

VERMONT AGENCY OF NATURAL RESOURCES  
**VERMONT GEOLOGICAL SURVEY PRACTICE FOR REVIEW  
OF ROCK EXTRACTION ACTIVITIES  
UNDER ACT 250 CRITERIA 9D AND 9E**  
DECEMBER 2016

This practice provides the general elements which the Vermont Geological Survey (VGS) deems necessary for an Act 250 applicant to address Criteria 9D and 9E related to the extraction of rock material. When a project is proposed, VGS and the Agency of Natural Resources (Agency) Office of Planning and Policy (OPP) review the application materials to determine whether the information provided by the applicant is sufficient. Additional information or modifications may be requested based on the particular aspects (size and nature) of the individual project. Once a comprehensive set of information is reviewed, the Agency will determine whether the proposed project sufficiently avoids, minimizes or mitigates impacts in accordance with Criteria 9D and 9E.

Permits and information required by entities other than the Agency of Natural Resources or addressing other Act 250 Criteria are not described below, such as a Multi-Sector General Permit, Stormwater Construction General Permit, a Practice for Review of Groundwater Monitoring Plan, Best Management Practices for Blasting to Avoid Environmental Contamination, applicable local and municipal ordinances, etc.

The section below describes the minimum information necessary to satisfy the Agency's review of Criterion 9D.

CRITERION 9D: “**Earth Resources.** A permit will be granted whenever it is demonstrated by the applicant, in addition to all other applicable criteria, that the development or subdivision of lands with high potential for extraction of mineral or earth resources will not prevent or significantly interfere with the subsequent extraction or processing of the mineral or earth resources.”

To satisfy Criterion 9D, the applicant must demonstrate that the proposed project would not have the potential to prevent or significantly interfere with future earth or mineral resource extraction at the project site.

The applicant will compare the site location maps with mineral resources maps and other available geologic data to see if an identified earth resource is located in the project area. The information is present on the Agency's [Natural Resource Atlas](#) (Atlas)<sup>1</sup> in two data layers: **USGS Mineral Resource Data System** and **Sand and Gravel Deposit Resources**.

If no resource exists, no further action is required. Some resources may be considered unavailable because of the following land uses: a) built-up areas, b) critical habitat, c) public water source protection area, and d) public lands.

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<sup>1</sup> [Natural Resource Atlas, http://anrmaps.vermont.gov/websites/anra5/](http://anrmaps.vermont.gov/websites/anra5/)

If such a resource exists, determine whether the project is likely to interfere with the future extraction of the potential resource. The applicant will provide a statement describing the basis for the determination and will provide two maps to support their determination: 1) a general location topographic map at a scale of 1:24,000 which shows all land, water, existing quarries or sand and gravel operations, and built environment features within a two-mile radius of the site, and 2) a site plan showing the current and proposed (final) extent of the project. If the applicant's statement is accepted by VGS, this Criterion 9D will be considered satisfied. If there is a likelihood that the proposed project will prevent or significantly affect the extraction or processing of the material, then meetings may be held with VGS and OPP to discuss solutions or modifications to the project.

The remainder of this practice describes the minimum information necessary to satisfy the Agency's review of Criterion 9E.

**CRITERION 9E: "Extraction of Earth Resources.** A permit will be granted for the extraction of processing of mineral and earth resources, including fissionable source material:

(1) when it is demonstrated by the applicant that, in addition to all other applicable criteria, the extraction or processing operation and the disposal of waste will not have an unduly harmful impact upon the environment or surrounding land uses and development; and,

(2) upon approval by the district commission or the board of a site rehabilitation plan which insures that upon completion of the extracting or processing operation the site will be left by the applicant in a condition suited for an approved alternative use or development. A permit will not be granted for the recovery or extraction of mineral or earth resources from beneath natural water bodies or impoundments within the state, except that gravel, silt and sediment may be removed pursuant to the regulations of the water resources board, and natural gas and oil may be removed pursuant to the rules of the natural gas and oil resources board."

## **BEST MANAGEMENT PRACTICES FOR BLASTING ACTIVITIES**

If explosives are planned as part of project operation, the applicant must follow the **DEC Best Management Practices for Blasting to Avoid Environmental Contamination**. Although not part of the Agency's review, the District Environmental Commission may require the application materials to include a general Blasting Plan.

If the project will disturb more than 5,000 yd<sup>3</sup> of undisturbed earth resources (rock) per year, see the **DWGPD Practice for Review of Groundwater Monitoring Plan under Act 250 Criteria 1 and 9E**.

## SUBMITTAL OF ROCK EXTRACTION PLAN

The VGS's review of proposed mineral or earth resources extraction (non-sand and gravel) requires specific information about the project site and type of mining proposed.

To satisfy Criterion 9E, applicants for rock quarry operations will need to include in their applications four general types of plans: (1) scope of work, (2) present site conditions, (3) quarry design and operational plans, and (4) reclamation plans. It is strongly recommended that rock quarries be designed by a qualified geotechnical or mining engineer.

