

## **INSTRUCTIONS**

### **Phase I & II Investigation Submission Procedures**

1. In compliance with the (name of Soil Conservation District) soil erosion and sediment control submission procedures, all applications for development or improvements in limestone geology shall be accompanied by a completed Phase 1 Investigation. This checklist is the initial step of a geologic investigation process recommended to all applicants installing soil erosion and sediment control practices in limestone bedrock areas.
2. The Phase I Investigation is intended to ensure that the information to be submitted by the applicant demonstrates that the applicant has sufficient information available on geotechnical issues to enable the applicant to prepare a plan for investigation of the proposed development site. If problem areas are identified in the Phase 1 Investigation the applicant should complete a more detailed site specific investigation into the geologic conditions as defined under the Phase II Investigation procedures.
3. The Phase II Investigation is to include a detailed outline of the proposed investigation program, including reference to site specific investigation techniques, equipment, program objectives and remediation techniques.

### **DISCLAIMER OF LIABILITY**

In limestone areas the alteration and development of land may be hazardous with respect to the foundation safety of structures, the creation of unstable land as a result of changes in drainage and grading, and the contamination of ground and surface waters.

The exact occurrence of sinkholes and/or subsidence is not always predictable; therefore, the administration of these regulations shall create no liability on behalf of the municipality, the municipal engineer, the municipal geotechnical consultant, municipal employees, or municipal agencies as to damages which may be associated with the formation of sinkholes or subsidence. Compliance with these regulations represents no warranty, finding, guarantee, or assurance that a sinkhole and/or subsidence will not occur on an approved property. The municipality, its agencies, consultants, and employees assume no liability for any financial or other damages which may result from sinkhole activity.

It is also noted that sinkholes and ground subsidence may occur in areas outside the CRD and/or in areas of carbonate geology presently not identified as such. The applicant and/or property owner should always make independent investigations of these matters prior to using this land for construction of a building or structure or any activity which alters the soil and bedrock materials.

## Phase I Investigation Checklist

(Name of SCD) limestone investigation program submission requirements: (check if attached)

\_\_\_\_\_ US Geologic Survey 7 1/2 minute topographic quadrangle maps with parcel identified.

\_\_\_\_\_ USDA Soil Conservation Service soil survey map indicating soils present on parcel.

\_\_\_\_\_ Information from any special reports completed by NJ State Geological Survey, US Geologic Survey, or NJ Department of Environmental Protection and Energy.

\_\_\_\_\_ Site plan map at a scale of 1"=1,000' identifying proposed development site and boundaries of site that are within the limestone bedrock area.

\_\_\_\_\_ Aerial photograph print for the proposed site and surrounding area (taken at a minimum scale of 1"=1,000' obtained during periods of little or no foliage cover).

\_\_\_\_\_ A project sketch plat at a minimum scale of 1"=200' with existing surface water bodies, location of any existing water production wells, faults, outcrops, springs, sinkholes, disappearing streams, and surface water flows.

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## Phase II Checklist

Proposed investigation program to be conducted in limestone by \_\_\_\_\_ (applicant)

### A. General Requirements:

1. Test borings and test pits are to be used as the primary means of identifying potential geologic hazards. Percussion probes and geophysical techniques (e.g. seismic refraction and reflection, ground penetrating radar, magnetic gravity and conductivity) can be used to provide data between test borings and pits.

2. Proposed exploration techniques which are not outlined in this checklist may be submitted to the District for review and possible inclusion in the approved investigation program. Alterations to the planned program can be made during the progress of the field investigation upon request to the District if so required by the nature of the encountered subsurface conditions.

B. The intention of the site investigation program is to define the nature and limits of possible design, construction and operating concerns that could result from the existence of carbonate soil and/or rock formations underlying the proposed development site.

### C. List name and address of New Jersey licensed engineer:

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List name and address of New Jersey licensed well driller:

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List name and address of geologic consultant:

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**PHASE II SUBMISSION REQUIREMENTS**

**TO BE REVIEWED BY DISTRICT**

Accept      Reject      See Attached

1. DIRECT TESTING PROCEDURES

\_\_\_ Test Borings

(a) number proposed \_\_\_\_\_

\_\_\_\_\_

(b) depths anticipated \_\_\_\_\_

\_\_\_\_\_

NOTE: If rock encountered is within 40' of ground surface, a minimum of 10' of rock is to be cored. Rock cores shall be a minimum of 2" in diameter, to be obtained by double tube, split barrel coring device or equivalent.

