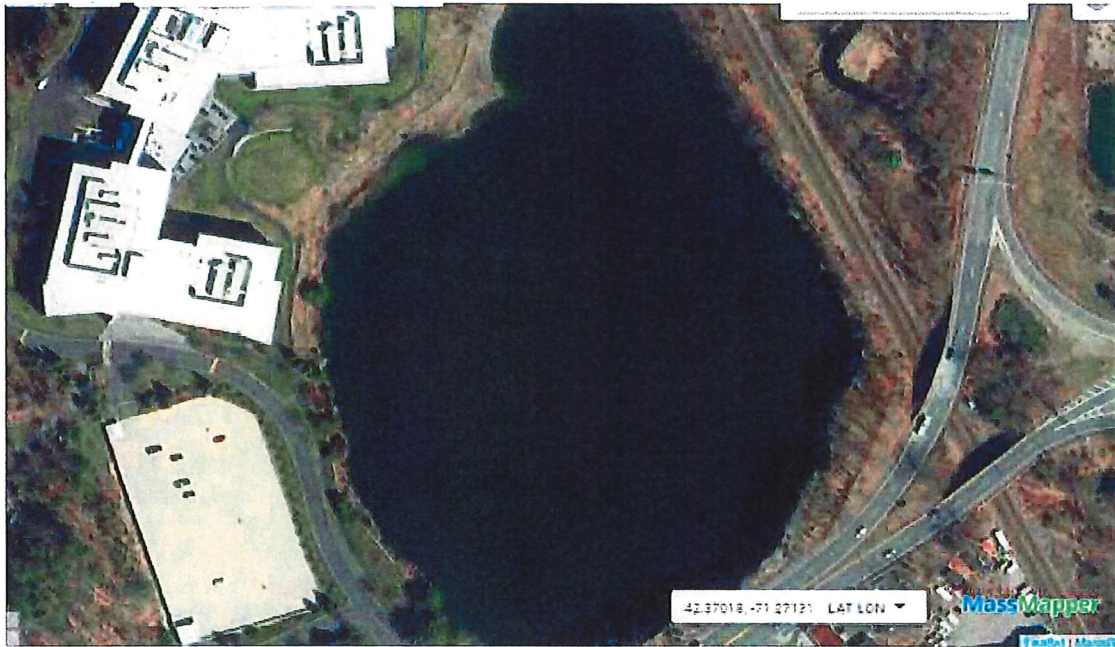
5.2 Areas Available for Concurrent Reclamation

Mining is generally planned as a continuous activity consistent with hard rock mining practices associated with developing a quarry at incrementally increasing depths. The final area of mining and reclamation will be when the quarry floor elevation is reached at the foot of the highwalls. The mining activity at this site is dictated by the geology encountered, economics, and available working space within the site. The open pit development scenario distinctly limits the type of reclamation activities and the degree to which they can be employed during active mining. As explained by the National Research Council (1979):

Active open pits, as compared with surface coal mines, provide little opportunity (if any) for simultaneous mining and reclamation because the pit continues to expand and deepen as long as the mine is producing. Also, the ultimate depth and shape of the pit, although roughly predictable, are dictated by the economics of mining and the geometry of the ore deposit rather than by particular reclamation goals....



View of Quarry from Biogen Headquarters
PJ Keating Quarry
Figure 17



Biogen Headquarters at Former Quarry Site in Weston
MA in Plan View
PJ Keating Quarry
Figure 18

6.0 Reclamation Practices and Actions

6.1 Drainage, Stormwater, and Erosion Control

Drainage, stormwater, and erosion control measures will be implemented when PJK completes earth-disturbing activities, such as mine site preparation (removal of overburden), construction of staging areas, and construction of access roads. Proposed measures shall be implemented to prevent and control the release of pollutants to waterbodies, wetlands, and groundwater, and reduce impacts associated with changes in flow. Stormwater and process water discharges from PJK's Acushnet facility will continue in compliance with the requirements of the Individual NPDES Permit (MA0029297). There is a site-specific Stormwater Pollution Prevention Plan (SWPPP) for stormwater, erosion control, and drainage provides designs to control stormwater and prevent erosion.

Town Bylaw Article IX refers to stormwater management practices to protect surface water quality. The Site is a pre-existing operation and does not discharge to the Town's stormwater collection system. Nevertheless, PJK meets the intent and requirements of the Bylaw through control of stormwater and process water on site within the quarry and subsequent discharge through a NPDES (Permit MA0029297) regulated outfall. In this manner, the mining process reduces the overland runoff and improves water quality by capturing and treating precipitation and stormwater onsite rather than allowing it to immediately runoff. Specifically, the stated goals of the Acushnet bylaw are:

- **Reduce flooding** – PJK reduces flooding by storing precipitation and allowing discharges to occur after peak precipitation events have subsided.
- **Protect water quality** – Discharged water from the facility must meet rigorous discharge limits set by the USEPA and MassDEP.
- **Maintain aquatic habitat** – Among the many water quality tests required in the NPDES permit are the Whole Effluent Toxicity test that specifically assesses ecological impacts and fish toxicity, and prior testing has shown that the discharge consistently meets the limits and is of higher quality than the receiving water.
- **Implement structural and nonstructural stormwater controls** – Section 4.0.1 below describes a variety of structural and nonstructural stormwater controls implemented at the site.
- **Provide protection from property damage by stormwater** – PJK assists the surrounding neighborhood to the southwest by intercepting off-site stormwater runoff and allowing the surface water to migrate through a culvert across the site for eventual discharge to the Acushnet River. In the absence of PJK's drainage culvert the neighborhood would be impacted by flooding.

The state Stormwater Handbook is referenced in the Acushnet stormwater standards as the standard to meet. The NPDES permit that the facility received from the USEPA and MassDEP can only be issued if the site is currently meeting the state stormwater standards and is reflecting in the Massachusetts Water Certification. The applicable quoted section of the NPDES permit is as follows:

"2.2.5 State Certification EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving water(s) either certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate the State WQSs, the State waives, or is deemed to have waived, its right to certify. See 33 U.S.C. § 1341(a)(1). Regulations governing state certification are set forth in 40 CFR § 124.53 and § NPDES Permit No. MA0029297 2020 Fact Sheet Page 8 of 52 124.55. EPA has requested permit certification by the State pursuant to 40 CFR § 124.53 and expects that the Draft Permit will be certified." (it was certified)

"If the State believes that conditions more stringent than those contained in the Draft Permit are necessary to meet the requirements of either CWA §§ 208(e), 301, 302, 303, 306 and 307, or applicable requirements of State law, the State should include such conditions in its certification and, in each case, cite the CWA or State law provisions upon which that condition is based. Failure to provide such a citation waives the right to certify as to that condition. EPA includes properly supported State certification conditions in the NPDES permit. The only exception to this is that the permit conditions/requirements regulating sewage sludge management and implementing CWA § 405(d) are not subject to the State certification requirements. Reviews and appeals of limitations and conditions attributable to State certification shall be made through the applicable procedures of the State and may not be made through EPA's permit appeal procedures of 40 CFR Part 124. In addition, the State should provide a statement of the extent to which any condition of the Draft Permit can be made less stringent without violating the requirements of State law. Since the State's certification is provided prior to final permit issuance, any failure by the State to provide this statement waives the State's right to certify or object to any less stringent condition."

Clearly if there was a need for additional stormwater controls on site this is the section where the MassDEP would have added those stormwater requirements into the NPDES permit. A review of the individual State stormwater handbook standards further demonstrate that they are being met at the site.

- Standard 1 specifies that stormwater discharges are not to cause scour or erosion. All the runoff from the site drains to the quarry where it is captured and held or seeps into the ground. It does not flow off site except from the approved NPDES outfall at a controlled (pumped) rate known to not cause scour, and therefore cannot cause scour or erosion and meets this standard.
- Standard 2 specifies that the development of a site should not cause an increase in the rate of flow to an abutting property. Runoff flows to the quarry where it is held for later controlled discharge, meeting this standard.
- Standard 3 specifies that at least 44% of total suspended solids should be removed. It also calls for infiltrating runoff from at least 65% of proposed impervious surfaces, but PJK is not proposing new impervious surfaces. It prescribes runoff recharge volume for new developments and that drainage infrastructure be sized to deal with that volume. The site is not a new development. In fact, the sediment total

suspended solids discharges are far superior to other facilities as the PJK facility has large settling basins, a long residence time onsite and coagulation control to further remove solids. The PJK facility has not had any difficulty meeting limits for the past few years.

- Standard 4 prescribes the water quality volume that drainage system infrastructure must be sized to handle but PJK is not proposing a redevelopment of the site and the quarry easily contains runoff from the site.
- Standard 5 calls for measures to be installed for chemical containment and the handling of spills at a land use of higher potential pollutant loading. The facility has a SWPPP and a Spill Prevention Control and Countermeasures Plan (SPCC) that address these requirements. Chemical containment is provided as well as spill prevention, spill response and training.
- Standard 6 calls for special measures to be taken if there is a discharge to an area of Critical Environmental Concern. The runoff from the site discharges through a NPDES regulated discharge point. There are no discharges to Critical Environmental Concern areas. The facility tests for ecological risk as part of their water discharge permit and has met those criteria.
- Standard 7 allows for an applicant to designate his project as a redevelopment project and to be allowed to achieve the other standards only to the maximum extent feasible. PJK is not proposing a new development, so this standard does not apply.
- Standard 8 calls for a description of construction period erosion and sediment control measures on Site Plans as necessary. PJK is not proposing a redevelopment of this existing facility. No construction of new facilities is proposed, either so this standard does not apply.
- Standard 9 calls for the preparation and dissemination of an Operation and Maintenance Plan for both the construction period and for the long term. The former is not applicable, but the latter has been provided as part of the SWPPP.
- Standard 10 calls for an applicant or operator to describe measures that will be taken to prohibit illicit discharge of pollutants. This requirement is addressed in the SWPPP and SPCC. The SWPPP and SPCC describe the storage measures for potential pollutants and the locations of spill kits and other remedial measures on site. The facility inspects during dry periods for illicit discharges.
- Acushnet Standard 11 – Volume Control – Acushnet adds to the State standards with condition 11 advising that the discharge rate needs to be controlled during stormwater events. As previously stated, the site's stormwater discharges to quarry ponds that have a very large storage capacity, and all discharges from the ponds are controlled by pumping at a rate that will not cause erosion or excessive loading on downstream receptors.

6.1.1 Stormwater Runoff Control and Management

The site is designed to prevent stormwater and non-stormwater (e.g., water used to control dust) from leaving the site. Water will either soak into the ground, evaporate, drain into the excavation, or drain to the man-made containment basins, until new areas are mined, at which point all runoff within the limits of surface disturbance will still flow into the quarry excavation. PJK will continue to manage the quarry stormwater runoff for operational purposes and to mitigate potential impacts to offsite stormwater quality as follows.

Structural controls that are maintained at the facility include the following:

- Dikes, berms, or retaining walls;
- Culverting, trench, or other drainage systems;
- Sorbent material;
- Floating boom;
- Silt curtain² deployed in sediment basin 1A and 1C;
- Diversion of stormwater to multiple settling basins;
- Flocculant/Coagulant addition to encourage settling;
- Hay Bales;
- Concrete Road barriers;
- Street sweeper and water truck to control dust; and
- Stormwater transfer through sequential settling basins.

The following non-structural methods are also implemented at the site:

- Operating procedures specifically designed to minimize the potential for a release;
- Personal training regarding the facilities available and the procedures established to prevent spills and subsequent discharges;
- Facility security measures;
- Routine inspections, monitoring and recordkeeping; and,
- Routine Plan effectiveness reviews and amendments.

Generally, stormwater from the existing and future reclaimed site, operations, parking lots, and access roads is directed via drainage swales/channels, catch basins, and overland flow to a series of stormwater quality basins to discharge into the quarry pond to promote the settling of suspended solids. Further, PJK takes measures to minimize the transmission of sediment into the quarry pond by discharging from the basins near the top of the vertical water column. The site stormwater discharges are scheduled to coincide with the water levels of the quarry pond and stormwater quality basins. In the summer months there is typically little water discharged due to the high evaporation rate.

During mining operation, and until the excavation is complete, the existing drainage system, which includes silt settling basins and flocculent/coagulant, will remain in place to manage and treat the stormwater onsite.

The site is generally surrounded by vegetated earthen or gravel berms to create a buffer from the neighboring properties. A vegetated berm, approximately 10 feet high, is located along the southern portion of the site. The northern and eastern portions of the site are also equipped with vegetated berms. The berms surrounding the site will remain in place after reclamation to prevent offsite discharges. The pond and drainage area will be monitored in accordance with the NPDES permit and SWPPP to verify that water is contained on-site or discharged in accordance with the NPDES limits and will take action to contain and further treat the water if necessary.

6.1.2 Erosion Control

During mining and reclamation of the site, PJK will utilize various erosion control methods to prevent sediment discharge. Stormwater runoff will be controlled through various erosion control measures. These measures include, but are not limited to, vegetative berms surrounding the site, vegetated/riprap swales, check dams, stabilized construction entrances, silt fence, and straw bales.

Erosion control measures would be used in, but not limited to, areas of surface disturbance, including:

- Active mining areas,
- Material and soil stockpiles,
- Unpaved internal haul roads, and
- Equipment storage area(s).

Vegetation or overburden will be removed incrementally as necessary to execute mining operations. Surface runoff and drainage from disturbed surfaces will be controlled through erosion control measures depending on the scale of surface disturbance, terrain, and location of waterways and stormwater control facilities. Potential erosion control measures may include, but not be limited to, grading berms, silt fences, revegetation, or hay bales. Any disturbed areas not actively planned as part of future mining or used in processing activities will be revegetated.

Erosion and sedimentation will be controlled consistent with a site-specific SWPPP and applicable State and Federal regulations. The SWPPP includes the following site controls related to erosion and sedimentation:

- Best Management Practices – Structural
 - Site is graded to drain in to holding pond at quarry base.
 - Site is bermed to prevent off-site drainage.
 - The quarry base holding pond has overflow piping to multiple secondary drainage ponds providing a series of settling basins for suspended solids in water to be removed.

- Bulk storage tanks are equipped with secondary containment in accordance with the facility SPCC Plan.
- Dikes, berms, or retaining walls.
- Culverting, trench, or other drainage systems.
- Sorbent material used.
- Floating booms used on several basins.
- Large silt curtain used for the Basin 1A.
- Flocculant/Coagulant addition to encourage settling.
- Hay Bales.
- Concrete Road barriers.
- Best Management Practices – Non-Structural
 - Plant area and ditches shall be kept clear of debris.
 - Preventative Maintenance:
 - Stormwater ponds are checked for adequate freeboard and capacity.
 - The secondary containment for the oil tanks is checked to make sure there is no standing liquid or debris.
 - Plant personnel inspect the stormwater catch basins on a frequent basis, but at least monthly. If problems are found, corrective action is taken.
 - Facility has operating procedures that are specifically designed to minimize the potential for a release.
 - Personal training regarding the facilities available and the procedures established to prevent spills and subsequent discharges.
 - Facility security measures.
 - Routine inspections and recordkeeping.
 - Routine Plan effectiveness reviews and amendments.

The layout of the facility is largely fixed, with stormwater controls permanently in place. In general, PJK conducts site grading as necessary to direct runoff towards sediment basins to assist in the settling of solids, as described above, to minimize sediment impacts. Paved surfaces are also swept mechanically with a street sweeper. There is a stabilized construction entrance to minimize tracking, trench drains to intercept road entrance stormwater and mobile water truck is also used at the facility to wet down on-site roads to minimize the amount of dust generated by vehicle traffic and the transport and deposition of sediment on surrounding public roadways. Both the water truck and street sweeper make continuous loops on pre-determined routes throughout the facility.

6.1.3 Dust Control

The following plan outlines steps that PJK follows to control particulate matter (PM) emissions at their facility in Acushnet, MA as described in the Particulate Matter (PM) Control Plan (2021).

Sources of Particulate Matter (PM):

- ✓ Roadways (paved, unpaved, and haul roads)
- ✓ Asphalt plant
- ✓ Crushing plant (Primary and finishing plant)
- ✓ Quarry

Actions taken by PJK to address dust:**Paved Roadways / Unpaved Roadways / Haul Roads**

- Paved roadways on site shall be swept with a street sweeper throughout the day (Monday through Friday).
- A portion of South Main Street (from the Century House to the Alden Road split) shall be swept at least once per day (Monday through Friday). Sweeping is typically done in the early afternoon.
- Saturday (or Sunday) street sweeping shall occur if conditions warrant. It shall be determined by either the Operations Manager or the Quarry Manager (or an employee that is designated by one of the managers responsible for this plan) if sweeping needs to be done. Conditions that could warrant sweeping could include very dry and windy days where there could be any excessive amount of dust being carried off site, high production days where there are numerous trucks entering and exiting the site, and other activities that may cause dust from leaving the site. PJK intends to sweep based on activity and need.
- South Main Street shall be cleaned with a vacuum truck at a minimum once per day (Monday through Friday).
- Keating shall have a designated employee (or 2 employees) on site whose responsibility includes wetting the site down with the water truck. There will be one water truck at the site.
- Paved roadways on site shall be wetted continuously throughout the day. (Note: This condition does not apply when it is raining or snowing or when there is snow cover on the ground.)
- The sprinkler system which is located at the entranceway to the site shall be in operation when conditions warrant (dry days). The sprinkler system will not be in operation when it is raining or when there is snow cover on the ground.
- Water for the sprinkler system located at the main entrance of the site shall come from a clean water source.
- The sprinkler system which is located within the site (along the haul roads to the asphalt plant and on haul roads in the quarry) shall always be in operation when conditions warrant (i.e., dry days). The sprinkler system will not be in operation when it is raining or when there is snow cover on the ground.

- Water source for the sprinkler system located within the site shall come from the retention pond located on site. The water used is from the cleaner section of the retention pond where the water and solids have already been filtered. The water used in the dust control on site will have TSS levels that follow the EPA's MSGP limit of a maximum of 100 mg/L. Using this water for dust control on site will not contribute to air pollution.
- Keating shall operate a water truck on the unpaved roadways continuously on a daily basis. (This condition does not apply when it is raining or snowing or when there is snow cover on the ground.)
- The water used to fill the water truck will come from the cleaner portion of the retention pond on site. Using this water for dust control on site will not contribute to air pollution.
- The water truck shall be used at least once each day to "wash" down the paved roads at the entranceway of the site. This is in addition to the continuous wetting of the on-site paved roads listed above.
- Speed limit signs of 15 mph shall be posted throughout the site.
- A speed limit of 10 mph shall be posted near the scale house.
- Speed limit shall be enforced by PJK personnel. Those who exceed the speed limit will be warned. Incidents from repeat offenders will be reviewed on a case-by-case basis.
- Water nozzles are located at the exit of the scales to rinse off trucks' tires prior to their leaving the site. All trucks exiting the site follow the traffic pattern that leads them through the Stanton wheel wash system.
- PJK is responsible for sampling and testing the water pumped out of their retention pond as part of their SWPPP and NPDES permit. PJK files a Discharge Monitoring Report (DMR) every month as per the requirement of its NPDES permit. DMRs are public documents.

Asphalt Plant

- PJK shall maintain daily production logs and shall make sure those logs are readily available at the site.
- Maintenance and malfunction logs shall be up to date and kept available on site.
- In the event of an excessive upset or malfunction to the facility's equipment or monitoring equipment, PJK will contact the MassDEP's Compliance and Enforcement Chief by telephone or fax. An excessive upset or malfunction occurs when the equipment exhibits greater than their allowed opacity limits and emission limits as established in the Comprehensive Air Plan approval permit AQ02P-0000032 dated July 21, 2021.
- A visolite test shall be performed before startup of every season. Additional visolite tests are performed on a monthly basis and opacity on a daily basis. Records shall be maintained documenting the results of the visolite test.
- At a minimum of once per workday, a designated employee familiar with facility operations and air pollution matters, shall conduct an inspection of all air pollution control equipment. The facility shall maintain a recordkeeping log that shall include a report of conditions noted by the observer and any corrective actions taken.

- A minimum of 100 replacement filter tubes shall be kept on site (per the Manufacturer's recommendations.). The baghouse on-site houses 1280 bags. If a visolite test shows there are broken bags in the baghouse, they are replaced immediately, thus it is important to have spare filter bags on-site.
- Trucks must cover loads prior to leaving the site.