### 1. Operational Plans

Describe the intended scope of work and identify:

- a. proposed length of operation (whether year-round or seasonal, phasing and staging),
- b. the planned size of operation (expected annual production and final size),
- c. the number of daily truck trips expected,
- d. whether crushing, screening or washing equipment will be on-site.
- e. whether a Blasting Work Plan, Groundwater Monitoring Plan for Blasting, or other Practice(s) are required.

**2. Present Site Conditions** – Three plans are required: a general location topographic map, a bedrock geologic map and a site plan. VGS recommends the use of several maps, rather than including all the requested information on one large cluttered map.

- a. **General project location** – identify site on a topographic map at a scale of 1:24,000 and include at least a two-mile around radius around the site.
- b. **Bedrock geologic map** – show the rock types underlying and in the vicinity of the quarry and include geologic structural data (ex. bedding, cleavage, and fracture data).
- c. **Site plan** at an appropriate scale to show required details with at least:
  - i. current land elevation contours;
  - ii. existing roads, if any;
  - iii. surface water drainage features - lakes, ponds, wetlands, streams and rivers;
  - iv. cultural and/or historic landmarks or features;
  - v. location of nearby public and potable (non-public) water supplies, including dug wells and springs; include available well completion reports;
  - vi. relative position of the groundwater table based on 2 -5 test drill holes, dug holes or existing groundwater information (i.e. field located wells or springs and associated well completion reports). Locate on the site map any test pits and sample drilling sites along with the results of these test pits and borings.

### 3. Quarry Design and Operational Plans (new quarry or expansion of existing quarry)

Frequently, the intended size of an operation changes over time. Expansions of projects may require amendments to the current land use permit. The applicant is encouraged to identify and account for anticipated changes to the size and scope of mining, quarrying, and sand or gravel extractions.

- a. The quarry should be located topographically so that its orientation will blend with existing topography and will expose the least amount of bare quarry wall to the viewing public.
- b. The quarry should be located to take advantage of existing vegetation to screen the opening and quarry walls from the viewing public. Indicate all plans for phasing and staging development.
- c. The design should include stockpile areas for stripped topsoil, debris (stumps, brush, etc.), size-screened products, and over-burden material **in accordance with all Multi-Sector General Permit (MSGP) and/or Stormwater Construction General Permit (CGP) permit conditions**, if applicable, and proper use or disposal of all trees and vegetation that are removed from the site.
- d. A detailed plan and narrative for erosion control and identification of the location on the plans where the measures are to be used **in accordance with MSGP and/or CGP permit conditions**.
- e. Indicate plans for aesthetic quality control, such as plantings, dust fences, and other dust control measures.
- f. The quarry should be designed for safety with no lift greater than 40 feet high. For quarries that will be deeper than 30 feet, the quarry should be constructed with benches which are a minimum of 15' wide at intervals that will leave no lift greater than 40 feet high.
- g. Benches should slope towards the quarry face to encourage infiltration of uncontaminated water into fractures (spills or releases of petroleum, fuel oils or similar products need to be removed, remediated or cleaned prior to completion of operations).
- h. Unless the proposed alternative use for the quarry (see 4 below) calls for water containment in the finished quarry, all designs should leave the quarry capable of free drainage.
- i. Unless reclamation or alternative use plans (see 4 below) require another design, all quarry entries should be as narrow as possible to leave a "key" or "slot" that can be easily filled in or blocked to prevent easy entry after completion.

#### 4. Reclamation Plans

- a. Stockpiled topsoil and overburden should be returned to the quarry floor. Appropriate seedings and plantings should be made that will allow the quarry site to eventually blend with the indigenous vegetation in accordance with the [Vermont Standards and Specifications for Erosion Prevention and Sediment Control Handbook \(2006, updated 2008\)](#).<sup>2</sup>
- b. Benches and walls should be cleared of loose rock and other debris.
- c. Rocks may be placed at base of quarry walls to discourage venturing too close to walls.
- d. Overburden and waste rock should be placed in the entry slot to discourage easy entry to the abandoned quarry.
- e. Large quarry stone blocks should be spaced around the top crest perimeter of the quarry in an offset pattern with a maximum 10-foot spacing between blocks. Alternatively, outside of these blocks at approximately 15 feet from the crest, chain link fence comparable to those specified by the Agency of Transportation for preventing access to an Interstate Highway shall be constructed.
- f. The area shall be completely policed of trash, broken equipment, and all materials left over from the quarrying operation.
- g. Roadways shall be graded, seeded, fertilized and mulched.
- h. The plan should discuss and show how the reclamation will be monitored and how remediation will occur, if reclamation is not working.

#### Worldwide Alternative Uses for Reclaimed Quarry

Reclaimed quarries have been converted to recreation areas, mixed-use housing, geologic research and education sites, nature preserves, wetlands, training courses, or cooling water for industry. A limestone quarry in Burlington was successfully reclaimed as a private tennis and swimming club.

