

# CITY OF BRIER

## DEVELOPMENT INFORMATION

### ROCKERY & RETAINING WALLS

#### PERMIT REQUIRED

A permit is required for retaining walls made of any material, including rockeries that are over three feet in height. Any retaining wall located in a Critical Area as defined by the Brier Municipal Code must obtain a permit.

#### APPLICABLE CODES

Uniform Building Code (Current Edition)

Washington State Engineers Code

Brier City Ordinance 83.I

#### GENERAL REQUIREMENTS

A freestanding retaining wall, for the purpose of retaining earth with backfill, cannot exceed three feet in height within setback areas. Retaining walls may not be built over utility easements, be constructed to adversely affect drainage or create a sight distance hazard. Proposals located within developed or undeveloped City right-of-way must obtain approval from the City Building Department under a Street Opening Permit.

#### SUBMITTAL REQUIREMENTS

1. A copy of the Critical Areas Determination, issued by the Building Department (if applicable)
2. Three (3) Plot Plans; one must be 8 ½" x 11", scaled 1 – 20', and include:
  - a. Property line dimensions, north arrows, streets, easements
  - b. Existing structures within the property
  - c. Physical features, i.e., streams, creeks, drainage courses, etc.
  - d. The proposed location of the retaining wall or rockery
  - e. Existing and proposed grade contours and five foot intervals
  - f. Top and bottom wall elevations to clearly show height of wall
3. Section and Elevation Views: Three (3) copies, including the following:
  - a. Classification of soils
  - b. Footing width, wall height, rebar schedule, size of rock or material, drainage details
  - c. Provide section views and grading calculations

**NOTE:** A grading permit is required when removing, filling or grading in excess of 15 cubic yards.

**NOTE:** Plans must be designed and stamped by a licensed professional engineer

#### DESIGN PARAMETERS FOR RETAINING WALLS

There are two types of retaining walls: One type is projecting, typically used for soils that are capable of standing by themselves without support. The other type is retaining or supporting, for soils that are not capable of standing or remaining at the existing slope.

Retaining walls should be designed based on standard engineering methods provided by the Uniform Building Code and Washington State Engineering Code. Width and height of footings and walls should be provided. Include a reinforcing steel schedule and design calculations. Plans must be designed and stamped by a licensed Professional Engineer.

## DESIGN PARAMETERS FOR ROCKERIES

Rockery construction is a craft and depends largely on the skill and experience of the licensed contractor. Typically, rockeries are used as a protective system to retard weathering and the erosion process on an exposed cut. Rockeries should be designed based on engineering methods to prevent sliding or overturning between rocks or at the base. The required weight should be calculated above each one-foot intersection to determine the friction necessary to resist sliding, or the moment to resist overturning.

Rock design parameters should include the weight of the rock, the resistance to sliding between rocks, and the percentage of voids. The friction factor is determined by testing. Allowable voids will vary depending on the shape of the rocks; a maximum of 20% voids is allowed. The maximum slope behind rockery is 3:1, horizontal to vertical.

Design calculations require knowledge of the active soils behind the rockery, slope stability, surcharge loads, equivalent fluid pressure and physical properties of the soils. Soil properties are determined by the geotechnical engineer. Plans must be designed and stamped by a licensed Professional Engineer.

	ROCK SIZE					
	Approximate Weight		Approximate Height		Approximate Diameter	
1 Man	50	200	0.6	2.5	12	18"
2 Man	200	700	3.0	5.0	18	28"
3 Man	700	2000	5.5	7.5	28	36"
4 Man	2000	4000	8.0	10.0	36	48"
5 Man	4000	6000	10.5	12.5	48	54"
6 Man	6000	8000	13.5	15.0	54	60"

Reference: Associated Rockery Contractors General Construction Guidelines

## PLACEMENT OR USE OF FILL MATERIALS

When fill is placed behind a retaining wall, the soil parameters for design are based on the knowledge of the proposed fill soils and the anticipated control of the compaction. Special inspection by a licensed geotechnical engineer is required to verify that the soils and compaction procedures are proper and the compacted soil properties achieve the design parameters.

Backfilling is critical. The purpose of the fill material is to hold the natural soils in place without allowing the soils in place without allowing the soils to shift or to erode the rockery voids. Crushed rock is a good material to use to minimize this sloughing. The plans should indicate the number of cubic yards of fill material that will be used.

## DRAINAGE REQUIREMENTS

A system shall be designed to intercept groundwater behind the retaining wall in order to prevent the erosion of soil. This system will intercept the groundwater and channel it to an approved drainage system, or, the retaining wall can be designed to channel the run-off to its own drainage system. Specify drainage details on the plans.

### **SPECIAL INSPECTION**

Special inspection is required on retaining wall installations unless specifically waived by the Building Official. A licensed geotechnical engineer inspects the soil after excavation has been completed and prior to the placement of the retaining wall base. The inspection shall include determination of soil bearing capacity and the effect of groundwater conditions on the proposed drainage system. Soils information shall be included in the field report prepared by the geotechnical engineer. Additional study may be required to evaluate soil strength, compressibility and expansiveness. The field report shall indicate the location of the test pits, the class of materials encountered and the allowable pressure (Reference Table 18-I-A of the Uniform Building Code).

A second inspection to verify backfill and compaction methods, drainage, and retaining wall placement procedures is also required. Field reports shall be submitted to the Building Department for review and approval (if applicable).

**NOTE: THE PURPOSE OF THIS HANDOUT IS TO ASSIST THE PUBLIC IN COMPLYING WITH DETAILED PERMIT SUBMITTAL REQUIREMENTS. IT IS NOT A COMPLETE LIST OF PERMIT OR CODE REQUIREMENTS AND SHOULD NOT BE USED AS A SUBSTITUTE FOR APPLICABLE LAWS AND REGULATIONS. IT IS THE RESPONSIBILITY OF THE OWNER/DESIGNER PROFESSIONAL TO REVIEW THE SUBMITTAL FOR COMPLETENESS AND APPLICABILITY TO OTHER CODES. ONLY COMPLETE APPLICATIONS WILL BE ACCEPTED BY THE CITY FOR REVIEW.**