Crushing Plants

- Wet dust suppression systems are located on the primary and finishing plants. Nozzles are located at all crusher discharges, as well as some crusher inlets, and belt conveyors. The only crusher inlet that does not contain nozzles is the HP300.
- Shrouding around many of the crusher discharge openings is installed. The primary crusher discharge does not contain shrouding as it is below the rim of the quarry.
- Whenever possible, material stockpiles at the end of a stacking conveyor shall be kept high so that the material drop is low. If stockpiles are consistently low, the stacker height will be adjusted accordingly to minimize the drop distance.
- Use the water truck to wet the shot/blasted rock prior to loading into the primary crusher as needed.
- Steel structure areas that show accumulated dust shall be washed off as needed. (The steel structure will be observed as part of the daily inspection. Any areas that show excessive dust will be cleaned off immediately.)
- Water shall be on when plant is in operation.
- If the wet dust suppression system is inoperable or malfunctioning, the plant shall be shut down until the problem is fixed.
- Spray nozzles on the plant and on site shall be cleaned as required. In addition, nozzles will be replaced whenever necessary.
- At a minimum of once per workday, a designated employee familiar with facility operations and air pollution matters, shall conduct an inspection of all air pollution control equipment (wet dust suppression system and shrouding). The facility shall maintain a recordkeeping log that shall include a report of conditions noted by the observer and any corrective actions taken.
- If dust is observed at any of the material transfer points, the plant operator shall increase the water flow to the nozzle(s) that service the specific location(s).
- Trucks shall cover their loads prior to leaving the site.

Miscellaneous

- Trees, berms, walls and/or other structures shall be added to the site if conditions warrant. These structures will be added if there is excessive noise or dust leaving the site.
- The site will contain two (2) water cannons to wet some of the material stockpiles. The first cannon, which has already been installed, wets the $\frac{3}{4}$ " stone pile on the southwest part of the property. The second cannon will wet the $\frac{3}{8}$ " stockpile on site. All other

stockpiles will be inspected daily and if it is found that other stockpiles exhibit excessive amounts of dust regularly, then additional water cannons may need to be added.

- This PM Control Plan will be reviewed for effectiveness on a monthly basis. If it is determined by PJK personnel that changes need to be made, they will do so immediately. Records of the changes will be kept on-site.
- A copy of the PM Control Plan will be posted at the main office and at the asphalt plant, so that employees can view it at any time. The Plan will be reviewed with employees on a quarterly basis.
- PJK has a public 24-hour phone line monitored by an answering service. When a call comes in, the appropriate manager is notified, and they will call the person back. Any dust related complaints about the quarry are logged on a spreadsheet. Depending on the complaint, modifications to the operation are made. Examples of modifications include reducing material flow by 50%, extending water truck run times, and shutting down portions of the operation. Any modifications will be done internally by PJK personnel and kept on site. These records will be submitted to the Board of Health on a monthly basis during the 2023 operating season. Any logs following the 2023 operating season will be available upon request.

6.2 Protection of Fish and Wildlife

6.2.1 Wildlife

Wildlife habitat is not a proposed second land use; however, the site will eventually produce an open space environment with some habitat value.

While no mapped habitat for rare, threatened, or endangered plant or wildlife species occurs within the limits of work related to quarry operations, reasonable measures to protect potential habitat for these species will be taken. This includes ensuring that equipment operators confine equipment usage to the defined on-site working areas, a preference for removal of vegetation during nonbreeding and nesting seasons, and pre-disturbance surveys. Where working areas are expanded, removal of vegetation will not exceed the minimum necessary to complete operations.

6.3 Site Facility Reuse

6.3.1 Building, Structure, and Equipment Removal

Equipment used in mining and reclamation will be stored at designated areas of the site. All quarry operation buildings and equipment, and site features that do not support the planned end use, will be dismantled, and demolished, and disposed or recycled offsite. Site features that support the planned end use, such as access roads and fencing, may be left in place.

6.4 Revegetation During Reclamation

As is common with hard rock mining operations, post-mining revegetation is limited to those hard rock areas that can be sufficiently covered with overburden and topsoil to establish vegetation. The site will be reclaimed to a post-mining land use of a basin sufficient for water storage, commercial/industrial redevelopment, Town Park and/or open space. The quarry's slopes will

remain unvegetated. Those areas undisturbed during mining operations will remain in their natural state.

Disturbed areas outside of the quarry will be revegetated as necessary to improve post-construction ground cover. Seeding and mulching for final stabilization shall be completed as soon as practicable and phased throughout construction. Areas of final stabilization shall be clearly marked in the field and protected to prevent damage from construction vehicle traffic. Areas shall be inspected throughout construction and after project completion until vegetative growth is established.

Areas that do not successfully revegetate will be reseeded as necessary. Revegetated areas and embankments will be inspected for signs of erosion. Any signs of erosion or inadequate revegetation of these areas will be corrected as needed.

6.4.1 Topsoil Salvage, Maintenance, and Redistribution

Topsoil and overburden will be stripped and used for highest and best use. Topsoil salvage will not precede operations by more than one year. If topsoil and overburden are not used immediately, they will be stockpiled within the previously disturbed areas, as feasible, or within other areas of the quarry that will remain undisturbed by mining operations for some time to avoid overhandling of the material. Topsoil is stockpiled separate from overburden and other material stockpiles.

All topsoil stripped from work areas is stockpiled on site for future use. Areas chosen for topsoil stockpiling are dry and stable. PJK designed, installed, and maintains effective erosion and sediment controls to minimize the discharge of pollutants from construction activities. If any stormwater flow becomes or will be channelized, PJK will design erosion and sediment controls to control both peak flowrates and total stormwater volume to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.

6.4.2 Test Plots

A test plot program will be established on the perimeter of the quarry. Three plots will be tested. Each plot will have varied topsoil, and overburden depths and representative mixes of native seeds and plants of each plant community type to be restored. Test plots will be created at least three (3) years before final reclamation of the quarry's perimeter.

6.4.3 Site Preparation

Internal access roads no longer necessary for active mining or part of permanent facilities to remain post-reclamation will be inspected for road-base materials. If present, this material will be removed before decompaction.

6.4.4 Revegetation Species, Actions, and Success Criteria

Species to be planted will consist of grasses that have evidenced good success on disturbed soils and are prompt generating grasses acclimated to varying harsh site conditions.

Modifications to this seed mix may be used based on cost, availability from suppliers, and success rates demonstrated by the test plots.

Grass will be seeded in the fall before the winter rains. Fertilizer (a slow release of organic Biosol Mix [N-P-K=7-2-3] at a rate of 1,000 pounds per acre, or similar) will be applied only if test plots or soil tests show the need for amendments.

6.4.5 Estimated Costs of Reclamation

Reclamation activities are a continual part of operations and are planned to be completed incrementally during the various phases of proposed mining activities. Therefore, a significant portion of overall reclamation costs are incidental to routine operations. The anticipated costs of reclamation as outlined in this plan are intended to capture the costs (at the point mining operations are terminated) of decommissioning, dismantling, and removing equipment; structure demolition and removal; overburden and topsoil placement; site preparation and erosion control measure implementation; and revegetation. The cost of reclamation is limited to the minimum measures necessary to decommission mining activities and stabilize the site, and do not account for final costs of potential second land use plans.

Table 1. Estimate Costs of Reclamation

Activity	Quantity	Unit	Unit Rate	Cost
Mobilization & Demobilization	1	LS	\$75,000.00	\$75,000.00
Building, Structure & Equipment Removal	1	LS	\$375,000.00	\$375,000.00
Site Preparation: Excavation & Subsoil Grading	121000	SY	\$0.88	\$106,480.00
Overburden & Topsoil Placement	40,000	CY	\$4.50	\$180,000.00
Revegetation: Seeding, Mulch, & Erosion Control Measures	25	Acre.	\$3,200.00	\$80,000.00
			Subtotal	\$816,480.00
			Contingency/Engineering/Consulting (15%)	\$122,472.00
			TOTAL	\$938,952.00

6.4.6 Monitoring and Maintenance

Reconnaissance Surveys

A qualified botanist, ecologist, or revegetation specialist will periodically survey the revegetation area(s) during the first year after planting. Reconnaissance surveys will be conducted four times during the first year and twice a year during the second and third years. During these surveys, revegetation areas will be examined for plant damage and changes or adjustments to revegetation plan activities will be made as necessary (i.e., altering the maintenance schedule, adding extra weed control visits).

Maintenance

The revegetation specialist will monitor the need for maintenance and document maintenance task items performed. Documentation will include the date, maintenance tasks performed, who performed maintenance, notes on other tasks requiring action, and observations of problems or potential problems. Maintenance tasks documented will include irrigation, weed control, supplemental planting, mulching, plant protection measures, and debris removal.

Weed Control

Infestations of non-native plants will be reduced and controlled throughout the revegetation area and in adjacent existing vegetation if these areas are providing a significant source of weed seeds.

Several control measures are available to manage invasive and noxious weeds to stabilize the native environment and achieve management objectives. Appropriate control measures are selected by considering the management objectives, effectiveness of control measures against the target invasive and/or noxious species, environmental factors, economics, policy and legal restrictions, practicality, safety, cost, and geographical extent of the infestation. Below is a list of standard weed management control measures:

- **Prevention:** Emphasizes the prevention and detection of new invasive and/or noxious weed infestations (e.g., removing seed sources from roads and other dispersal routes; reestablishing vegetation in disturbance areas; washing vehicles and equipment to remove weed seeds before they are moved into new areas).
- **Biological Control:** Uses animals, fungi, or other microbes that prey on, consume, or parasitize target invasive and/or noxious weed species (e.g., grazing animals).
- **Chemical Control:** Uses herbicides (chemicals that kill or inhibit plant growth) to reduce or eliminate invasive and/or noxious weed populations.
- **Manual and Mechanical Control:** Uses manual and mechanical techniques to physically remove individual invasive and/or noxious weeds (e.g., pulling weeds by hand, pulling with tools, weed-eating, tilling).
- **Physical Control:** Uses physical means to reduce or eliminate invasive and noxious weed infestations (e.g., fire, flooding, mulching).
- **Cultural Control:** Uses cultivation to limit invasive and noxious weed populations. Cultural control is implemented by introducing pest-resistant native plants suited for the soil and water conditions of the site.

6.5 Geotechnical Requirements

A slope stability analysis was performed for the proposed reclamation slopes (Appendix B) under both static and pseudo-static (seismic) dry conditions, and static and pseudo-static (seismic) "flooded" conditions (i.e., with the pit functioning as a basin suitable for water storage). The analysis utilized slope benches 50-foot-height and 50-foot-width with 0.3:1 horizontal to vertical backslopes, resulting in a 1.3:1 horizontal to vertical (approximately 38 degree) slope for the approximately 537-foot proposed slopes (Figure 18). Based on the proposed post-reclamation open space use for the site (basin suitable for water storage), the appropriate post-reclamation

factors of safety for the site are 1.5 or greater for static (dry or “flooded”) conditions and 1.1 or greater (dry or “flooded”) for the pseudo-static conditions. The slopes as designed achieve this factor of safety.

6.6 Public Safety/Closure

To provide public safety during reclamation, PJK will fully fence the quarry upon completion of the mining and post “No Trespassing” signs throughout the site except where redevelopment has occurred.

6.7 Town Bylaws

Appendix C contains an itemization of Town Bylaws and their applicability and/or relevance to the PJK quarry operation. Many bylaws do not directly apply to PJK, and those that do apply are overseen by various town entities (such as the Fire Department) that conduct routine inspections of the site. Section 4 of this Reclamation Plan illustrates that PJK’s operations at the site meet the goals and standards of the Town stormwater management bylaw. Completion of the Earth Removal Application and permitting should achieve compliance with all the Town bylaws.

Earth Removal Bylaw – The Earth Removal Bylaw is highly subjective and contains several standards or requirements that are unclear and impractical for an active quarry operation to meet. Consequently, PJK will need more quantifiable standards and/or waivers to allow continued operation of its facility. Problematic requirements in the bylaw include the following:

Section 3 (A) of the Bylaw, includes but not limited to the following:

- (1) *will be injurious or dangerous to the public health or safety,*
- (2) *will produce noise, dust, or other effects observable at or beyond the lot lines in amounts seriously objectionable or detrimental to the normal use of adjacent property,*
- (3) *will result in transportation of materials on ways giving access to the land in question which will cause traffic congestion or hazards,*
- (4) *will result in transportation which will cause undue injury to the roadway surfaces,*
- (5) *will result in change in topography and cover which will be disadvantageous to the most appropriate use of land on which the operation is conducted,*
- (6) *will have a material adverse effect on the health or safety of persons living in the neighborhood, or on the use of amenities of adjacent land.*
- (7) *Will result in transportation of materials in excess of the Federal truck weight limits of 80,000 pounds.*

These standards are arbitrary and allow the Soil Board to determine noncompliance based on a subjective opinion rather than a quantifiable standard. Under these Bylaw provisions, PJK

would be at the whim of the Soil Board with no ability to plan as the requirements are not objectively quantifiable/verifiable.

Also, the 80,000-pound limit is below the MassDOT standard of up to 99,000 pounds without a permit, and heavier than that with a permit or grandfathered (Mass. Gen. Laws Ann. Ch. 85, §§30 et seq. and Mass. Gen. Laws Ann. ch. 90, §19 through §19L.). The weight needs to be increased to the MassDOT standard, which is proven safe for truck traffic on all roads. The Soil Bylaw should require that the truck weights meet the State Standard, rather than some arbitrary weight lower than the State Standard. We note that if the lower weight is kept in the Bylaw, many non-PJK trucks passing through Town would likely exceed the Town's limit, making this arbitrary and capricious standard for PJK alone to meet.

Section 3(B)(k) of the Bylaw - At the conclusion of every day's operation, the vertical bank shall be caved into a slope no greater than a 2 to 1 vertical slope to protect public safety.

This standard is effectively impossible to meet with a hard rock mine, especially on a daily basis. The final safe slopes have been described in the geotechnical portion of PJK's proposed Reclamation Plan. It would be impractical to repeatedly blast a rock wall to try to get a smooth 2 to 1 vertical slope throughout the facility. PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 5(A) of the Bylaw

No permit for the removal of earth shall be approved by the Board of Selectmen except upon the condition that a drainage layer of not less than eighteen inches (18") in depth, with a permeability of <10⁻⁵ and a cover of topsoil of not less than 4 inches in depth shall be replaced or allowed to remain, except that it shall be no greater than the depth of the topsoil, if any, shown on submitted plans, and except where, due to construction of roads, buildings or other permanent physical features, such provision is impractical.

PJK's proposed Reclamation Plan states how the facility will be best reclaimed for future use. In comparison, this Bylaw provision is too restrictive. For example, part of the proposed Reclamation Plan will include creating a lake potentially for recreation. The standard established by the Town would not allow for this type of use. PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 5(B) of the Bylaw

Every permit granted under this bylaw shall be valid for a period not to exceed one year. Requests for renewal must be submitted no later than the end of the 10th month following issuance, with decisions on renewal to issue within thirty days of such request. Renewals shall be granted based upon compliance with the terms of the underlying permit. Any expansion or material modification of the underlying soil removal activities, as may be determined by the Board's Agent, shall require a new hearing.

It is unworkable to limit permits for an existing quarry to one-year effective periods. This would place PJK in a perpetual cycle of needing to start a new permit application as soon as the original permit is received to meet all the deadlines. From a business perspective, it also makes planning and committing resources for maintenance, upgrades, and other improvements impossible as lending institutions are averse to loans for long-term expenditures

without a guarantee of continued operation. PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 6(C) of the Bylaw

No permit shall be issued for the removal of earth within twenty (20) feet plus a sufficient distance to provide a 2 horizontal to 1 vertical foot slope from an abutting owner, unless the Board of Selectmen finds after a report from the inspector that a closer distance would not be detrimental to the site or if a closer dimension is not objectionable to the abutting property owner. In the case of two abutting gravel operations, if it is agreeable to both parties, there shall be no lot line restrictions.

The standard set in the Bylaw is overly restrictive. The proposed quarry may be up to about 500 feet deep relative to surface elevation. The standard would require that the nearest neighbor would have to be about 1,000 feet from the quarry or else the quarry could not be constructed. The facility is able to operate now on a far lower setback to the neighbors without having an incident. PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 9(A) of the Bylaw

If the Enforcement Officer concludes that there has been a violation of this By-law, he or she shall hand deliver or send to the person in charge or permit holder, by certified mail, return receipt requested, to the address stated on the initial application, or any other manner provided for by law, a notice ordering a cessation of the improper activities.

The language in this section of the Bylaw allows a single individual to be judge and jury of the bylaw, authorized to impose stiff penalties and even revoke the permit. The Bylaw is largely non-quantitative and based rather on subjective standards governed by the opinion of an individual. PJK requests that the Board reconsider this untenable provision of the Bylaw.

Section 10 of the Bylaw

As soon as practicable, and in accordance with good conservation practices not to exceed 90 days, all stripped areas shall be graded and covered with a drainage layer, topsoil, and loam, graded and vegetated in a proper soil conserving manner.

The proposed Reclamation Plan and Stormwater Pollution Prevention Plan (SWPPP) outline what is required based on State and Federal Standards. The standard being applied in the Bylaw is arbitrary and limiting in the ability to pick the best solution for erosion control. PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 10 of the Bylaw

No earth shall be removed within four feet of spring high water table. This elevation shall be established from a test pit or piezometer and the level related to a permanent monument on the property. This information shall show on the topographic plan.

PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 10 of the Bylaw

No mounds of loam, fill, silt, waste, gravel, stones, brush, sand, etc. are to be left at the completion of this operation, or upon the termination of this permit.

This requirement is overly restrictive. Part of the proposed Reclamation Plan is to potentially leave intact the site berms to assist in noise, dust, and stormwater run-on/run-off control. The term 'mound' is not defined in the standard and thus is open to subjective interpretation. PJK requests that the Board waive this provision of the Bylaw for its facility.

Section 10 of the Bylaw

After the operation has proceeded 600 feet, the operator shall slope, grade, and reseed the initial 300 feet before or during the period when he begins work on the following 300 feet. Thereafter, he shall proceed to advance his operations at integral distances of 300 feet while he simultaneously grades, slopes, loams and reseeds the previous integral distance of 300 feet.

This is not how a quarry pit is constructed as you cannot fill in the pit with soil every 300 feet. The quarry pit needs to be free of cover so that it can be successively deepened. This requirement will not work for a quarry and should be waived. No other quarry in the state needs to meet this restrictive standard. PJK requests that the Board waive this provision of the Bylaw for its facility.

7.0 References

Olimpio, J.C., and de Lima, Virginia, 1984, Ground-water resources of the Mattapoisett River Valley, Plymouth County, Massachusetts: U.S. Geological Survey Water Resources Investigations Report 84-4043, 83 p.

Hansen, B.P., and Lapham, W.W., 1992, Geohydrology and simulated ground-water flow, Plymouth-Carver Aquifer, southeastern Massachusetts: U.S. Geological Survey Water-Resources Investigations Report 90-4204, 69 p

Lyford P. F., Garabedian P. S. Hansen P. B., 1999. Estimated Hydraulic Properties for the Surficial – and Bedrock-Aquifer System, Meddybemps, Maine. USGS File Report 99-199.

National Research Council. 1979. Surface Mining of Non-Coal Minerals: A Study of Mineral Mining from the Perspective of the Surface Mining Control and Reclamation Act of 1977. Washington, D.C.

Byron D. Stone, Janet R. Stone, Mary L. DiGiacomo-Cohen, and Kevin A. Kincare. 2011. Surficial Geologic Map of the Norton-Manomet-Westport Sconticut Neck 23-Quadrangle Area in Southeast Massachusetts. USGS Open-File Report 2006-1260-F.

Facts By City. 2020. Weather Statistics in Acushnet, MA.

Goldsmith, Richard. 1978. Geologic Map of the Fall River New Bedford Area, Massachusetts. USGS Open File Report 78-484.

Shepard, J. John, 2014. The Acushnet River Restoration Project Restoring Diadromous Populations to a Superfund Site in Southeastern Massachusetts, Massachusetts Division of Marine Fisheries Technical Report TR-56.

Duffield, M. Glenn. 2019, Representative values of Hydraulic Properties
http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm

Melvin, L. Robert, deLima, Virginia and Stone, D. Byron., 1992. The Stratigraphy and Hydraulic Properties of tills in Southern New England, USGS Open File Report 91-481.

Forest P. Lyford, Stephen P. Garabedian, and Bruce P. Hansen, 1999, Estimated Hydraulic Properties for the Surficial- and Bedrock-Aquifer System, Meddybemps, Maine. USGS Open File Report 99-199.

NOAA Technical Report NWS 34, 1982. Mean Monthly, Seasonal, and Annual Pan Evaporation for the United States

MassGIS MassMapper. 2022.
<https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html>

MassGIS 2016 Land Cover Land Use. May 2019.

MassGIS Natural Heritage and Endangered Species Program Priority Habitats of Rare Species. August 2021.