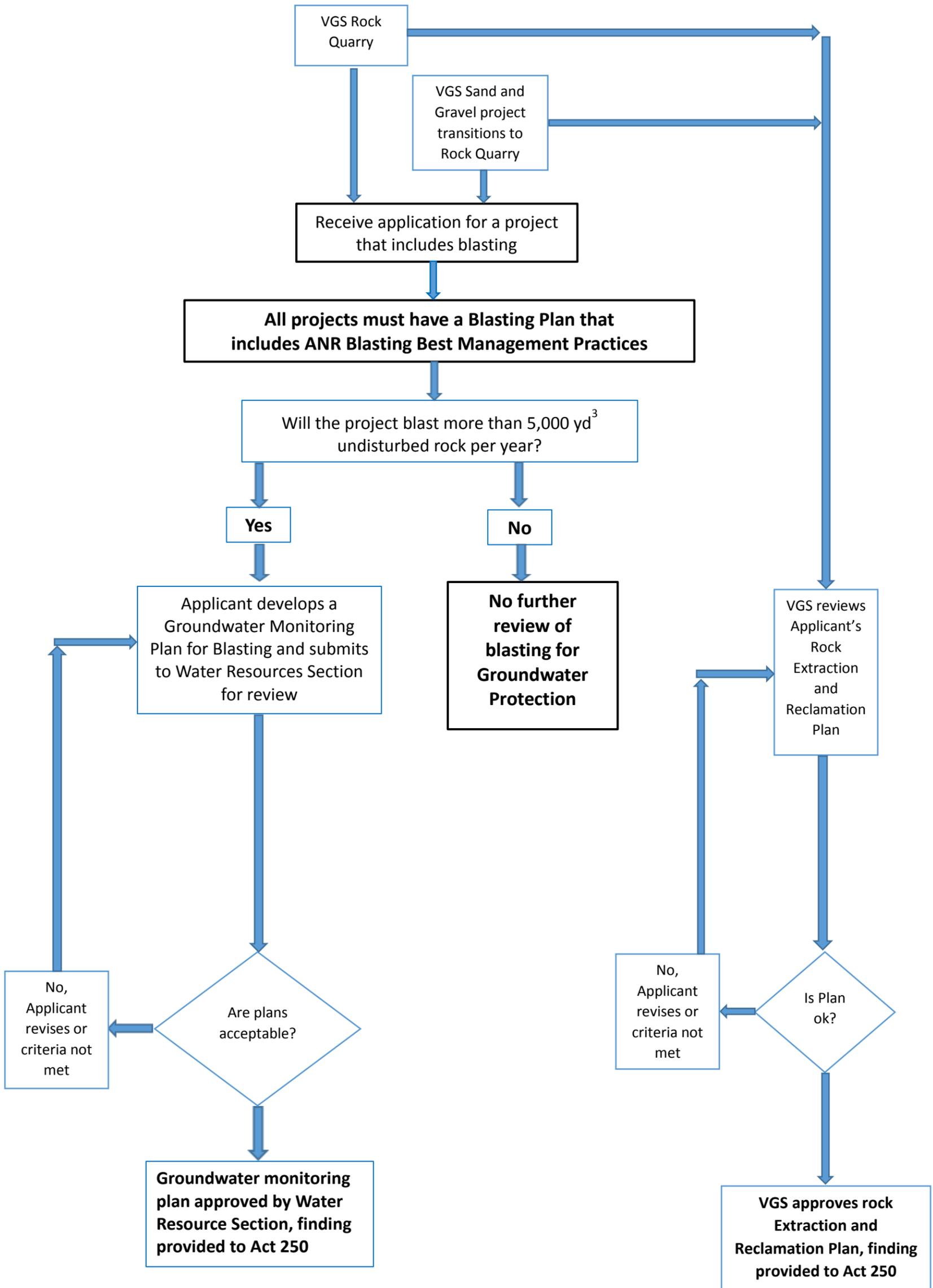
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<sup>2</sup> Vermont Standards and Specifications for Erosion Prevention and Sediment Control Handbook (2006, updated 2008), [http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/StormwaterConstructionDischargePermits/sw\\_vt\\_standards\\_and\\_specifications\\_2006\\_updated\\_2\\_20\\_2008.pdf](http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/StormwaterConstructionDischargePermits/sw_vt_standards_and_specifications_2006_updated_2_20_2008.pdf)

**VERMONT AGENCY OF NATURAL RESOURCES REVIEW UNDER ACT 250**

**CRITERIA 9D AND 9E: Decision Flow Chart for Projects involving Blasting and Earth Extraction**

December 2016



Relevant Practices:

**DWGPD Practice for Review of Groundwater Monitoring Plan under Act 250 Criteria 1 and 9E**

**VGS Practice for Review of Sand and Gravel Extraction under Act 250 Criteria 9D and 9E**

**VGS Practice for Review of Rock Extraction – Quarries under Act 250 Criteria 9D and 9E**

**DEC Best Management Practices for Blasting to Avoid Environmental Contamination**