(c) boring techniques to be used:

\_\_\_\_\_  
 NOTE: Unless written approval is authorized, all test borings will be drilled using rotary wash/without use of drilling muds. Water losses in borings are to be monitored as to depth and quantities; air loss, drilling speed and rod drops must also be monitored.

\_\_\_\_\_

(d) proposed bore hole grouting techniques shall be consistent with N.J.A.C. 7:9-9.1 et seq.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_

(e) descriptions of proposed monitoring well completions.

NOTE: Attach as-built drawing.

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(f) soil and rock sampling to be performed in accordance with ASTM Standards D420, D1586, D1587, and D2113.

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	Accept	Reject	See Attached
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(g) logging of all test borings or test pits in accordance with the Unified Soil Classification System and in addition information on the geologic origin of the constituents of the encountered materials, e.g. light yellow brown silty clay (CH), with occasional angular dolomite fragments, moderately stiff, residual soils, some stained paleo jointing.

	_____	_____	_____
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\_\_\_\_\_ Test Pits

(a) number & depth of proposed pits

\_\_\_\_\_

NOTE: To be acceptable, minimum bottom area of pits shall be 10 square feet

	_____	_____	_____
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(b) method of backfill to be employed:

\_\_\_\_\_

NOTE: Test pit backfill shall be composed of excavated material placed in layers and compacted to pre-excavation density, unless authorized otherwise by District

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\_\_\_\_\_ Piezometers, Lysimeters & Watertable Data

(a) number, locations, & types to be used:

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	_____	_____	_____
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(b) other methods to be used:

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NOTE: These shall be installed and monitored in sufficient locations to identify depth to seasonable high water-table and direction of ground water flow.

	_____	_____	_____
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	Accept	Reject	See Attached
_____ Geochemical Testing of Properties of Soils, Rock, and Water			
Methods proposed:			
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**2. INDIRECT TESTING PROCEDURES**

_____ Percussion Probes	_____	_____	_____
(a) number proposed			
(b) depths anticipated			
(c) measuring techniques to be utilized			

_____ Geophysical Studies			
(a) seismic refraction and reflection; location and number of runs anticipated; equipment to be used:			
_____	_____	_____	_____
_____			
_____			
(b) ground penetrating radar	_____	_____	_____
(c) magnetic, gravity or conductivity techniques--specify procedures and location of surveys.	_____	_____	_____

_____ Geologic Reconnaissance			
(a) factors to be examined -- vegetative changes, observable seeps, or groundwater discharge, circular depressions, swales.	_____	_____	_____
(b) additional field investigation techniques proposed:	_____	_____	_____
_____			
_____			

Accept	Reject	See Attached
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**MAPS, DRAWINGS, AND OTHER DOCUMENTATION**

(a) location of site on 1:24,000 scale USGS topo map (See Phase I Checklist). General site plan showing locations of all field testing procedures, in relation to the planned development at a minimum scale of 1"=100'.

_____	_____	_____
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(b) timetable of proposed field investigation, laboratory testing, test data receipt and final report to the Township. If investigation is to be performed in more than one phase, give an estimated schedule of each phase and expected results.

_____	_____	_____
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(c) proposed technical inspection procedures during investigation (continuous technical supervision of field investigations is strongly recommended.)

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(d) special factors or conditions applicant wishes to bring to the attention of the GTC:

_____	_____	_____
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**DISTRICT REVIEW**

Approval of Phase I Checklist

_____	_____	_____
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Approval of Phase II Checklist

_____	_____	_____
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Phase I Checklist completion date:

\_\_\_\_\_

Phase II Checklist completion date:

\_\_\_\_\_

Conditions to be imposed on approval:

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Denial of Phase I Checklist: \_\_\_\_\_

Denial of Phase II Checklist: \_\_\_\_\_

Remarks:

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