MassGIS Natural Heritage and Endangered Species Program Estimated Habitats of Rare Wildlife. August 2021.

MassWildlife Natural Heritage and Endangered Species Program (NHESP). Division of Fisheries and Wildlife. 2022. Rare Species Viewer. <https://www.mass.gov/info-details/rare-species-viewer>

NAR, 2018. Surface Mine Plan for Acushnet Quarry Aggregate Operations Acushnet, Massachusetts MSHA Mine ID # 1900046

RESPEC. 2022, Reserve Analysis for P.J Keating Acushnet, Southern Massachusetts Topical Report RSI-3207

TRC 2022a. Geology Strike and Dip Measurement at the PJK Acushnet Quarry

TRC 2022b. PJK 001 Outfall Flow Measurements for 2021-2022

U.S. Natural Resources Conservation Services. 2021. Results of Soil Survey Geographic (SSURGO) Database Search for Bristol County.

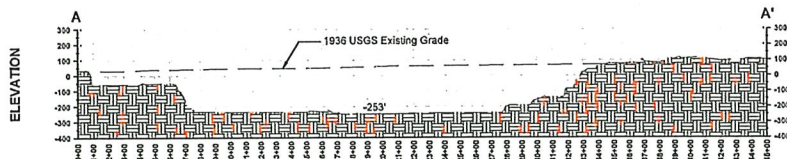
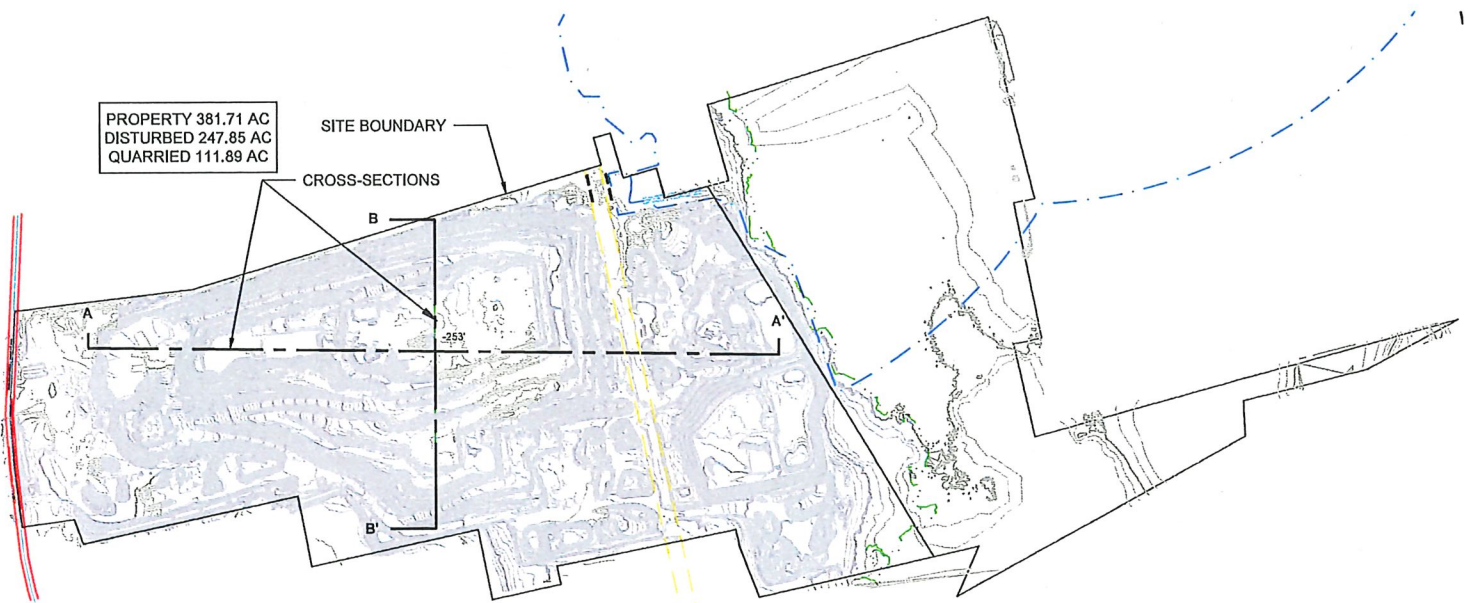
Weatherspark. 2022. Climate and Average Weather Year-Round in Acushnet. <https://weatherspark.com/y/26792/Average-Weather-in-Acushnet-Massachusetts-United-States-Year-Round>

Sheets



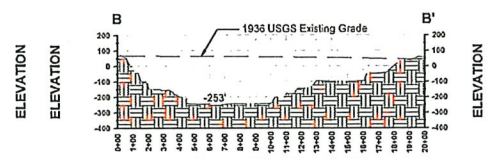
SCALE: 1 INCH = 600 FEET
0 300 600 1200 1800
FEET

Existing Conditions Aerial Photograph
PJ Keating Quarry
Sheet 1



Cross-Section A-A'

Scale: 1" = 600'



Cross-Section B-B'

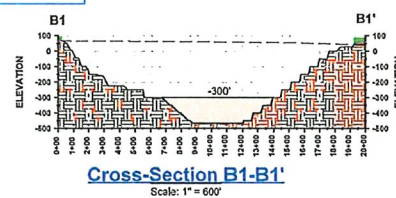
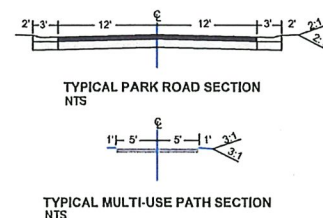
Scale: 1" = 600'



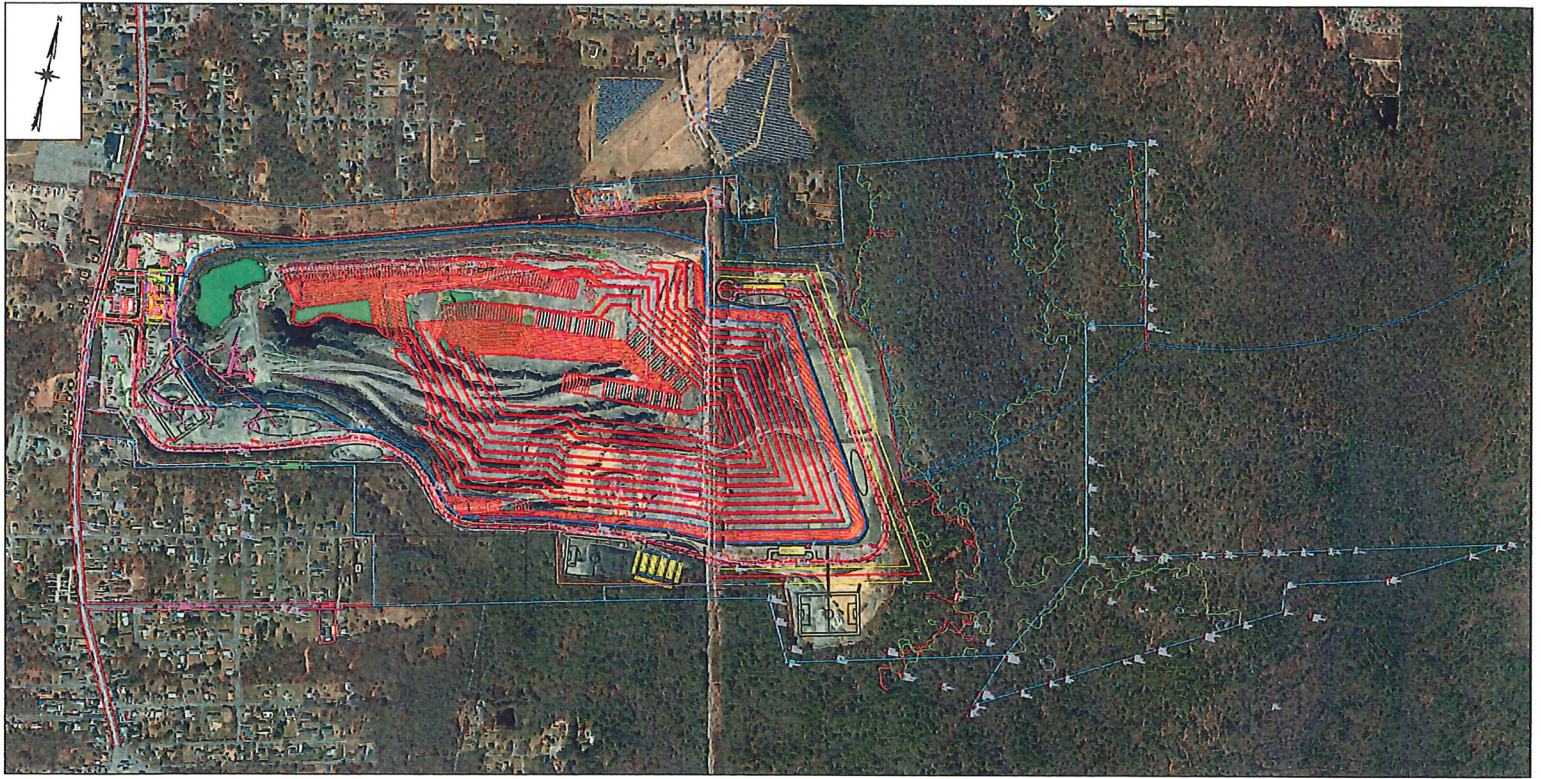
0 100 200 400
Feet

REF: BASE CAD FILE FROM AN "D-100-BRICK-AGE" PLAN-CRIT GOOD SET (12-13-2019)
THIS IS A QUARRY PLAN AND PROFILE SHEET





REF: BASE C&G FILE FROM P&K "20-100-SURVEY-BASE-PLAN-COST CO-00 SET 12-13-BELOW"
THE FILE P&K REGISTRATION PLAN AND PROFILE (TABLES 20-12/20-13)



SCALE: 1 INCH = 600 FEET
0 300 600 1200 1800
FEET

Proposed Conditions Aerial Photograph
PJ Keating Quarry
Sheet 4



Appendix A: Adjacent Parcels/Owners within 300 feet

prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-477	2 BELANGER STREET	2	BELANGER STREET	ACUSHNET	02743	BRILHANTE CARLOS	26 EVERGREEN DRIVE	ACUSHNET	MA
15-257	0 BRADFORD AVENUE	0	BRADFORD AVENUE	ACUSHNET	02743	RIVET ADRIENNE Y	53 SO MAIN STREET	ACUSHNET	MA
15-390	0 CLIFFORD STREET	0	CLIFFORD STREET	ACUSHNET	02743	VIEIRA GERMAINE I LIFE ESTATE	30 CLIFFORD STREET	ACUSHNET	MA
15-396	26 CLIFFORD STREET	26	CLIFFORD STREET	ACUSHNET	02743	POLCHLOPEK DEBORAH J LIFE ESTATE	26 CLIFFORD STREET	ACUSHNET	MA
15-391	27 CLIFFORD STREET	27	CLIFFORD STREET	ACUSHNET	02743	SILVA SEAN D & CAROL A	27 CLIFFORD STREET	ACUSHNET	MA
15-395	30 CLIFFORD STREET	30	CLIFFORD STREET	ACUSHNET	02743	DEJESUS PATRICIA ANN ALFERES REBECCA ANN	30 CLIFFORD STREET	ACUSHNET	MA
15-394	32 CLIFFORD STREET	32	CLIFFORD STREET	ACUSHNET	02743	THOMAS LINDA L	32 CLIFFORD STREET	ACUSHNET	MA
15-393	38 CLIFFORD STREET	38	CLIFFORD STREET	ACUSHNET	02743	POLCHLOPEK DEBORAH LIFE ESTATE	38 CLIFFORD STREET	ACUSHNET	MA
15-429	27 CROWELL STREET	27	CROWELL STREET	ACUSHNET	02743	ARRUDA ANTHONY W JR	27 CROWELL STREET	ACUSHNET	MA
15-451	16 DALTON STREET	16	DALTON STREET	ACUSHNET	02743	DUFF ALEXANDER D	16 DALTON STREET	ACUSHNET	MA
15-450.449	19 DALTON STREET	19	DALTON STREET	ACUSHNET	02743	STEVENS GEORGE J JR & ANITA L LIF	19 DALTON STREET	ACUSHNET	MA
15-452	20 DALTON STREET	20	DALTON STREET	ACUSHNET	02743	SOULIERE JAMES	20 DALTON STREET	ACUSHNET	MA
15-498	32 DALTON STREET	32	DALTON STREET	ACUSHNET	02743	PEPIN CHARLES J	32 DALTON STREET	ACUSHNET	MA
15-496	35 DALTON STREET	35	DALTON STREET	ACUSHNET	02743	BRIGHTMAN MICHAEL P & TRACY LYNN	35 DALTON STREET	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-388	0 DOROTHY STREET	0	DOROTHY STREET	ACUSHNET	02743	TILCON CAPALDI INC.	875 PHEONIX AVENUE	CRANSTON	RI
15-401.404	15 DOROTHY STREET	15	DOROTHY STREET	ACUSHNET	02743	PAUL R NUNES LIVING TRUST	15 DOROTHY STREET	ACUSHNET	MA
15-386	26 ENOS STREET	26	ENOS STREET	ACUSHNET	02743	COTE AUGUST R. TRUSTEE	10 PARK AVENUE	ACUSHNET	MA
15-445	0 HERSOM AVENUE	0	HERSOM AVENUE	ACUSHNET	02743	TILCON CAPALDI INC.	875 PHEONIX AVENUE	CRANSTON	RI
15-456C	0 LABONTE STREET	0	LABONTE STREET	ACUSHNET	02743	MG PROPERTY GROUP LLC	8 HEBERT RD	ACUSHNET	MA
15-426	61 LAURA KEENE AVENUE	61	LAURA KEENE AVENUE	ACUSHNET	02743	GRAVESON VIRGINIA	61 LAURA KEENE AVENUE	ACUSHNET	MA
15-33D	62 LAURA KEENE AVENUE	62	LAURA KEENE AVENUE	ACUSHNET	02743	TEIXEIRA LOUIS	62 LAURA KEENE AVENUE	ACUSHNET	MA
15-33B	66 LAURA KEENE AVENUE	66	LAURA KEENE AVENUE	ACUSHNET	02743	VENTURA ALICE	66 LAURA KEENE AVENUE	ACUSHNET	MA
15-32	OFF LAURA KEENE AVENUE	OFF	LAURA KEENE AVENUE	ACUSHNET	02743	GRACIA JOHN & HELEN; LIFE EST	52 LAURA KEENE AVENUE	ACUSHNET	MA
15-439	0 LAWSON AVENUE	0	LAWSON AVENUE	ACUSHNET	02743	P. J. KEATING COMPANY, INC.	72 SO MAIN STREET	Acushnet	MA
15-441	0 LAWSON AVENUE	0	LAWSON AVENUE	ACUSHNET	02743	P J KEATING COMPANY	72 SOUTH MAIN STREET	ACUSHNET	MA
15-440	0 LAWSON AVENUE	0	LAWSON AVENUE	ACUSHNET	02743	TILCON CAPALDI INC.	875 PHEONIX AVENUE	CRANSTON	RI
15-384	117 LAWSON AVENUE	117	LAWSON AVENUE	ACUSHNET	02743	TRIPP FAMILY REVOCABLE TRUST	117 LAWSON AVENUE	ACUSHNET	MA
15-385	119 LAWSON AVENUE	119	LAWSON AVENUE	ACUSHNET	02743	DEMELLO ANTHONY P	119 LAWSON AVENUE	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-400	124 LAWSON AVENUE	124	LAWSON AVENUE	ACUSHNET	02743	DESOUSA JASON LEE	124 LAWSON AVENUE	ACUSHNET	MA
15-387	127 LAWSON AVENUE	127	LAWSON AVENUE	ACUSHNET	02743	FELACCIO STEVEN N	127 LAWSON AVENUE	ACUSHNET	MA
15-406	128 LAWSON AVENUE	128	LAWSON AVENUE	ACUSHNET	02743	SAETHER ERIC W	128 LAWSON AVENUE	ACUSHNET	MA
15-389	129 LAWSON AVENUE	129	LAWSON AVENUE	ACUSHNET	02743	QUITERIO MARIA L	129 LAWSON AVENUE	ACUSHNET	MA
15-392	131 LAWSON AVENUE	131	LAWSON AVENUE	ACUSHNET	02743	DUBE MICHAEL A	131 LAWSON AVENUE	ACUSHNET	MA
15-409	134 LAWSON AVENUE	134	LAWSON AVENUE	ACUSHNET	02743	NOWICKI ADAM W & AMANDA M	134 LAWSON AVENUE	ACUSHNET	MA
15-411	138 LAWSON AVENUE	138	LAWSON AVENUE	ACUSHNET	02743	SYLVIA GEORGE A & ELAINE T	138 LAWSON AVENUE	ACUSHNET	MA
15-430	141 LAWSON AVENUE	141	LAWSON AVENUE	ACUSHNET	02743	ROSE CHARLES H.	41 WINFIELD STREET	EAST FREETOWN	MA
15-416	142 LAWSON AVENUE	142	LAWSON AVENUE	ACUSHNET	02743	BLANCHETTE ERIC L	142 LAWSON AVENUE	ACUSHNET	MA
15-431	147 LAWSON AVENUE	147	LAWSON AVENUE	ACUSHNET	02743	BENTO WANDA L	147 LAWSON AVENUE	ACUSHNET	MA
15-432	149 LAWSON AVENUE	149	LAWSON AVENUE	ACUSHNET	02743	GONSALVES CHRISTINE M	149 LAWSON AVENUE	ACUSHNET	MA
15-433	151 LAWSON AVENUE	151	LAWSON AVENUE	ACUSHNET	02743	COULOMBE DAVID A & STEPHANIE E	151 LAWSON AVENUE	ACUSHNET	MA
15-434	155 LAWSON AVENUE	155	LAWSON AVENUE	ACUSHNET	02743	NELSON DWAYNE P	155 LAWSON AVENUE	ACUSHNET	MA
15-427	160 LAWSON AVENUE	160	LAWSON AVENUE	ACUSHNET	02743	DROLET PETER H	160 LAWSON AVE	ACUSHNET	MA
15-435	161 LAWSON AVENUE	161	LAWSON AVENUE	ACUSHNET	02743	SMITH KEVIN M & KAREN	161 LAWSON AVENUE	ACUSHNET	MA
15-437	166 LAWSON AVENUE	166	LAWSON AVENUE	ACUSHNET	02743	BAKER ALLAN D & CORA G	166 LAWSON AVENUE	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-474	6 LEOEUF STREET	6	LEOEUF STREET	ACUSHNET	02743	JARVIS MELANIE	66 LAKE STREET	ACUSHNET	MA
15-473	7 LEOEUF STREET	7	LEOEUF STREET	ACUSHNET	02743	DWINELLS ANDREW	7 LEOEUF STREET	ACUSHNET	MA
15-475	18 LEOEUF STREET	18	LEOEUF STREET	ACUSHNET	02743	HARRISON PATRICIA	18 LEOEUF STREET	ACUSHNET	MA
15-464	8 MARTELLE STREET	8	MARTELLE STREET	ACUSHNET	02743	JACQUES AMY L & JASON A	8 MARTELLE STREET	ACUSHNET	MA
15-463	11 MARTELLE STREET	11	MARTELLE STREET	ACUSHNET	02743	SCHESTAK CHARLES J III	11 MARTELLE STREET	ACUSHNET	MA
10-48.49	0 MORTON LANE	0	MORTON LANE	ACUSHNET	02743	TUCKER HOWARD	202 ROYAL ROAD	JAMESTOWN	NC
14-39.40	0 MORTON LANE	0	MORTON LANE	ACUSHNET	02743	TOWN OF ACUSHNET	122 MAIN STREET	ACUSHNET	MA
14-43	0 MORTON LANE	0	MORTON LANE	ACUSHNET	02743	TOWN OF ACUSHNET SELECTMEN	122 MAIN STREET	ACUSHNET	MA
14-41	0 MORTON LANE	0	MORTON LANE	ACUSHNET	02743	KOSKA JOHN T; TRUSTEE	15 SUNRISE COURT	FAIRHAVEN	MA
14-25.26.28.30	OFF MORTON LANE	OFF	MORTON LANE	ACUSHNET	02743	TOWN OF ACUSHNET CONSERVATION COMMISSION	122 MAIN STREET	ACUSHNET	MA
15-458B	0 PEMBROKE AVENUE	0	PEMBROKE AVENUE	ACUSHNET	02743	FREDETTE DOUGLAS	52 PEMBROKE AVENUE	ACUSHNET	MA
15-491	0 PEMBROKE AVENUE	0	PEMBROKE AVENUE	ACUSHNET	02743	THE CIOPER FAMILY LIMITED PARTNERSHIP	308 MIDDLE ROAD	ACUSHNET	MA
15-481	0 PEMBROKE AVENUE	0	PEMBROKE AVENUE	ACUSHNET	02743	DETERRA DEVELOPMENT LLC	1 BOW DRIVE	ACUSHNET	MA
15-492	11 PEMBROKE AVENUE	11	PEMBROKE AVENUE	ACUSHNET	02743	RODRIGUES JORDAN J	11 PEMBROKE AVENUE	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-444	14 PEMBROKE AVENUE	14	PEMBROKE AVENUE	ACUSHNET	02743	CORREIA PAUL	14 PEMBROKE AVENUE	ACUSHNET	MA
15-493.497	23 PEMBROKE AVENUE	23	PEMBROKE AVENUE	ACUSHNET	02743	AGUIAR NATHANIEL C	23 PEMBROKE AVENUE	ACUSHNET	MA
15-453	26 PEMBROKE AVENUE	26	PEMBROKE AVENUE	ACUSHNET	02743	LUIZ-ABRAM DIANNE	26 PEMBROKE AVENUE	ACUSHNET	MA
15-454	30 PEMBROKE AVENUE	30	PEMBROKE AVENUE	ACUSHNET	02743	SAVERY LARRY C & KERIE A	30 PEMBROKE AVENUE	ACUSHNET	MA
15-503	31 PEMBROKE AVENUE	31	PEMBROKE AVENUE	ACUSHNET	02743	DESOUSA SHERRY	31 PEMBROKE AVENUE	ACUSHNET	MA
15-455	32 PEMBROKE AVENUE	32	PEMBROKE AVENUE	ACUSHNET	02743	REBOCA NICOLAS	32 PEMBROKE AVENUE	ACUSHNET	MA
15-460	54 PEMBROKE AVENUE	54	PEMBROKE AVENUE	ACUSHNET	02743	LAROSE JAMES A & MARGARET E	54 PEMBROKE AVENUE	ACUSHNET	MA
15-482	90 PEMBROKE AVENUE	90	PEMBROKE AVENUE	ACUSHNET	02743	DETERRA DEVELOPMENT LLC	1 BOW DRIVE	ACUSHNET	MA
15-483	100 PEMBROKE AVENUE	100	PEMBROKE AVENUE	ACUSHNET	02743	LOPES LINO & ANA	100 PEMBROKE AVENUE	ACUSHNET	MA
15-259	0 RIVET STREET	0	RIVET STREET	ACUSHNET	02743	RAPOSO GIL S & MARIA O	9 RIVET STREET	ACUSHNET	MA
15-256	7 RIVET STREET	7	RIVET STREET	ACUSHNET	02743	RIVET MAUREEN E	7 RIVET STREET	ACUSHNET	MA
15-261	8 RIVET STREET	8	RIVET STREET	ACUSHNET	02743	CAMARA EVARISTO & ROSA	8 RIVET STREET	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-258	9 RIVET STREET	9	RIVET STREET	ACUSHNET	02743	RAPOSO GIL S & MARIA O	9 RIVET STREET	ACUSHNET	MA
15-425	10 ROTCH STREET	10	ROTCH STREET	ACUSHNET	02743	BUTCHER DAVID A	12 ROTCH STREET	ACUSHNET	MA
15-424	12 ROTCH STREET	12	ROTCH STREET	ACUSHNET	02743	BUTCHER DAVID A.	12 ROTCH STREET	ACUSHNET	MA
15-423	16 ROTCH STREET	16	ROTCH STREET	ACUSHNET	02743	MONIZ MANUEL JR & MARIA A	16 ROTCH STREET	ACUSHNET	MA
15-43B.447	0 SO. MAIN STREET	0	SO. MAIN STREET	ACUSHNET	02743	TILCON CAPALDI INC.	875 PHEONIX AVENUE	CRANSTON	RI
25-34A	0 SO. MAIN STREET	0	SO. MAIN STREET	ACUSHNET	02743	N&T REALTY TRUST	P.O. BX 30360	ACUSHNET	MA
15-490	0 SO. MAIN STREET	0	SO. MAIN STREET	ACUSHNET	02743	FARLAND DAVID A & MELISSA M	6 PEMBROKE AVE	ACUSHNET	MA
25-63.64	0 WEST SO. MAIN STREET	0	SO. MAIN STREET	ACUSHNET	02743	ROBICHAUD JANET	89 SOUTH MAIN STREET	ACUSHNET	MA
25-45	59 SO. MAIN STREET	59	SO. MAIN STREET	ACUSHNET	02743	HALL CAROLE D & ROBERT W LE	59 SOUTH MAIN STREET	ACUSHNET	MA
25-36A.44	59 1/2 SO. MAIN STREET	59	SO. MAIN STREET	ACUSHNET	02743	TOWN OF ACUSHNET SELECTMEN	122 MAIN STREET	ACUSHNET	MA
15-255	60 SO. MAIN STREET	60	SO. MAIN STREET	ACUSHNET	02743	LEFEVRE JASON & LAUREN E	60 SO MAIN STREET	ACUSHNET	MA
25-42	61 SO. MAIN STREET	61	SO. MAIN STREET	ACUSHNET	02743	PORELLO JUSTIN M	61 SO MAIN STREET	ACUSHNET	MA
15-19	62 SO. MAIN STREET	62	SO. MAIN STREET	ACUSHNET	02743	TAVARES JOAO P	62 SOUTH MAIN STREET	ACUSHNET	MA
25-41	63 SO. MAIN STREET	63	SO. MAIN STREET	ACUSHNET	02743	GAUVIN PETER JAMES & TAMMY LYNNE	63 SO MAIN STREET	ACUSHNET	MA
25-40.40A	65 SO. MAIN STREET	65	SO. MAIN STREET	ACUSHNET	02743	SYLVIA JACK S & KAREN T	65 SO MAIN STREET	ACUSHNET	MA
25-38	69 SO. MAIN STREET	69	SO. MAIN STREET	ACUSHNET	02743	ALMEIDA BRIAN A	69 SOUTH MAIN STREET	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-17	72 SO. MAIN STREET	72	SO. MAIN STREET	ACUSHNET	02743	TILCON CAPALDI INC	875 PHEONIX AVENUE	CRANSTON	RI
25-37	73 SO. MAIN STREET	73	SO. MAIN STREET	ACUSHNET	02743	BUZZARDS BAY COALITION INC	114 FRONT STREET	NEW BEDFORD	MA
25-34	89 SO. MAIN STREET	89	SO. MAIN STREET	ACUSHNET	02743	ROBICHAUD JANET C	89 SOUTH MAIN STREET	ACUSHNET	MA
25-61.62.3 4B	91 SO. MAIN STREET	91	SO. MAIN STREET	ACUSHNET	02743	ROBICHAUD JANET C	89 SOUTH MAIN STREET	ACUSHNET	MA
25-35	93 SO. MAIN STREET	93	SO. MAIN STREET	ACUSHNET	02743	TURBIDES ANTHONY & TABITHA	93 SOUTH MAIN STREET	ACUSHNET	MA
25-33	95 SO. MAIN STREET	95	SO. MAIN STREET	ACUSHNET	02743	LECUYER PATRICIA H TRUSTEE	95 SOUTH MAIN STREET	ACUSHNET	MA
25-107	97 SO. MAIN STREET	97	SO. MAIN STREET	ACUSHNET	02743	HAMMOND ERNEST P JR	97 SOUTH MAIN STREET	ACUSHNET	MA
25-32	99 SO. MAIN STREET	99	SO. MAIN STREET	ACUSHNET	02743	BRIGGS CHRISTIAN C	99 SO MAIN STREET	ACUSHNET	MA
15-43A	106 SO. MAIN STREET	106	SO. MAIN STREET	ACUSHNET	02743	PIRES MICHAEL J TRUSTEE	2288 ACUSHNET AVENUE	NEW BEDFORD	MA
25-31	107 SO. MAIN STREET	107	SO. MAIN STREET	ACUSHNET	02743	CAMERON PROPERTIES LLC	107 SO MAIN STREET	ACUSHNET	MA
15-446	108 SO. MAIN STREET	108	SO. MAIN STREET	ACUSHNET	02743	FARLAND DAVID A	6 PEMBROKE AVENUE	ACUSHNET	MA
25-30	111 SO. MAIN STREET	111	SO. MAIN STREET	ACUSHNET	02743	GOULART MANUEL A & DOLORES	111 SOUTH MAIN STREET	ACUSHNET	MA
15-443	118 SO. MAIN STREET	118	SO. MAIN STREET	ACUSHNET	02743	FARLAND DAVID A & MELISSA	6 PEMBROKE AVENUE	ACUSHNET	MA
25-29G	119 SO. MAIN STREET	119	SO. MAIN STREET	ACUSHNET	02743	JOHNSON GARFIELD R	119 SO MAIN STREET	ACUSHNET	MA
15-489	122 SO. MAIN STREET	122	SO. MAIN STREET	ACUSHNET	02743	CLOPER NOMINEE TRUST	308 MIDDLE ROAD	ACUSHNET	MA



