Mendocino County Division of Environmental Health

Policy 42.11.04

GROUNDWATER INTERCEPT DRAINS

Intent and Benefit
The intent of this policy is for the Division to become more thorough and proactive in the testing, design and construction inspection of groundwater intercept drains (GID). The benefit will be that greater assurance can be given the applicant that a critical system component has been properly evaluated, designed and installed to minimum standards.

Background
There are very minimal standards for the testing, design and construction of intercept drains. The standard of practice was to allow the complete installation of the intercept drain prior to construction inspection. Once completely installed, construction inspections are of little value. The critical inspection control points are deeply buried.

Statement of the Problem
In some cases intercept drains are not effective in lowering the water table as expected. However, because testing in the specific drain area is not required and construction inspections are not thorough, it is difficult to pinpoint the cause of the drain failure when it occurs.

If the drain is a critical system component then it is deserving of specific and thorough evaluation and design. It must also be inspected during construction at critical control points to measure construction compliance with the design plans and specifications.

Implementation
A) TESTING
A good groundwater intercept drain design will depend on adequate testing. In order to reasonably assure the drain will key into the impermeable layer along the alignment, it is the policy of DEH to require 3 test profiles. One at each of the two ends and a third at the mid-point of the gravel filled portion of the intercept drain alignment. This can be accomplished with either a backhoe or hand auger. The depth to the impermeable soil layer shall be reported in the SER.
B) DESIGN
Certain design factors are important to the initial and continued satisfactory operation of the groundwater intercept drain.

1. It is the policy of DEH to require that the bottom of the drain extend a minimum of 1 foot into the impermeable layer or down to the soil/rock interface of hard bedrock. This is to assure that the invert of the drainpipe is at or below the impermeable layer.
2. The drain pipe shall be a minimum of 3 inch rigid perforated drain pipe on a minimum grade of 0.25% (3 inches per 100ft) and placed on a minimum 3 inch gravel base (maximum 6 inch gravel base). This is to insure the pipe is not imbedded or crushed into the trench bottom reducing its carrying capacity.

3. The GID trench width may be 12 inches or less and gravel may be 1 ½" or ¾" size.
4. The perforated drainpipe shall have screw capped clean-outs brought up to natural grade at the two ends and the mid point, if the mid-point is the high point and outlets on both sides. Clean-outs insure that continuity can always be checked, maintenance performed and the line flushed as needed.
5. The outlet shall be covered with a screen or perforated pipe that has maximum of ¼ inch openings. This is to assure that rodents or other animals do not block the drain with their nests. Outlets are encouraged at both ends of the GID. The proposed drain discharge point shall not adversely impact down-slope sewage systems or other neighboring improvements.
6. GID drawings shall be provided showing scaled cross-sectional and plan views.
7. Groundwater monitoring well(s) shall be installed down-slope of the GID to monitor the GID effectiveness.

C) INSPECTIONS

DEH inspection of the groundwater intercept drain shall include the following critical control points as a minimum. Alternately, a qualified professional designer may inspect and certify to DEH these same critical control points as a minimum.

OPEN TRENCH

1. The length of the open trench (prior to the placement of the drain rock) shall be inspected for the presence of the impermeable layer being keyed into and the depth of the drain per design. This may require phased inspections and close coordination between EH staff and the contractor. The minimum slope (0.25%) of the trench bottom shall be verified at this time with an eye level, or builder's level or laser level.
2. Do not enter the trench if greater than 5' deep or if it appears unstable in anyway.
3. The type of drainpipe used, gravel bedding and filter fabric or other specified materials shall be checked for compliance with the specifications.

FILLED TRENCH

4. The presence and proper location of clean-outs shall be checked in addition to the final lift of the gravel fill to the specified elevation.
5. The presence of a proper rodent screen shall be checked at the time of final inspection.
6. The presence of ground water monitoring wells installed to the depth of the impervious layer on the down-slope side of the GID shall be verified.

D) ALTERNATE OPERATIONAL DEMONSTRATION

A GID may be approved without DEH (or a qualified professional designer) inspection if it can: 1) be demonstrated to the satisfaction of DEH to have effectively lowered ground water to Basin Plan criteria, and demonstrated compliant through groundwater monitoring at the two ends of the most distant proposed trench location and 2) be shown that the installation of cleanouts, screened outlets and monitoring wells are consistent with this policy.

Effective Date: _1/1/2005
Revised Date: _____
Note:
Director's Initials_____