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
15-488	124 SO. MAIN STREET	124	SO. MAIN STREET	ACUSHNET	02743	LOGOZZO FRANK S.	124 SOUTH MAIN STREET	ACUSHNET	MA
15-486	132 SO. MAIN STREET	132	SO. MAIN STREET	ACUSHNET	02743	CIOPER TEDDY M.	308 MIDDLE ROAD	ACUSHNET	MA
25-36.39.3 9A	WEST OF SO. MAIN STREET	WEST OF	SO. MAIN STREET	ACUSHNET	02743	ACUSHNET RIVER RESERVE INC	114 FRONT STREET	NEW BEDFORD	MA
15-448	0 THOMAS STREET	0	THOMAS STREET	ACUSHNET	02743	TILCON CAPALDI INC.	875 PHEONIX AVENUE	CRANSTON	RI
15-428	16 THORNTON STREET	16	THORNTON STREET	ACUSHNET	02743	BIBEAU DAVID & MELISSA SUE	16 THORNTON STREET	ACUSHNET	MA
15-23	0 WING LANE	0	WING LANE	ACUSHNET	02743	FAIRHAVEN-ACUSHNET LAND PRESERVATION TRUST, INC	P.O. BOX 491	FAIRHAVEN	MA
14-37	0 WING LANE	0	WING LANE	ACUSHNET	02743	TOWN OF ACUSHNET SELECTMEN	122 MAIN STREET	ACUSHNET	MA
15-26	0 WING LANE	0	WING LANE	ACUSHNET	02743	GRACIA JOHN & HELEN; LIFE ESTATE	52 LAURA KEENE AVENUE	ACUSHNET	MA
14-36	0 WING LANE	0	WING LANE	ACUSHNET	02743	TUCKER FRANCIS J	11 DANIEL ROAD	WAREHAM	MA
15-5	87 WING LANE	87	WING LANE	ACUSHNET	02743	0 WING LANE LLC	109 W 27TH STREET 8TH FLOOR	NEW YORK	NY
14-21.22	88 WING LANE	88	WING LANE	ACUSHNET	02743	SUNRISE ON WING LANE LLC	109 W 27TH STREET 8TH FLOOR	NEW YORK	NY
15-14	101 WING LANE	101	WING LANE	ACUSHNET	02743	NSTAR ELECTRIC COMPANY	P O BOX 270	HARTFORD	CT



prop_id	site_addr	addr_num	full_str	city	zip	owner1	own_addr	own_city	own_state
14-23A.23 B	104 WING LANE	104	WING LANE	ACUSHNET	02743	DESROSIER MICHAEL L & MICHELE J	104 WING LANE	ACUSHNET	MA
14-23C	110 WING LANE	110	WING LANE	ACUSHNET	02743	COOPER RONALD M	110 WING LANE	ACUSHNET	MA
15-24.25	WEST OF WING LANE	WEST OF	WING LANE	ACUSHNET	02743	TOWN OF ACUSHNET SELECTMEN	122 MAIN STREET	ACUSHNET	MA
15-27	WEST SIDE WING LANE	WEST SIDE	WING LANE	ACUSHNET	02743	TOWN OF ACUSHNET SELECTMEN	122 MAIN STREET	ACUSHNET	MA
39-003	FAIRHAVEN LINE		FAIRHAVEN LINE	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER ST	FAIRHAVEN	MA
40-016	NEW BOSTON RD		NEW BOSTON RD	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
40-001	OLD RD TO ACUSHNET		OLD RD TO ACUSHNET	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
39-009	OLD RD TO ACUSHNET		OLD RD TO ACUSHNET	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
40-002	OLD RD TO ACUSHNET		OLD RD TO ACUSHNET	FAIRHAVEN	02719	KOSKA JOHN T	15 SUNRISE COURT	FAIRHAVEN	MA
39-008	TOWN FOREST		TOWN FOREST	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
40-003	TOWN FOREST		TOWN FOREST	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
39-002	TOWN LINE ACUSHNET		TOWN LINE ACUSHNET	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
39-001	TOWN LINE ACUSHNET		TOWN LINE ACUSHNET	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA
40-004	TURKEY GROVE		TURKEY GROVE	FAIRHAVEN	02719	FAIRHAVEN TOWN OF	40 CENTER STREET	FAIRHAVEN	MA

Appendix B: Slope Stability Evaluation



650 Suffolk St., Suite 200
Lowell, MA 01854

T 978.970.5600
TRCcompanies.com

Date: August 18, 2022

Memorandum

To: Mr. Doug Vigneau, CEP, Env-SP
P.J. Keating Company
988 Reservoir Road
Lunenburg, MA 01462

From: Shawn D. McGee, P.E.
Senior Geotechnical Engineering

Project No.: [421830.0000]

Subject: Global Slope Stability Analysis
Reclamation Plan
Acushnet P.J. Keating Quarry
72 South Main Street, Acushnet, MA 02743

TRC has prepared this Global Slope Stability Analysis for the proposed reclamation of the Acushnet P.J. Keating Quarry located at 72 South Main Street Acushnet, Massachusetts (Site). This memorandum presents the results of the evaluation of the stability for the proposed pit, and provides preliminary recommendations for reclamation slope configurations.

Purpose

This Global Slope Stability Analysis has been prepared to support the Site's Reclamation Plan and to meet the Court Order to obtain a Earth Removal Permit per the Acushnet by-law Article VI dated 8/11/2021 and more specifically to fulfill the permit application requirements at Section 3(B) to be filed with the Town Clerk. The proposed bench slope geometries for the reclamation walls will be set forth by satisfying minimum mining reclamation standard Factors of Safety (FOS) for stable conditions.

Site Background

The Acushnet P.J. Keating Quarry has been operating since prior to 1919 as demonstrated by historical town reports. The facility is a large, crushed stone quarry in a late proterozoic granite. The Site has slopes stepped with safety benches and haul roads that have greatly altered and steepened the original topography. Approximately 112 acres of the 382-acre property have been quarried. As illustrated in Figure 17, "Conceptual Phasing Plan," of the Reclamation Plan, the Site is divided into five general phases of mining. Once quarry operations have ceased, the overburden and tailing stockpiles will be removed and placed in the quarry as part of Phase IV from elevation -467' mean sea level (msl), at bottom of mining, to approximately elevation -300' msl. The total rim surface area of the quarry is approximately 148 acres and is at an elevation ranging from +30' to +70' msl along the Northern and Western Walls and from +50' to +70' msl along the Southern and Eastern Walls.

Operations at the site will use conventional mining practices common in the industry. Stone is separated from the quarry walls by drilling and blasting. Quarrying is initiated by establishing a working bench. A new bench is established as the bench is extended laterally along the quarry face. Bench areas are extended until the planned quarry backwall is reached; successive benches are developed as the quarry progresses. Quarry roads are installed as mining proceeds to reach and remove the accumulated rock.

In general, the potential land use after reclamation will result in a large basin suitable for water storage, commercial/industrial development, and open space.

Local Geology

Surficial Geologic sediments near the Site are very limited as the bedrock either outcrops at the Site or is very near the surface. Bedrock at the site is composed of igneous intrusive granodiorite and porphyritic granite which consists of inequigranular to porphyritic, gray, to, dark gray granite and quartz monzonite typically containing phenocrysts or augen of raicrocline, accessory sphene, and a color index as high as 15 increasingly gneissic from north to south. Below and intermixed with the granodiorite and porphyritic granite in some places are metamorphically intruded gneiss.

Based on a recent site inspection completed by a senior geologist from TRC, as discussed in Section 3.4 of the Reclamation Plan, it was observed the quarry contained steep, stable, quarry walls with little detritus/rockfall at the base. The rock was fractured in places either naturally or caused by the explosive shots used to mine the quarry. Locations of apparent groundwater seepage were very limited and obvious as the rock fractures in those places were iron stained. Very little water was observed entering the quarry even when observed on the quarry wall as it percolated into the quarry floor. The groundwater flow was in drips rather than a constant flow. A map of observed joint planes is provided in Figure 8 and their corresponding stereonet in Figures 9 and 10 of the Reclamation Plan.

Section 3.4 of the Reclamation Plan also discussed previously subsurface explorations completed at the Site. Sulfate soundness testing was performed on select samples. All of the samples submitted passed the MADOT standard of 10 percent for crushed quarry rock with an average of 1 percent meaning that the rock does not easily weather. The Rock Quality Designation (RQD) averaged over 85% throughout the total borehole length and greater than 91% over all but the top 20 feet of bedrock. The Rock Quality Designation is a rough measure of the degree of jointing and fracturing. High Quality rock has an RQD of more than 75% and excellent rock has a RQD of 91% or more. TRC also completed Slake Durability Testing (ASTM D4644) and Point Load Index Testing (ASTM D5731), see Attachment 1 of this memorandum, on samples collected during the site inspection as discussed above. The results indicated a Slake Durability Index of 99.3% and apparent Uniaxial Compressive Strength ranging from 7 to 35 ksi, further corroborating the rock at the Site is highly durable and very competent, with little overall fracturing.

Slope Stability Analysis Approach

Article VI, Soil Conservation of the Town of Acushnet's General By-Laws requires that a plan be prepared to propose grades as part of an Earth Removal Application. TRC completed a slope stability analysis to demonstrate acceptable FOS can be achieved for the reclaimed slopes for the proposed end use of the Site. Based on current mining standards and generally accepted practice, it is TRC's opinion that ***appropriate post-reclamation FOS for the Site are 1.5 or greater for static conditions and 1.1 or greater for pseudo-static conditions.***

Two sections were analyzed to evaluate the global stability of the proposed final slopes to be realized upon completion of reclamation that are considered the most susceptible to failure. The determination of the critical slopes for analyses were based on the height, cut depth, and grade steepness. Figure A below shows the general locations of the critical slope sections analyzed for the global stability along the northern wall and southern wall of the quarry. The North Wall Section represents a critical section within the North and West Walls that includes a main haul roadway.

The South Wall Section represents a critical section within the South and East Walls. The analyzed scenarios assume the final reclamation grades will be achieved.

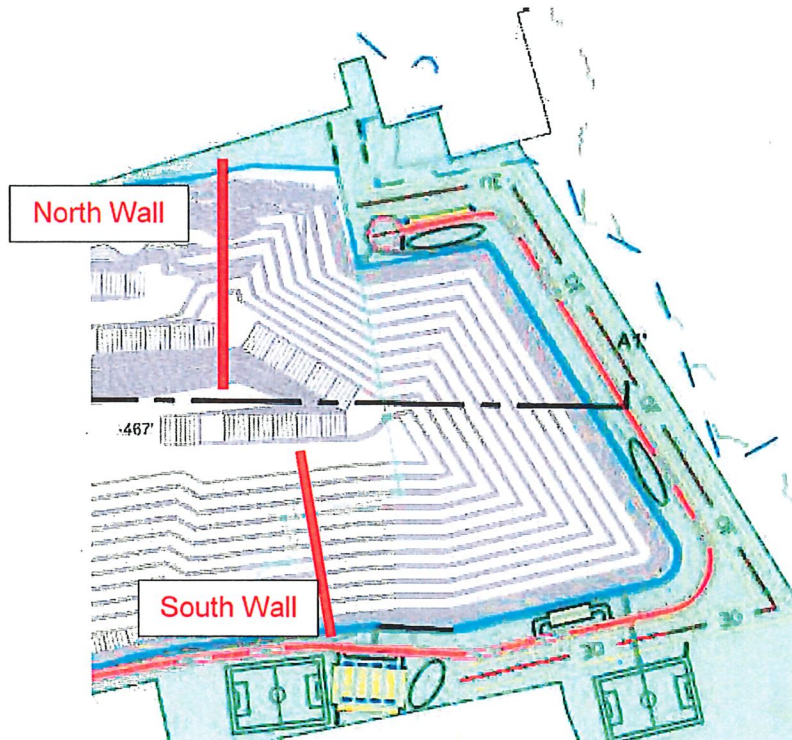


Figure A: Location of Slope Stability Cross-Sections Analyzed

Based on the proposed phasing and depth of quarry operations and a water level at 0 msl at reclamation, TRC has analyzed the reclamation slopes for the condition where the base of the slope/pit bottom is at an elevation of -467' msl, the overall slope height with a quarry rim elevation of +70' msl, resulting in pit heights up to 537'. As a conservative approach, the slope of the pits were also analyzed prior to and after the overburden and tailing stockpiles are placed in the bottom of the pit to elevation -300' msl. An assumed internal friction angle of 36 degrees and a cohesion of 10,000 pounds per square foot (psf) for the granite rock and 34 degrees with no cohesion for the overburden and tailing spoils at the bottom of the pit were used in the analysis.

Each of the primary slopes along the South Slope (representing a critical slope for the South and East Walls) and the North Slope (representing a critical slope for the North and West Walls) were analyzed to determine an appropriate maximum safe slope angle with the understanding that maximum reclamation slope heights will be on the order of 50 ft vertical feet with 50 ft wide benches and a 0.3H:1V backslope, resulting in an overall 1.3H:1V (approximately 38 degree) slope for the overall 537-foot tall proposed slopes. A schematic of the reclamation slopes is presented in Figures B and C below.

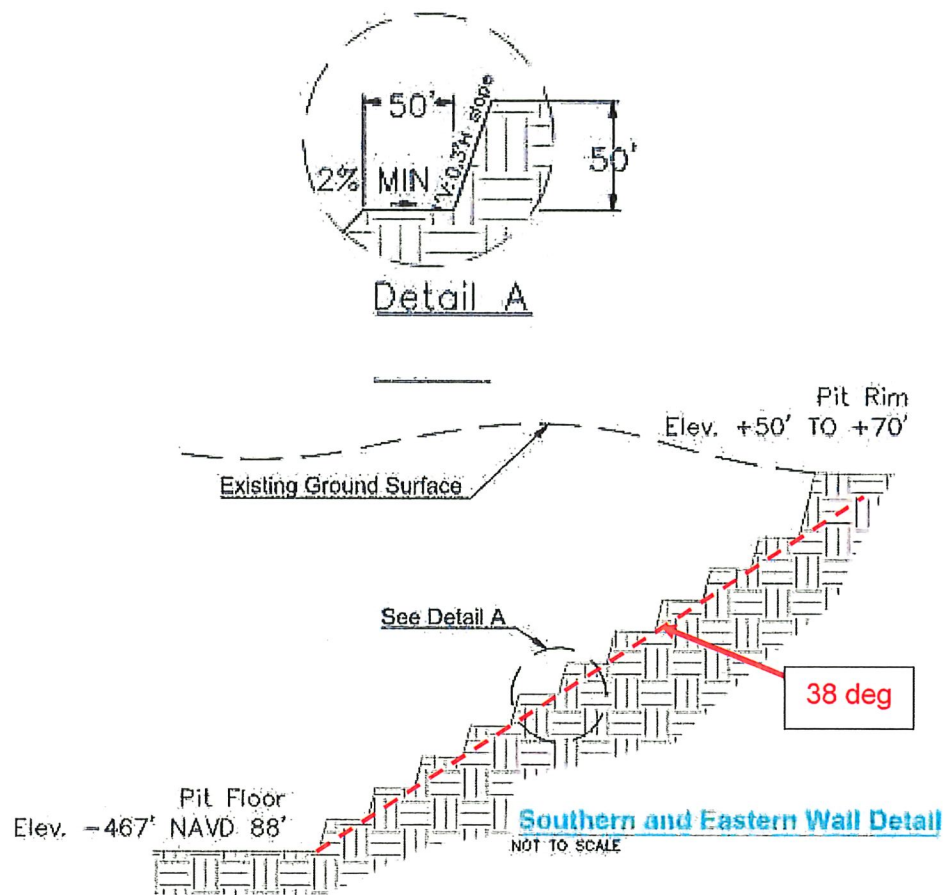


Figure B: Proposed Southern and Eastern Wall Slope Detail

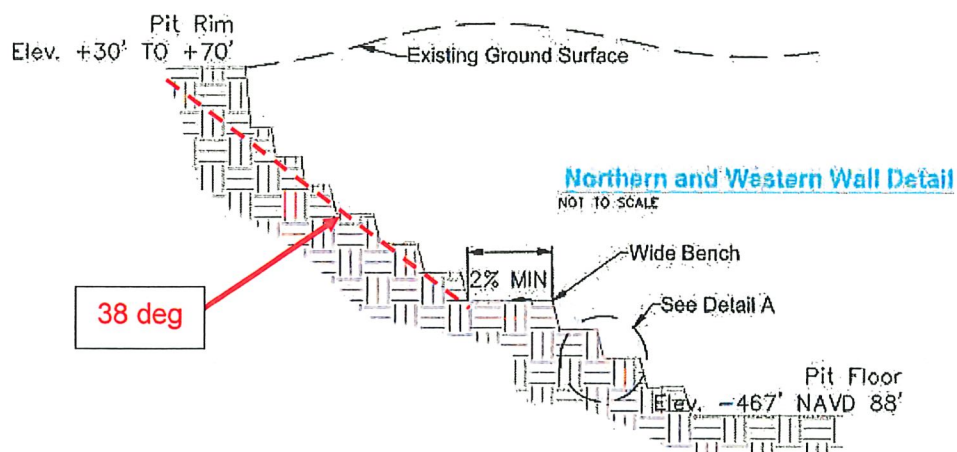


Figure C: Proposed Northern and Western Wall Slope Detail

The cross-sections were developed using the proposed slope grades, existing ground surface elevations, and the existing subsurface information extrapolated from the site exploration logs. Numerical slope stability analysis for the reclamation slopes was performed using SLIDE2, version 9.023, developed by Rocscience, Inc. This program determines the stability of the cross-section with a two-dimensional, limiting equilibrium method by analyzing numerous trial slip surfaces to find the critical failure surface that results in the lowest FOS for the slope. Input parameters such as soil/rock density, internal friction angle, and cohesion values were included in the reclamation slope stability evaluation.

Based on a review of publicly available information, the Site is not located on any known active fault trace. The slope stability analysis also considered pseudo-static (seismic) conditions by including a Peak Ground Acceleration (PGA) with a 10% chance of exceedance in 50 years (475-year return period) for the Site location. For a location founded on hard rock, such as this Site, the estimated PGA is approximately 0.10g based on USGS seismic hazard mapping as illustrated in Figure D below.

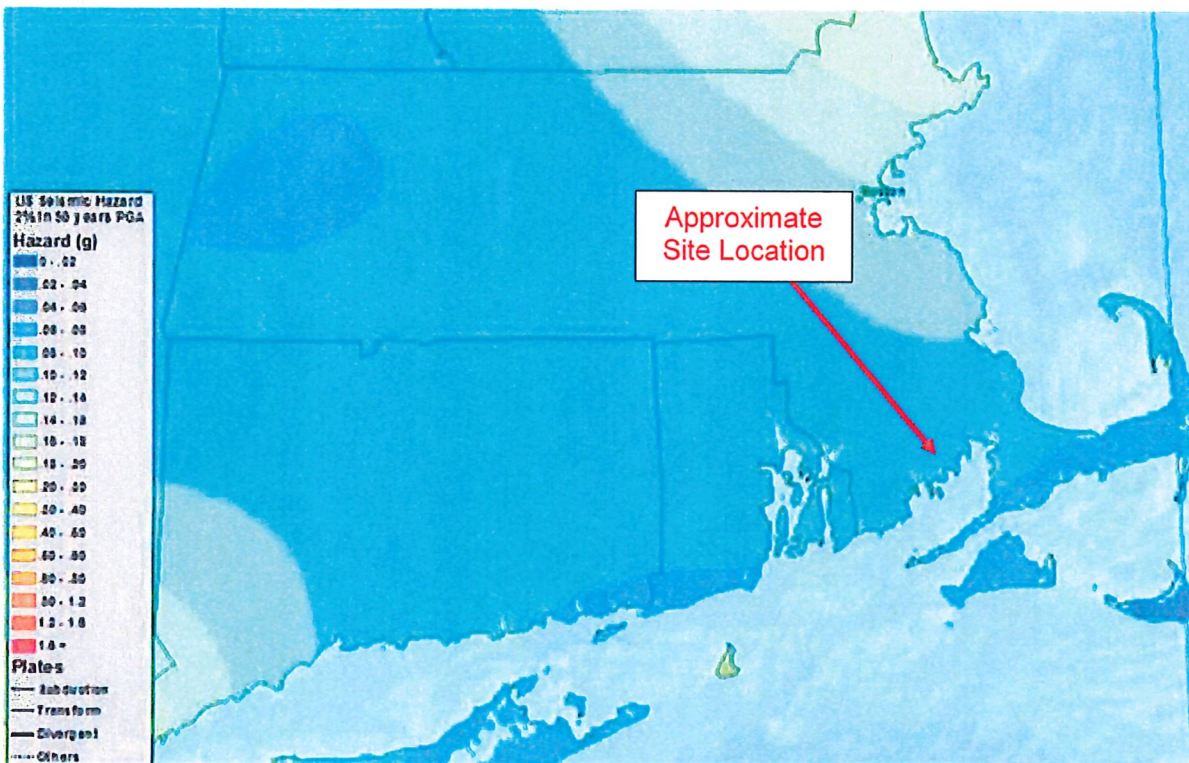


Figure D: US Seismic Hazard – 2% in 50 years PGA

The listed PGA is considered to be low to moderate. While listing PGA is common practice and useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the Site. The Site could be subject to ground shaking in the event of a major earthquake along other fault areas, however, the seismic risk at the Site is not considered to be significant.

Slope Stability Analysis Results

The results of the slope stability analysis in the dry pit and flooded pit scenarios, for both static and pseudo-static conditions, are presented in Table A below. Graphical (output) results from SLIDE2 are presented in Attachment 2.

Table A: Reclamation Slope Stability Factors of Safety

Pit Condition	Conditions	Factor of Safety
Southern and Eastern Wall Dry Pit at -467' msl	Static	2.3
	Pseudo-Static	1.9
Southern and Eastern Wall Dry Pit Reclaimed at -300' msl	Static	2.7
	Pseudo-Static	2.2
Southern and Eastern Wall Flooded Pit Reclaimed at -300' msl	Static	3.1
	Pseudo-Static	2.4
Northern and Western Wall Dry Pit at -467' msl	Static	2.3
	Pseudo-Static	2.0
Northern and Western Wall Dry Pit Reclaimed at -300' msl	Static	2.8
	Pseudo-Static	2.3
Northern and Western Wall Flooded Pit Reclaimed at -300' msl	Static	3.2
	Pseudo-Static	2.4

Conclusions and Recommendations

Based on current mine reclamation standards and practices considered acceptable to the industry, and the proposed end uses for the Site, it is TRC's opinion that the proposed post-reclamation factors of safety for the Site of 1.5 or greater for station conditions and 1.1 or greater for the pseudo-static conditions are appropriate. Therefore, the proposed reclamation slopes achieved FOS above the recommended minimum values. It should be noted that the FOS for the flooded pit scenario calculated as compared to the dry pit scenarios for both North and South sections are higher for both static and pseudo-static conditions. As would typically be expected, the FOS values for the flooded conditions are higher than for the dry condition due to the weight of the water counteracting some of the slope driving forces.

Slopes designed as described above, while stable from a slope angle perspective, will present a moderate risk of rock fall, primarily due to small-scale planar failures and topple-type failures. Additionally, loose blocks of materials were observed on several slope faces and at the top of slopes most likely due to opening of joints as well as loosening during quarry operations. Personnel access should be prohibited on benches below areas where potentially unstable blocks are observed until those blocks can be scaled from the slope. Loose blocks should be removed starting on the pit edges and bench tops and then working from the top of the slope down on slope faces. The area at the base of the slope should include adequately sized catchment ditches/swales based on historic rock fall conditions observed by facility personnel. The ditch should slope towards the face of the cut at least 4H:1V. We recommend that a small berm or temporary fence be constructed once access is not required on a regular basis.

Limitations

The slope stability analysis has been done in accordance with our authorized scope of work and in accordance with generally accepted practice in the fields of geologic and geotechnical engineering. This warranty is in lieu of all other warranties either expressed or implied. Our conclusions and recommendations are considered preliminary and are based on the limited data reviewed and available to TRC. We are not responsible for any conclusions or opinions drawn from the data included herein, other than those specifically stated, nor are the recommendations presented in this report intended for direct use as construction specifications. This report is intended for use with regard to the specific project discussed herein and any changes in geologic conditions, loads, structures, or locations should be brought to our attention so that we may determine how they may affect our conclusions. An attempt has been made to provide for normal contingencies but the possibility remains that unexpected conditions may be encountered during construction. If this should occur, or if additional or contradictory data are revealed in the future, we should be notified so that modifications to this report can be made, if necessary. We cannot be responsible for any problems that may arise from the misunderstanding or misinterpretation of this report, or failures to comply with our recommendations.

The recommendations contained in this memorandum are preliminary until verified during mining by representatives of TRC. Changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. Additionally, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of our knowledge. Accordingly, the findings of this memorandum may be invalidated partially or wholly by changes outside our control. Therefore, this memorandum is subject to review and should not be relied upon after a period of three years.

Attachment 1: Slake Durability and Point Load Index Testing Results



ASTM D4644: SLAKE DURABILITY
TEST SUMMARY

Project Name: Mine Reclamation Plan - Acushnet Quarry (MA)
Client Name: P.J. Keating Company
TRC Project No.: 421830.0000

Boring No.: B-1
Sample ID: S-1
Sample Depth (ft): N/A

Test Date: 8/10/2022
Tested By: JC

Dry Weight of Sample Before Test (g): 535.37

Tare 156.04 g

Tumble Cycle No. 1

Temperature		
Before Test (°C)	After Test (°C)	Average Temperature (°C)
20.3	20.3	20.3

Dry Wt + Tare 689.00 g
Tare 156.04 g

Dry Weight of Sample after Cycle No. 1 (g): 533.0

Tumble Cycle No. 2

Temperature		
Before Test (°C)	After Test (°C)	Average Temperature (°C)
20.0	20.1	20.1

Dry Wt + Tare 687.51 g
Tare 156.04 g

Dry Weight of Sample after Cycle No. 2 (g): 531.5

SLAKE DURABILITY INDEX (%):

99.3

FRAGMENTS RETAINED – TYPE:

I



ROCK SAMPLE BEFORE TEST



ROCK SAMPLE AFTER 1ST CYCLE



ROCK SAMPLE AFTER 2ND CYCLE

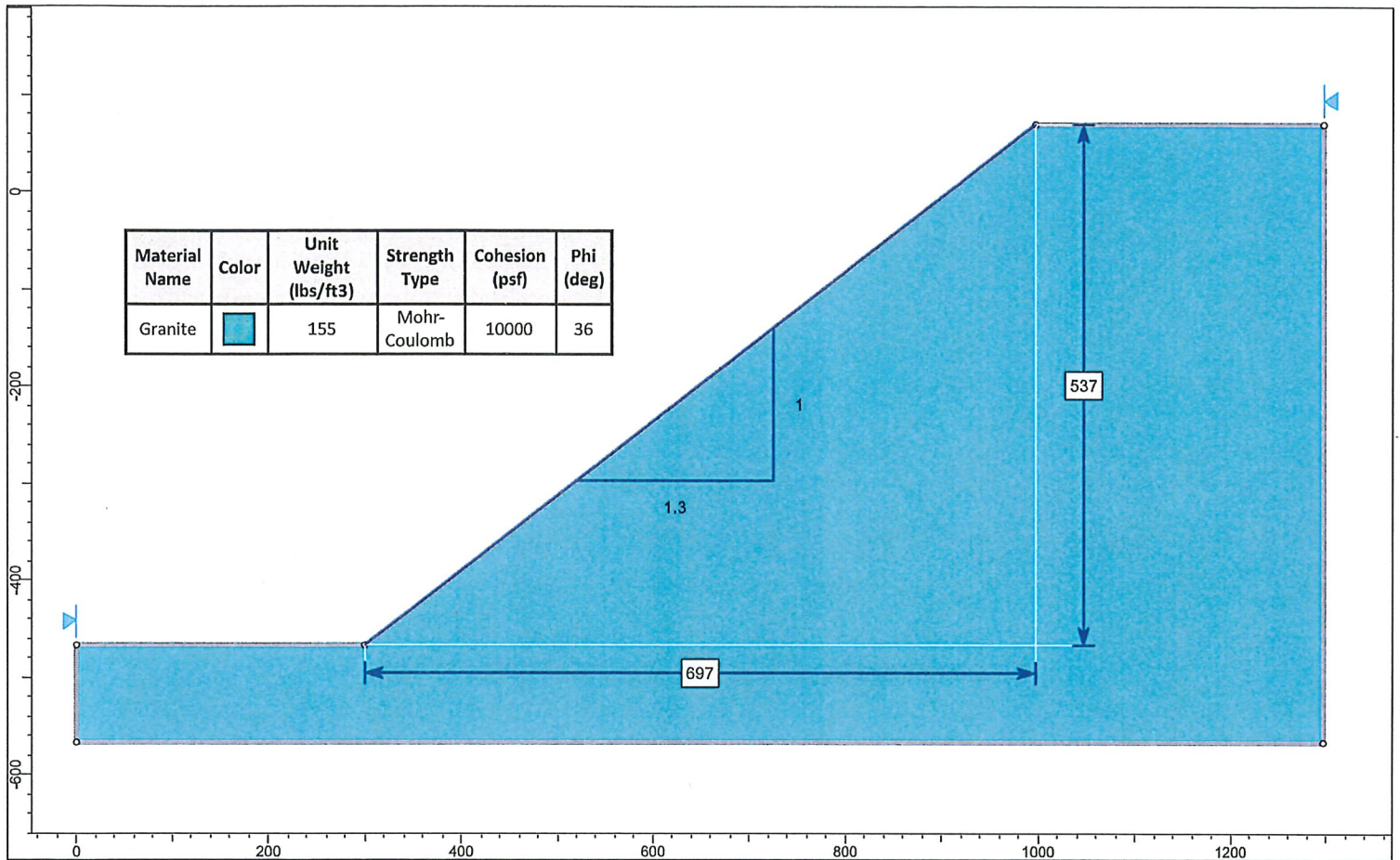
TRC Engineers, Inc.
Point Load Index Test Results (ASTM D 5731)


Date Tested: 08/10/2022

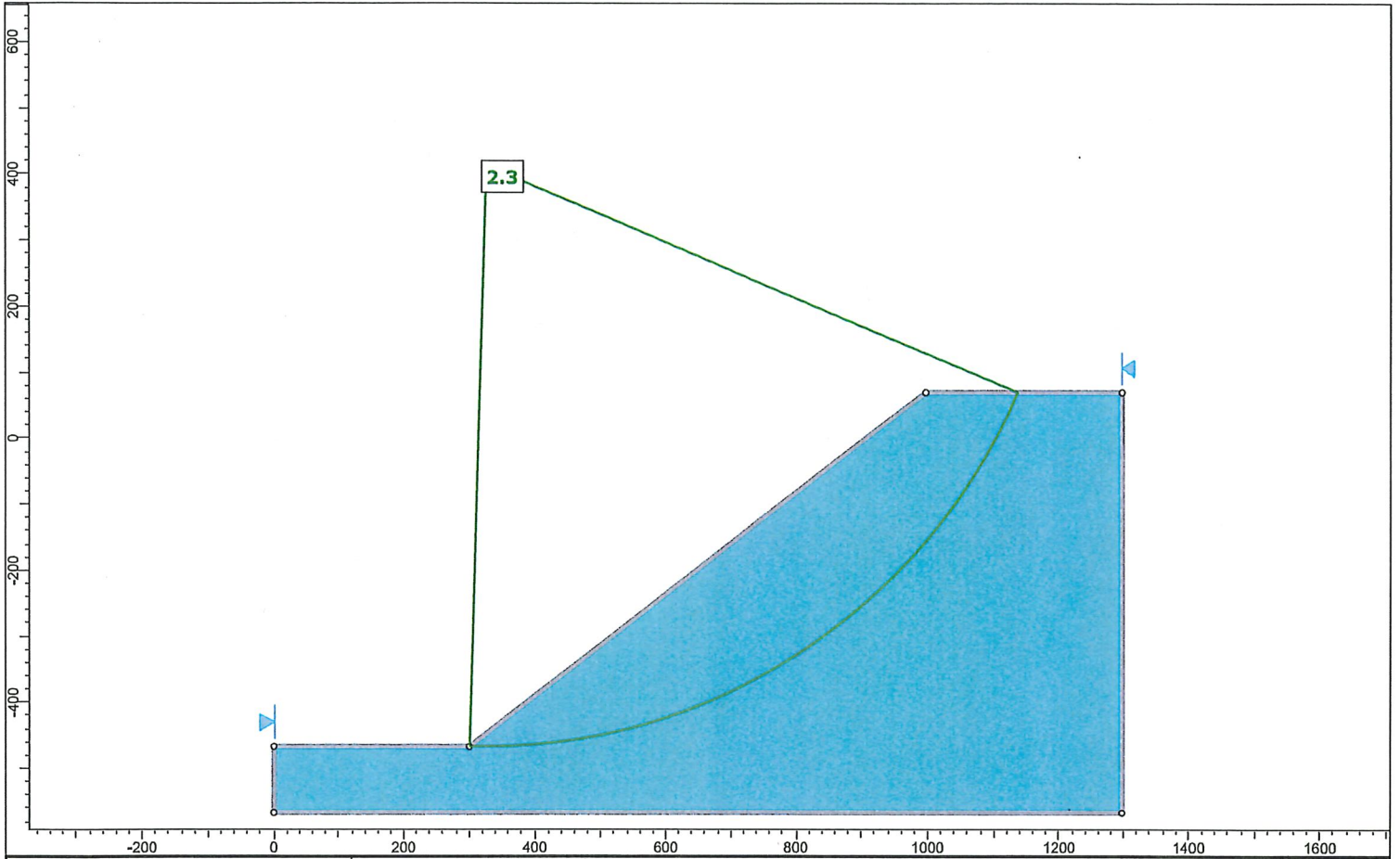
Specimens Tested Axially												
Sample #	Boring #	Core Run	Sample Depth	Test Type	Core Diameter, W (in.)	Specimen Height, D (in.)	Dc^2 (in ²)	Failure Load, P (lb)	Uncorrected Point Load Strength Index, I_L (psi)	Size Correction Factor, F	Size Corrected Point Load Strength Index, $I_{L(50)}$ (psi)	Uniaxial Compressive Strength, S_c (psi)*
1	B-1	S-1	N/A	Irregular Lump	2.4	1.4	4.2	3450	828	1.0	836	19,049
2	B-1	S-1	N/A	Irregular Lump	1.8	0.9	2.1	1300	615	0.9	533	14,145
3	B-1	S-1	N/A	Irregular Lump	1.8	0.9	2.0	1060	526	0.9	451	12,104
4	B-1	S-1	N/A	Irregular Lump	1.8	0.8	1.9	1300	671	0.8	570	15,440
5	B-1	S-1	N/A	Irregular Lump	1.7	1.2	2.5	1240	497	0.9	447	11,421
6	B-1	S-1	N/A	Irregular Lump	1.7	1.0	2.1	1600	765	0.9	661	17,592
7	B-1	S-1	N/A	Irregular Lump	1.8	0.9	1.9	3000	1560	0.8	1323	35,879
8	B-1	S-1	N/A	Irregular Lump	1.9	1.3	3.0	1300	435	0.9	407	10,005
9	B-1	S-1	N/A	Irregular Lump	1.8	1.1	2.5	2350	952	0.9	854	21,885
10	B-1	S-1	N/A	Irregular Lump	1.5	1.2	2.3	740	319	0.9	282	7,335


*The value of Uniaxial Compressive Strength (S_c) presented herein was calculated based on a generalized index to strength conversion factor (K) equal to 23 based on the core sample diameter and ASTM D5731, Table 1. They are not based on a site specific correlation between Unconfined Compressive Strength and Point Load Index Strength for the rock tested. Use of the generalized index factor in place of site specific correlation is at the discretion of the project engineer or geologist.

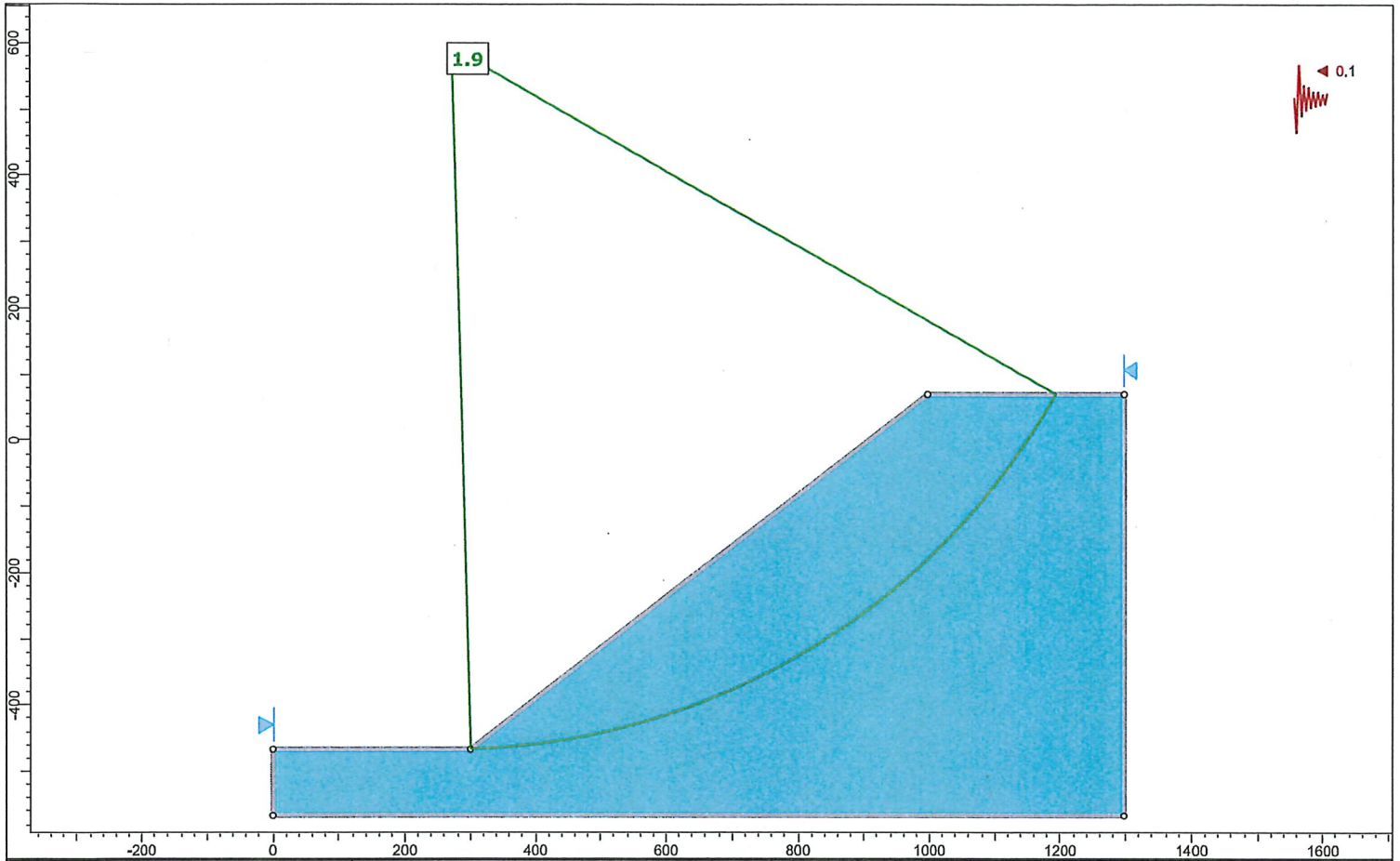
Attachment 2: Slope Stability Analysis Results



	Project		P.J. Keating	
	Group	Southern and Eastern Wall	Scenario	Master Scenario
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	Reclamation\Slope Stability Report\SLIDE\PJK Acushnet

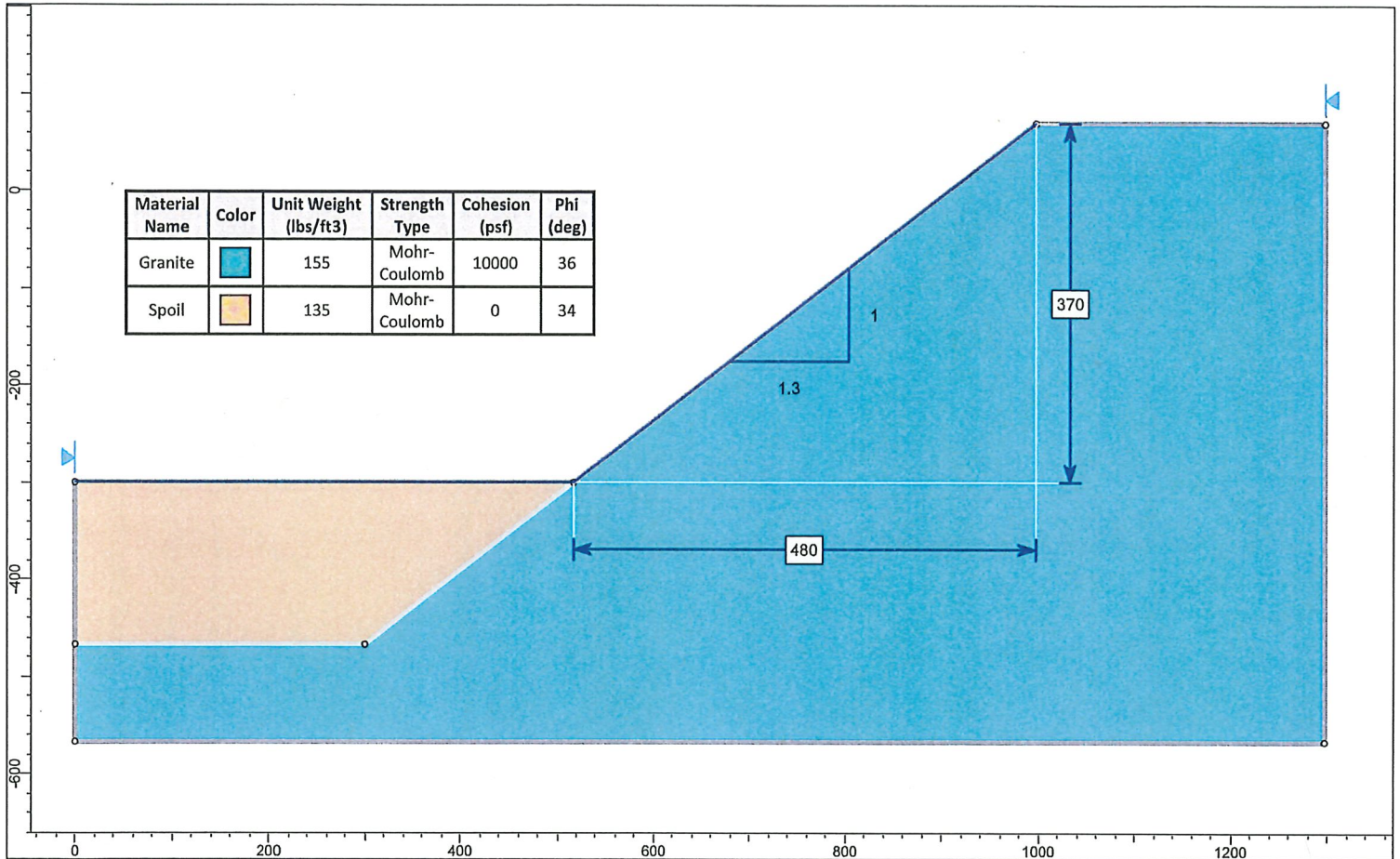



	Project		P.J. Keating	
	Group	Southern and Eastern Wall	Scenario	Dry Pit-Static
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd
	SLIDEINTERPRET 9.023			



SLIDEINTERPRET 9.023

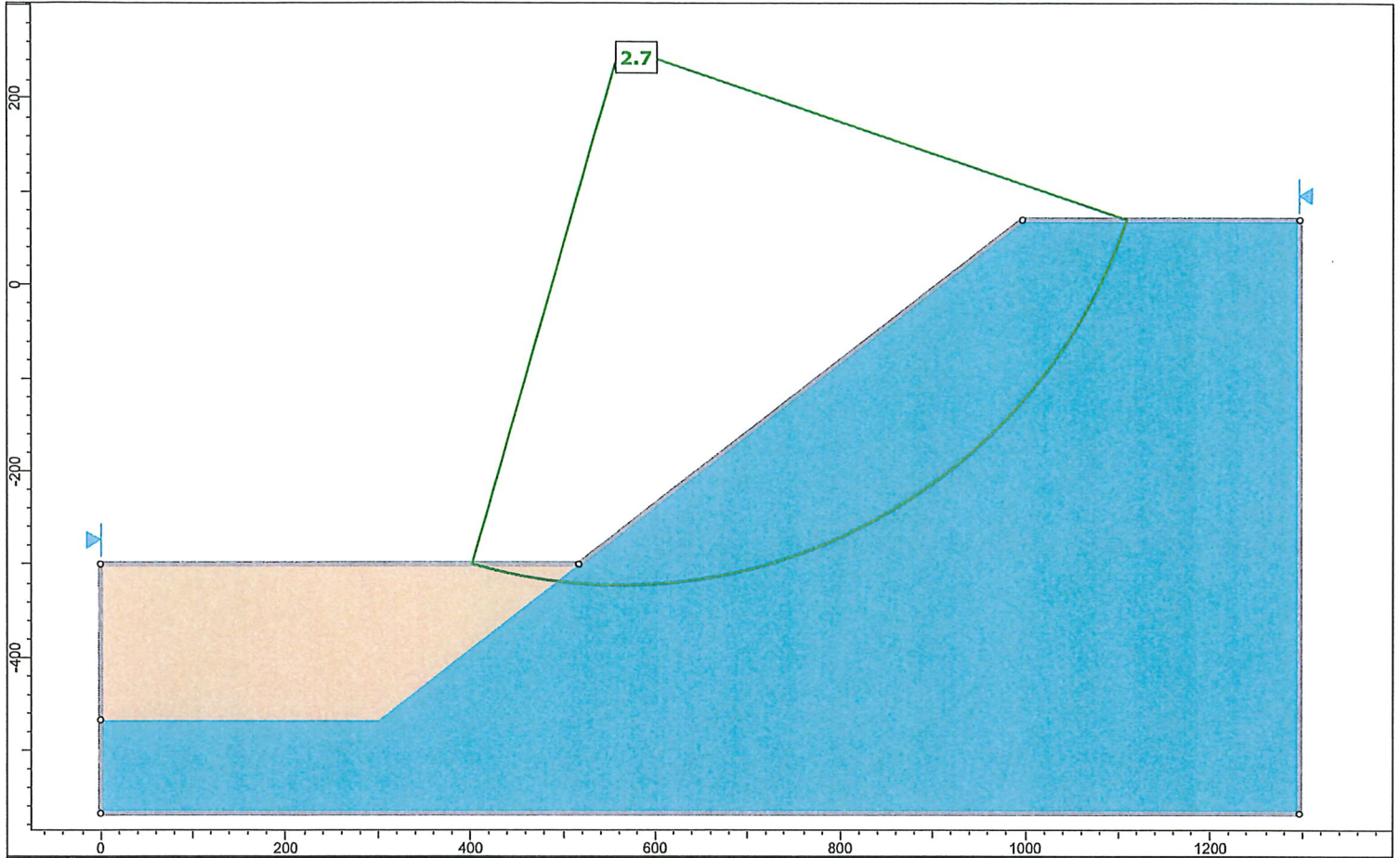
Project		P.J. Keating	
Group	Southern and Eastern Wall	Scenario	Dry Pit-Seismic
Drawn By	Shawn McGee, P.E.	Company	TRC
Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd




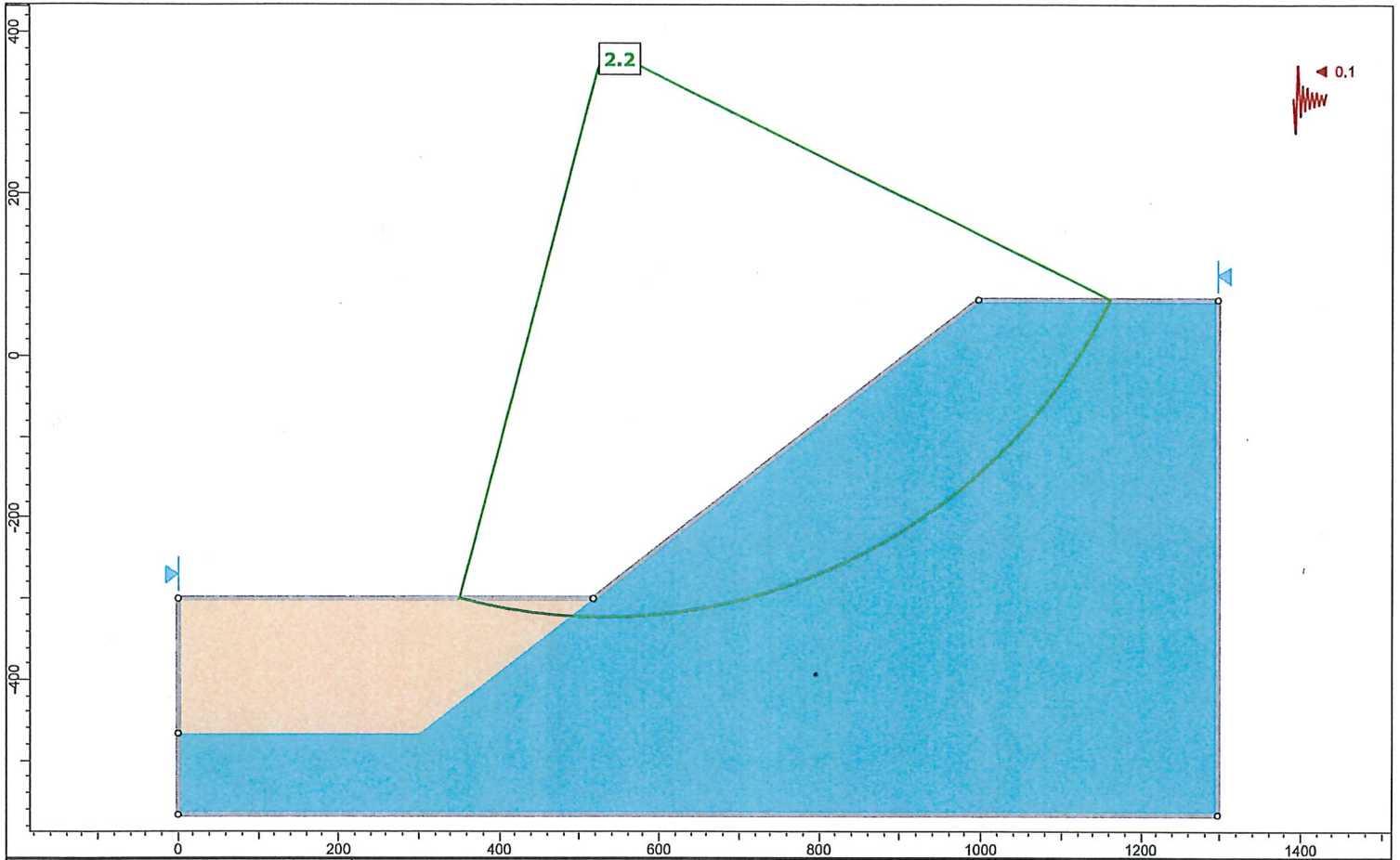


SLIDE 9.023

Project		P.J. Keating	
Group	Southern and Eastern Wall-Reclaimed	Scenario	Master Scenario
Drawn By	Shawn McGee, P.E.	Company	TRC
Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd

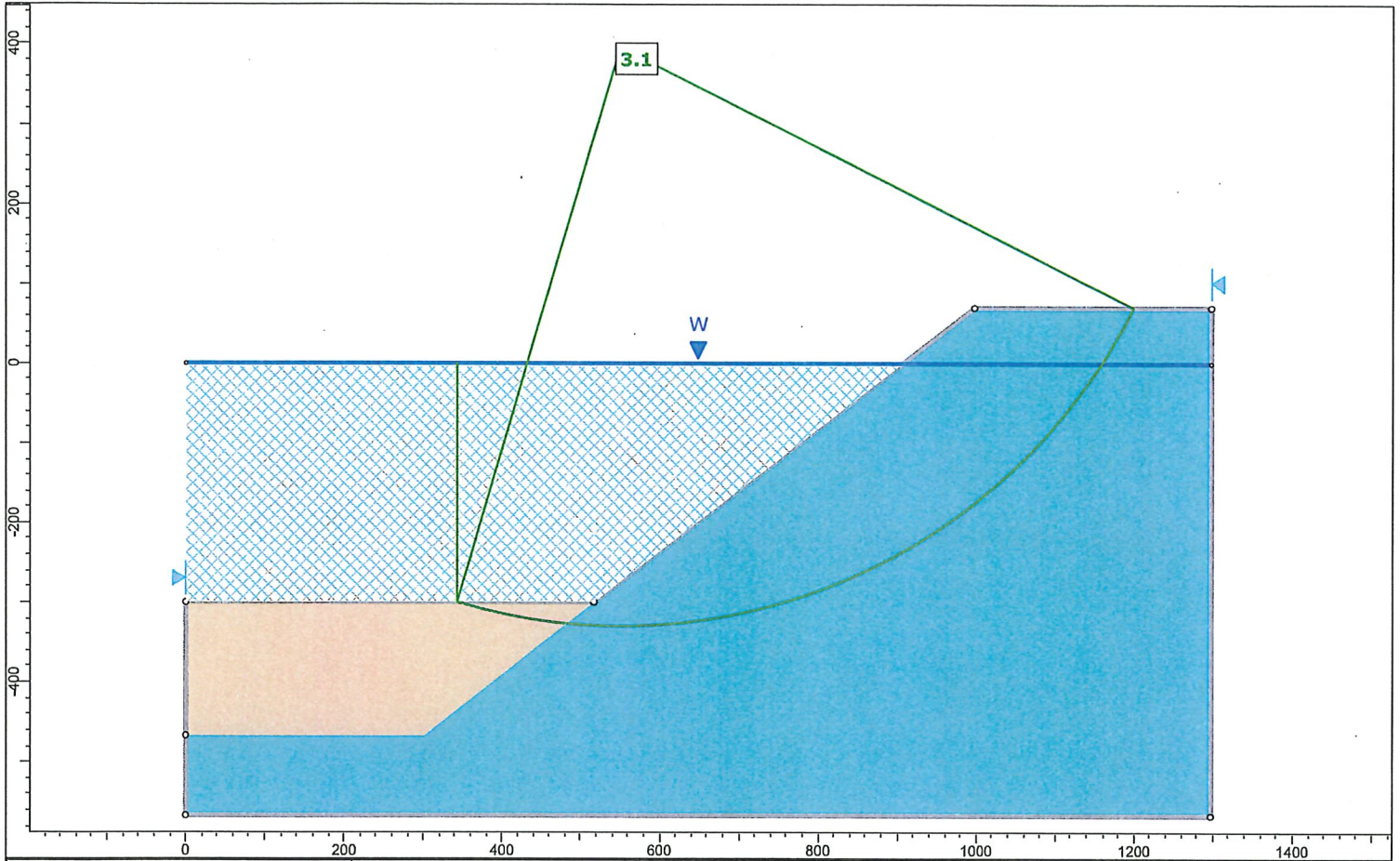



	Project		P.J. Keating	
	Group	Southern and Eastern Wall-Reclaimed	Scenario	Dry Pit Reclaimed-Static
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd

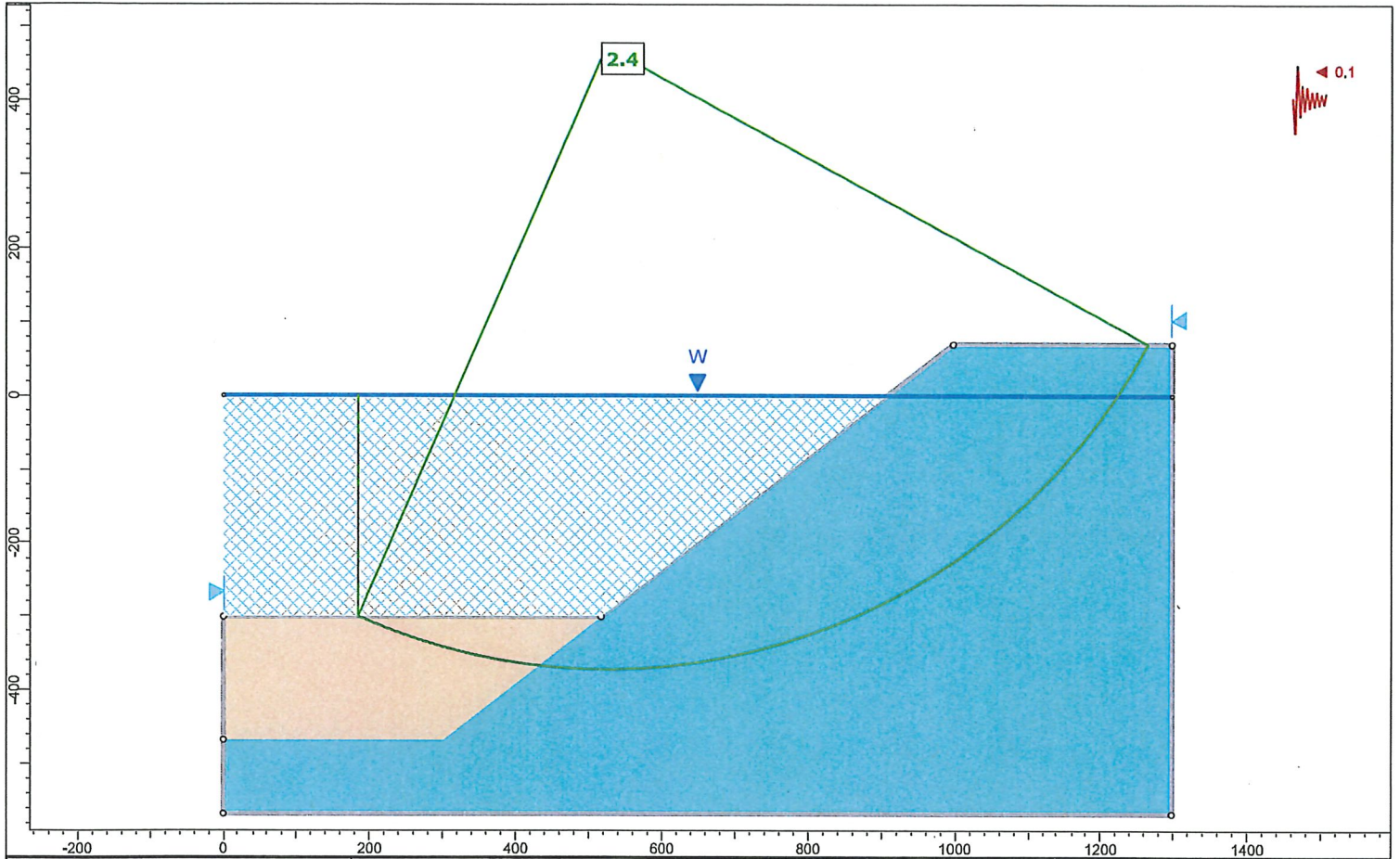



SLIDEINTERPRET 9.023

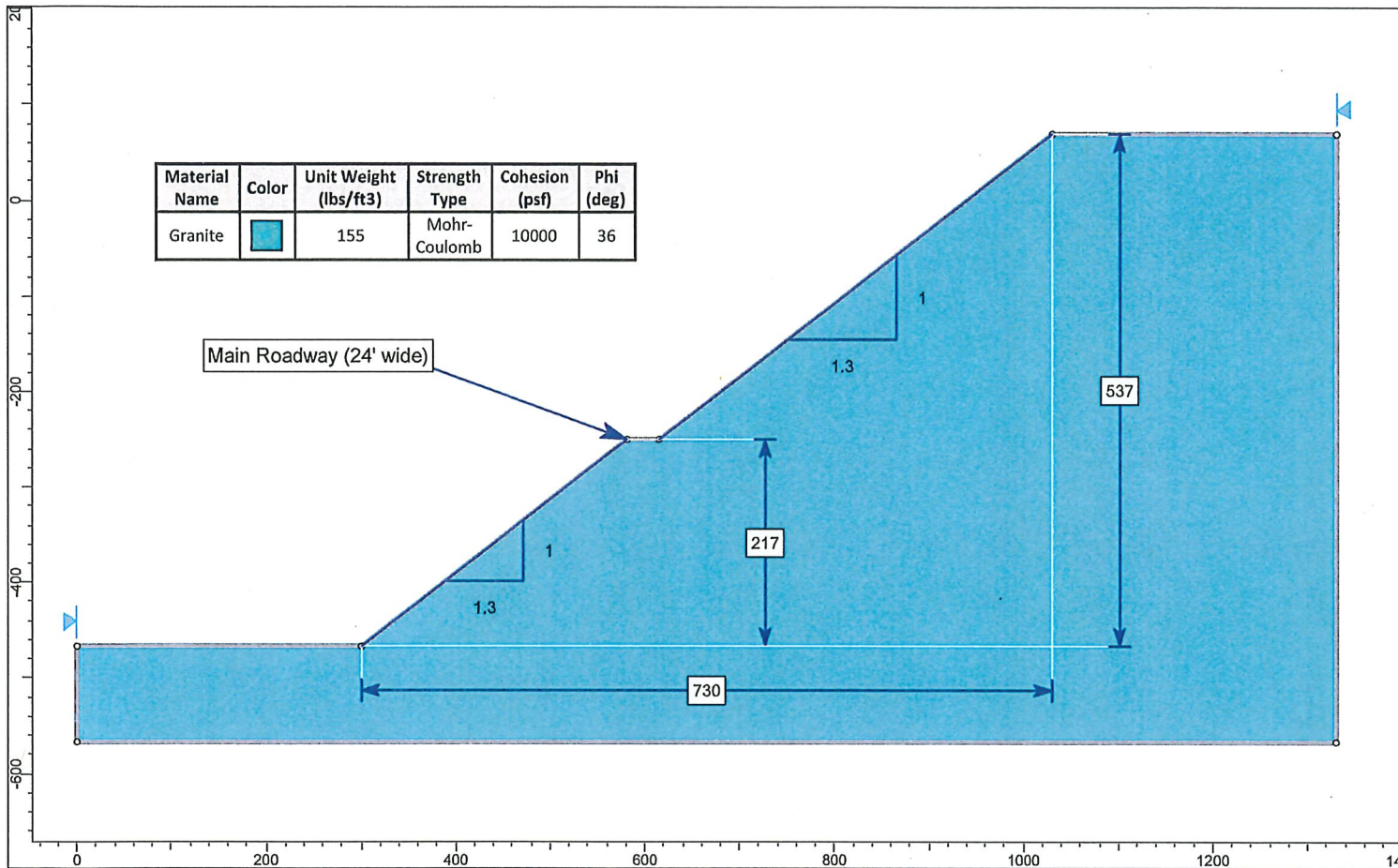
Project	P.J. Keating		
Group	Southern and Eastern Wall-Reclaimed	Scenario	Dry Pit Reclaimed-Seismic
Drawn By	Shawn McGee, P.E.	Company	TRC
Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd




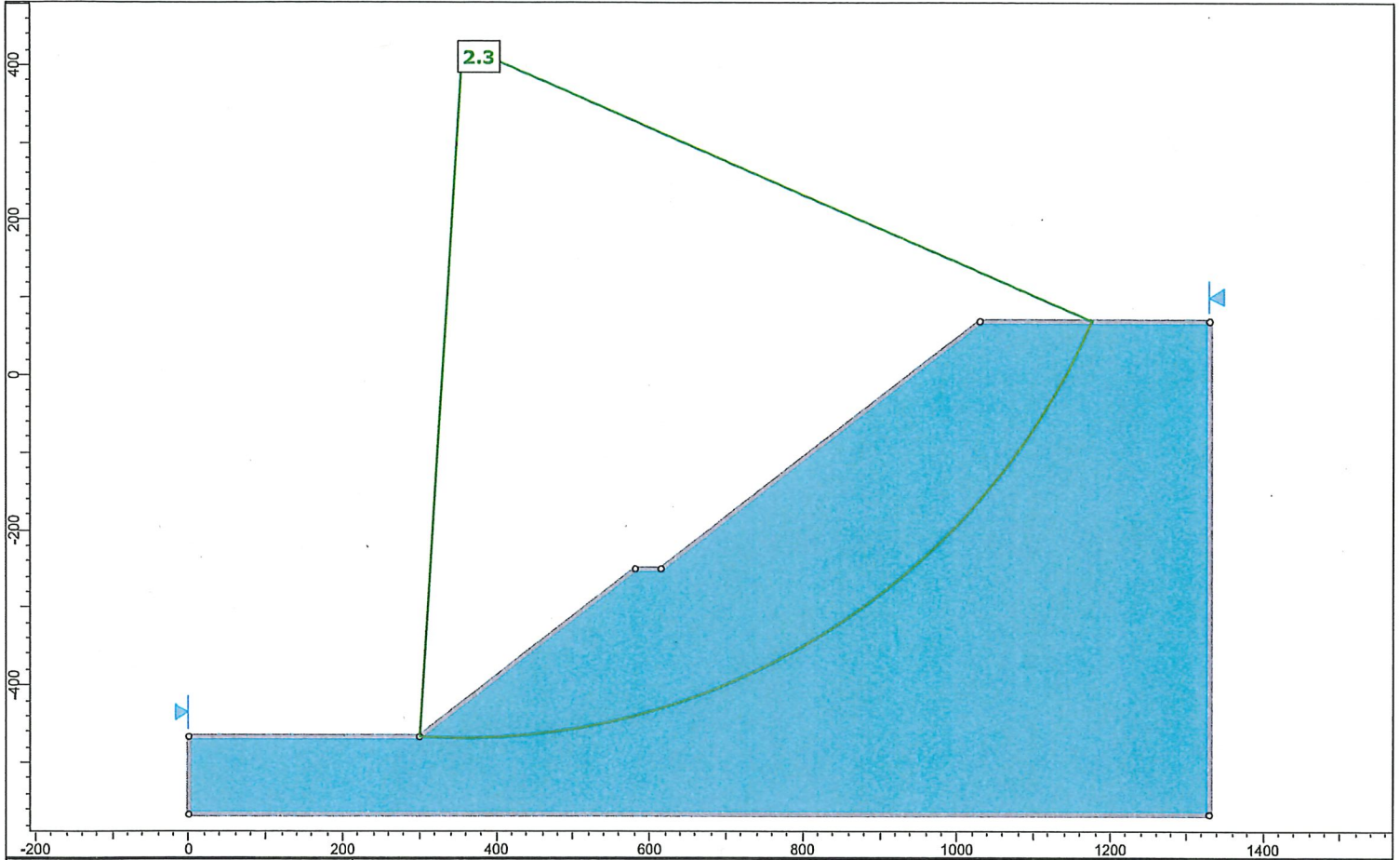
	Project		P.J. Keating	
	Group	Southern and Eastern Wall-Reclaimed	Scenario	Flooded Pit-Static
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd




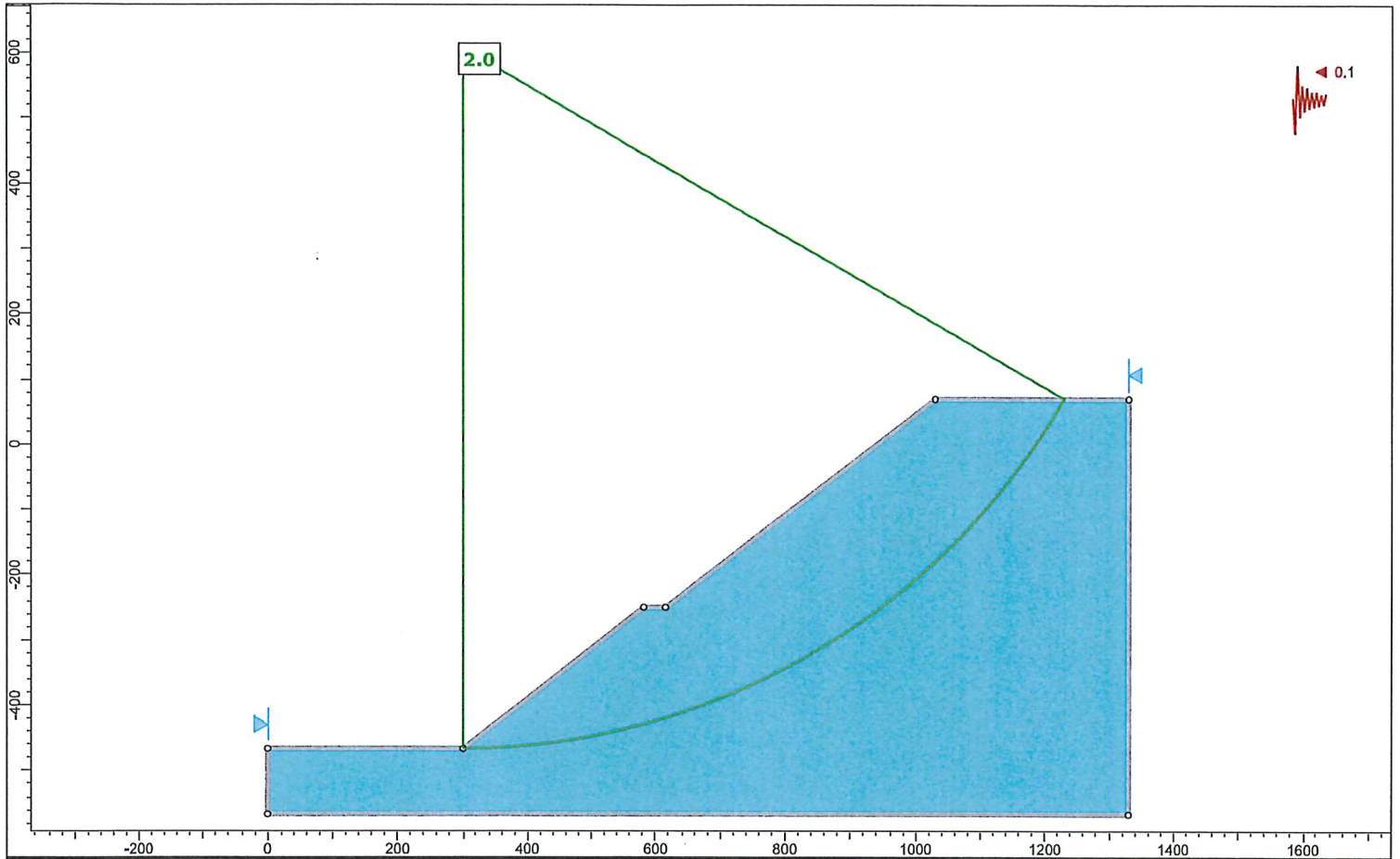
	Project		P.J. Keating	
	Group	Southern and Eastern Wall-Reclaimed	Scenario	Flooded Pit-Seismic
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd




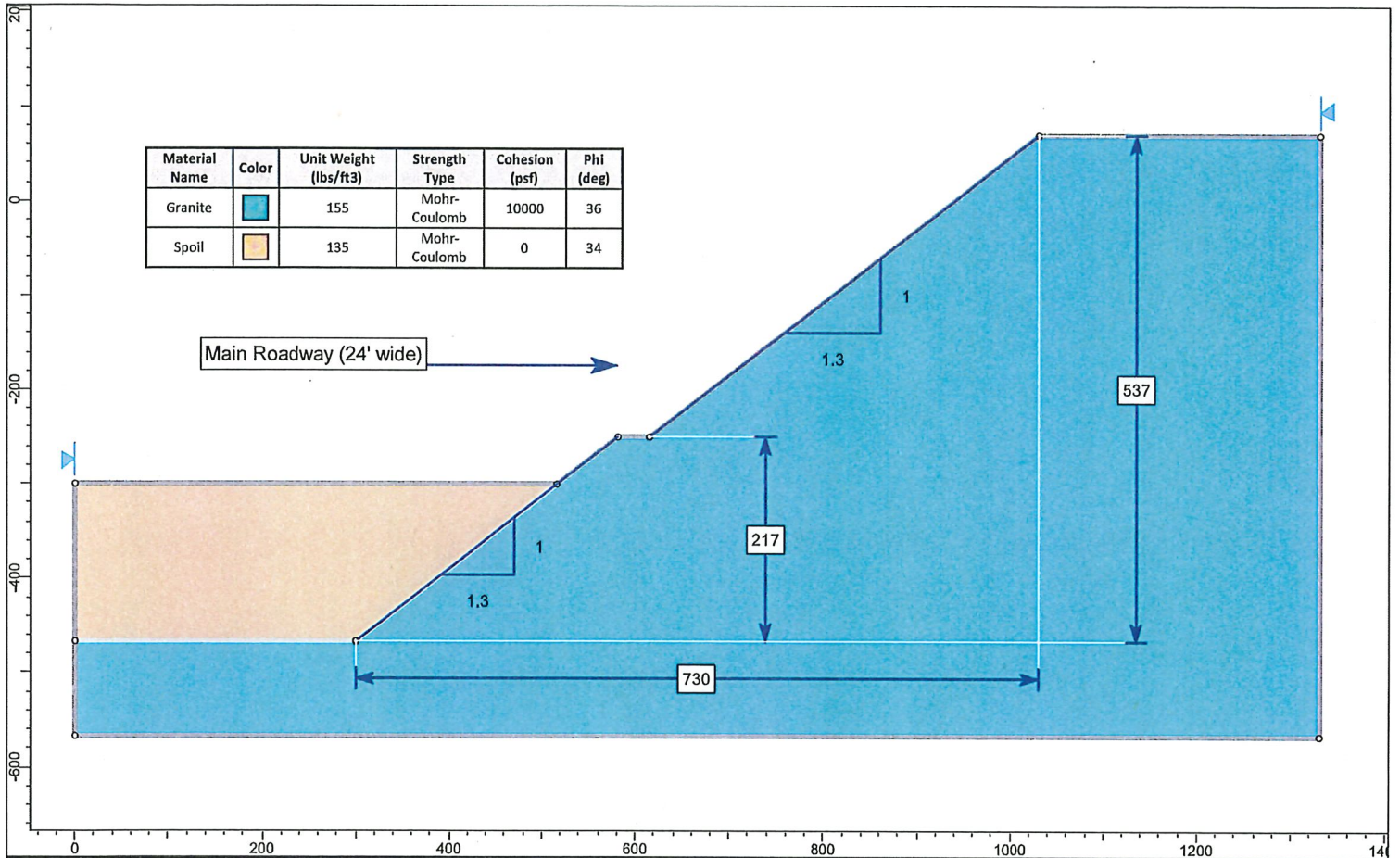
	Project		P.J. Keating	
	Group	Northern and Western Wall	Scenario	Master Scenario
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slm




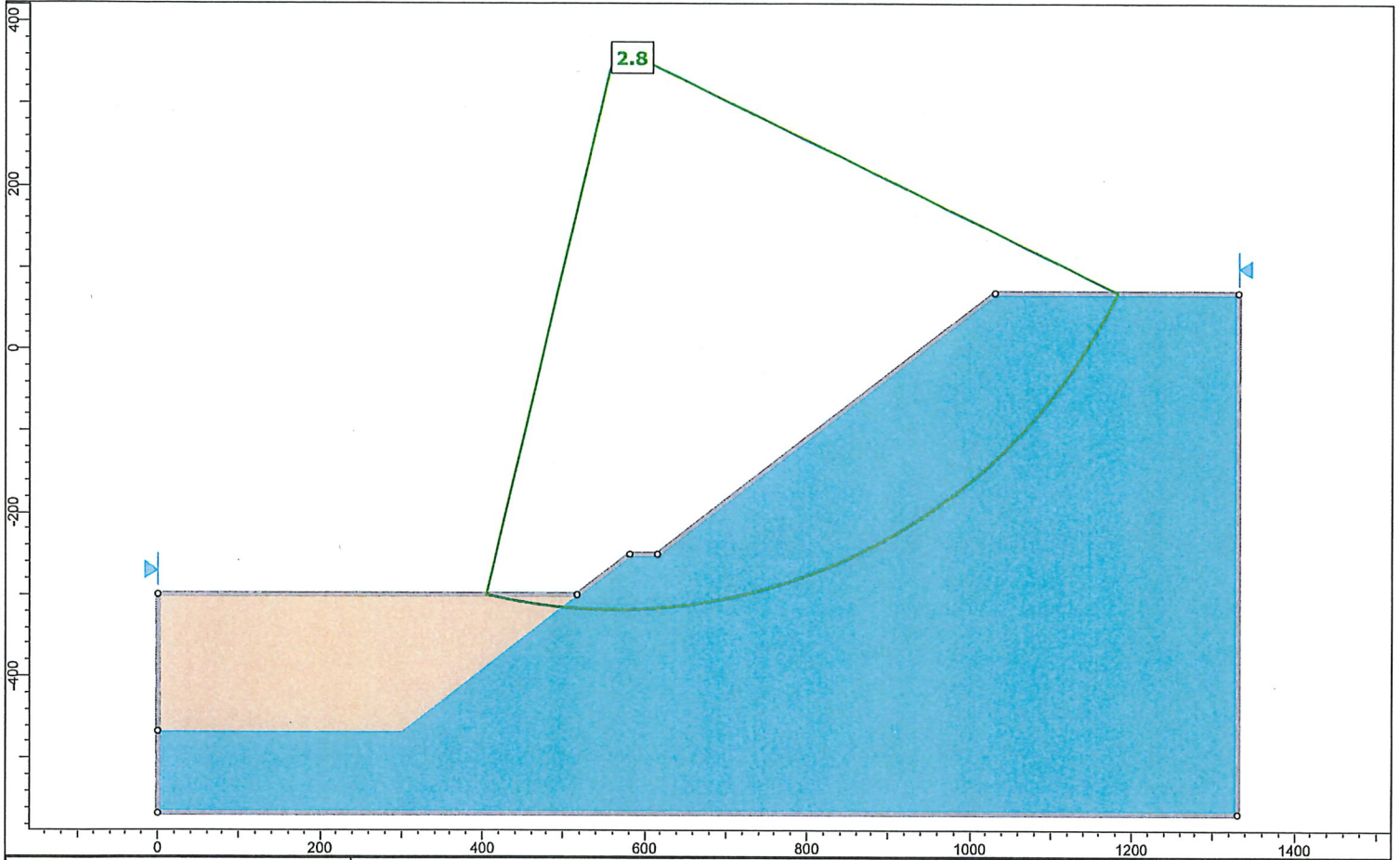
	Project		P.J. Keating	
	Group	Northern and Western Wall	Scenario	Dry Pit-Static
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd




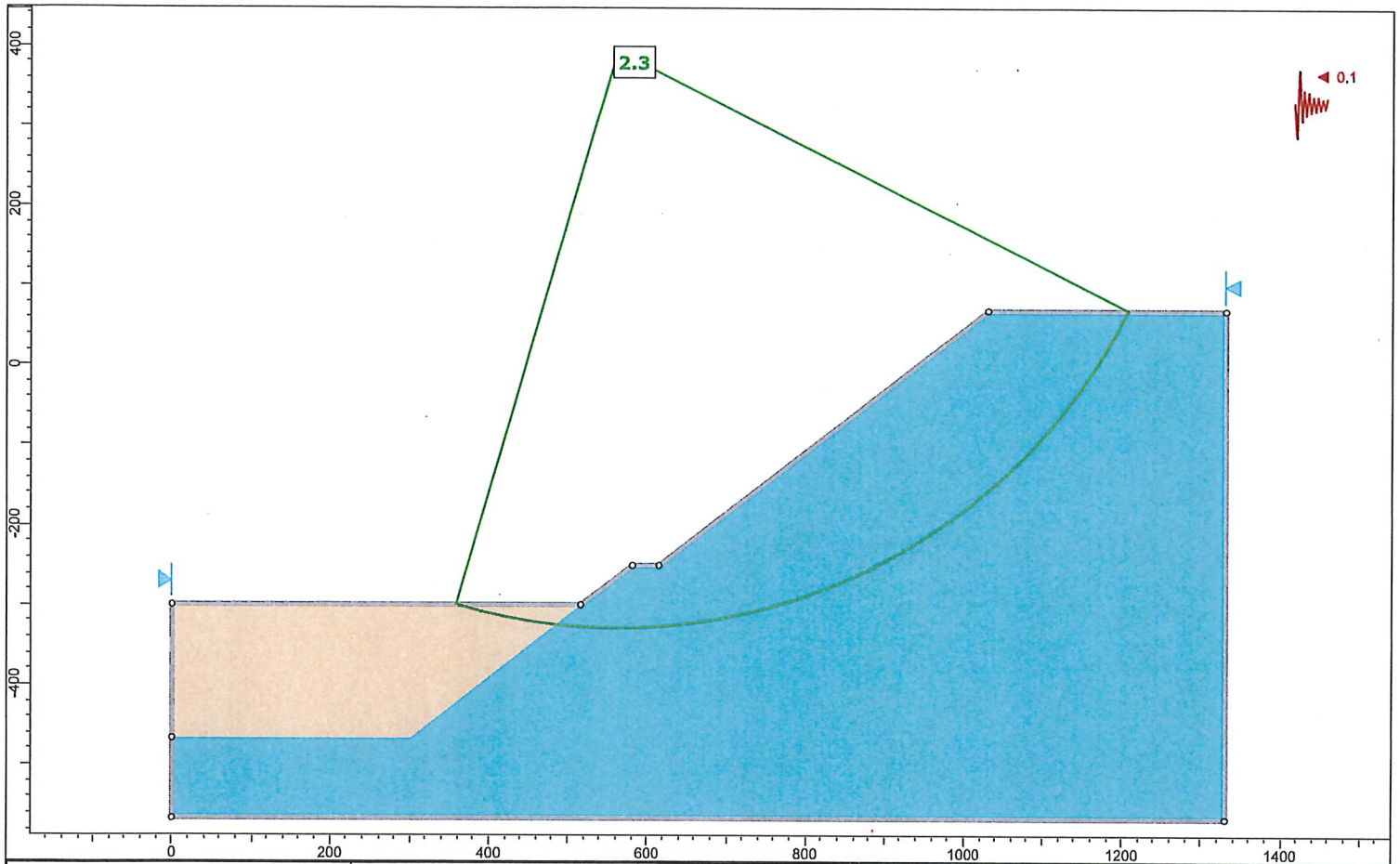
	Project		P.J. Keating	
	Group	Northern and Western Wall	Scenario	Dry Pit-Seismic
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd




	Project		P.J. Keating	
	Group	Northern and Western Wall-Reclaimed	Scenario	Master Scenario
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd

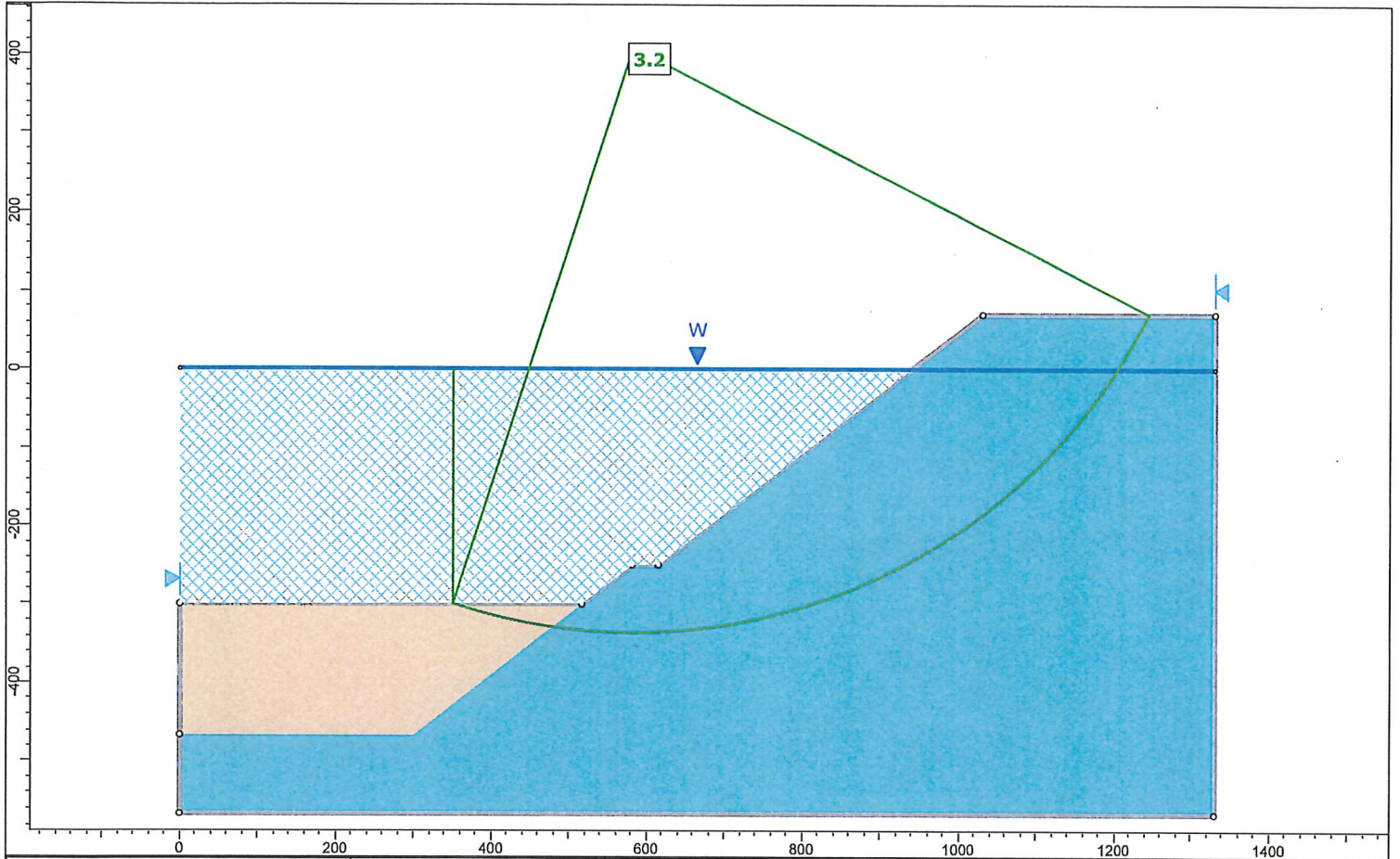



	Project		P.J. Keating	
	Group	Northern and Western Wall-Reclaimed	Scenario	Dry Pit Reclaimed-Static
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd
	SLIDEINTERPRET 9.023			



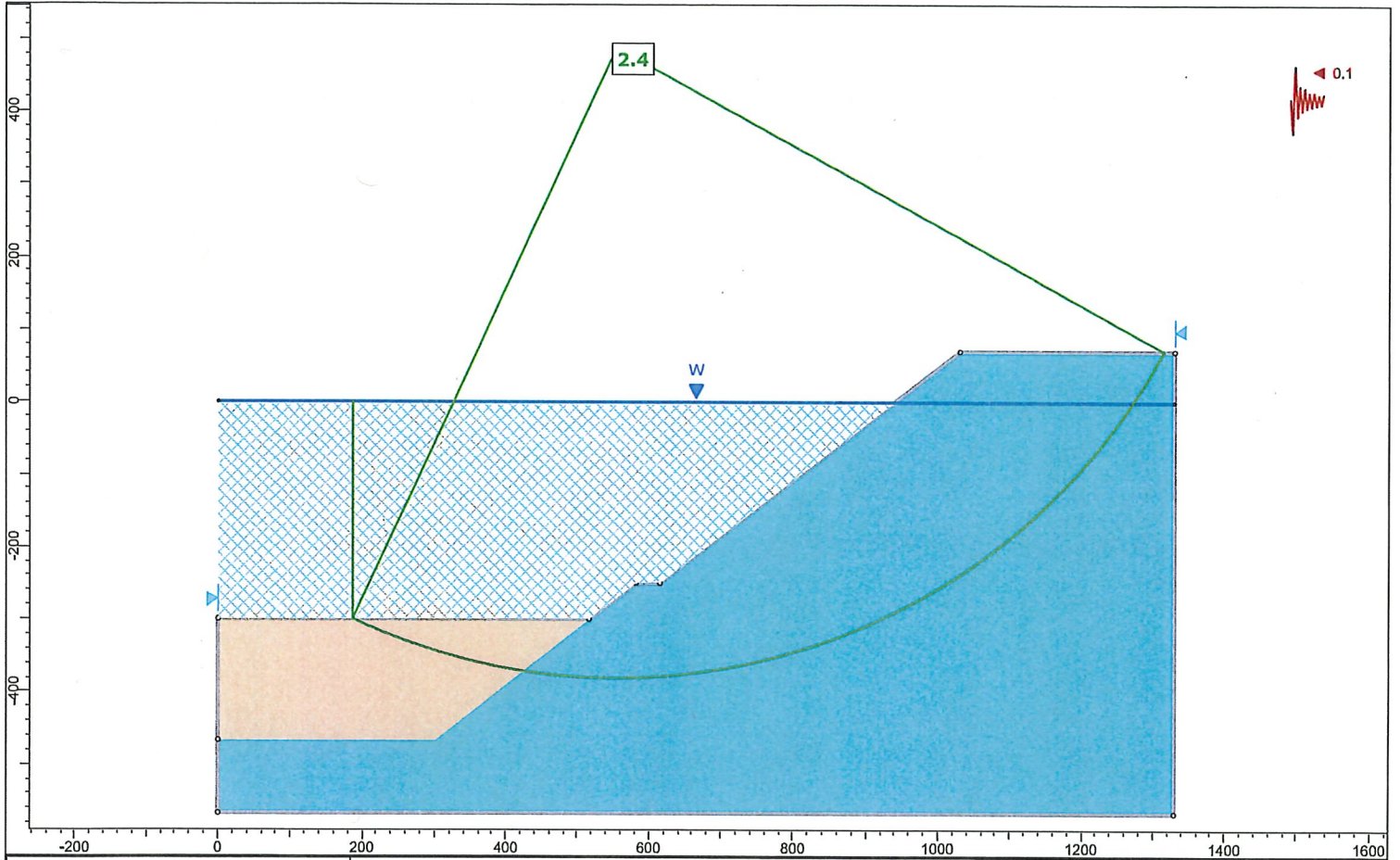
	Project		P.J. Keating	
	Group	Northern and Western Wall-Reclaimed	Scenario	Dry Pit Reclaimed-Seismic
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd


SLIDEINTERPRET 9.023



	Project		P.J. Keating	
	Group	Northern and Western Wall-Reclaimed	Scenario	Flooded-Static
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd

SLIDEINTERPRET 9.023



 SLIDEINTERPRET 9.023	Project		P.J. Keating	
	Group	Northern and Western Wall-Reclaimed	Scenario	Flooded-Seismic
	Drawn By	Shawn McGee, P.E.	Company	TRC
	Date	8/18/2022, 3:36:01 PM	File Name	PJK Acushnet Reclamation.slmd

Appendix C: Bylaw Applicability and Assessment

PJK Bylaw Applicability and Compliance Status

Acushnet Bylaws	PJK Compliance
I Town Meeting	Not directly applicable
II Rules for the Government of Town Meetings	Not directly applicable
III Financial Affairs	Not directly applicable
IV Streets	PJK takes measures to reduce track-out of dirt onto streets such as use of street sweepers, water truck spraying and wheel washing as described in SWPPP
V Truant Laws	Not directly applicable
VI Soil Conservation	Facility applying for Earth Removal Permit
VII Dog Regulations	Not directly applicable
VIII Zoning	Industrial Zoned, following rules
IX Stormwater Management	Facility does not discharge to Town Sewers and has an existing NPDES Stormwater Permit and SWPPP Plan. Facility was pre-existing to Bylaw. See also Section 4 of Reclamation Plan.
X Board of Public Works	Not applicable as this standard applies to just town sewer connections and PJK does not connect to Town sewer
XI Fire Alarm Systems	Facility inspected by Fire Dept
XII Carbon Monoxide Detectors	Not applicable as this standard applies to residential buildings
XIII Truss Construction	Truss labels, as applicable, are inspected by Fire Dept.
XIV Town By-Law Enforcement and Changes	Town has rights to enforce bylaws
XV Community Preservation Act Bylaw	Not applicable
XVI Alarms	Not applicable as this standard applies to falsely setting off town alarms
XVII Agricultural Commission	Not directly applicable
XVIII Right to Farm Bylaw	Not directly applicable
XIX Property Maintenance	Not applicable as this standard applies to abandoned and foreclosed properties
XX Fire Prevention Code Regulation	Facility inspected by Fire Dept
XXI Building Code Regulations	Facility subject to building codes.

January 31st, 2023

To: Chief Richmond,

Thank you for the opportunity to work here at Acushnet PD, it has been a pleasure. I, Alyssa Mello, am writing this to inform you that I will be resigning as a full time dispatcher effective February 12th, 2023.

However per our previous discussion, I would gladly like to stay as a per diem dispatcher.

Again, thank you so much for the opportunity to utilize this department as a stepping stone in my life. I am very grateful.

Best,

A handwritten signature in cursive script that reads "Alyssa Mello". The signature is fluid and stylized, with the first and last names being clearly legible.

Dispatcher Alyssa Mello

January 31st, 2023

To: Chief Richmond,

Thank you for the opportunity to work here at Acushnet PD, it has been a pleasure. I, Alyssa Mello, am writing this to inform you that I will be resigning as a full time dispatcher effective February 12th, 2023.

However per our previous discussion, I would gladly like to stay as a per diem dispatcher.

Again, thank you so much for the opportunity to utilize this department as a stepping stone in my life. I am very grateful.

Best,

A handwritten signature in cursive script that reads "Alyssa Mello". The signature is fluid and stylized, with the first and last names being clearly legible.

Dispatcher Alyssa Mello