E. Stormwater management facilities used for residential plats (over three lots) and all commercial developments must be designed by a licensed engineer in the State of Minnesota.

F. All stormwater management facilities, necessary to manage increased run-off, shall be designed to accommodate the five-year frequency 24 hour storm event for residential development and a ten-year frequency 24 hour storm event for commercial development. The facilities shall be designed to control the increased run-off at pre development rates or less.

G. All development shall provide for the continuance of natural drainage ways, and structures shall be so constructed as to be 1' above the water level in the drainage way created by a storm of a 100-year return period or a 1% chance of occurrence.

H. The use of natural or man-made stormwater storage areas is encouraged. These areas shall be vegetated and designed to naturally lower after a storm.

I. Direct runoff of stormwater to adjacent water bodies, including wetlands and adjacent parcels shall be eliminated through the use of berms, swales, or other permanent means.

4.9.12 Grading and Road Construction in Shoreland Area

A. Grading or filling in shoreland areas including riprap, wetlands or in the bed of public waters, or any alterations of the natural topography requires a land use permit or conditional use permit. Hand work and the removal of an annual ice ridge are exempt. When the slope of the land is toward a public water or watercourse involving the movement of more than 10 cubic yards of material in a bluff or shore impact zone or more than 50 cubic yards of material anywhere else in the City, this activity must be authorized by conditional use permit. The total movement of material shall be measured by the amount of material being removed plus the amount of material being installed (e.g. 5 cubic yards of dirt removed and replaced with 5 cubic yards of sand = the movement of 10 cubic yards of material). Excavation for permitted structures, drives, sewer systems and parking areas is allowable as part of the structure or sewer permit. The following conditions shall apply:

1. The smallest amount of bare ground is exposed for as short a time as feasible.
2. Four inches of topsoil is replaced and temporary ground cover such as mulch is used and permanent ground cover such as sod is planted.
3. Methods to prevent erosion and trap sediment are employed.
4. Fill is stabilized to acceptable engineering standards and must not create an unstable slope.

B. Ice Ridges. If ice ridges occur annually above the OHW, the property owner may

restore the shoreline every year without a permit. Removal or grading of an ice ridge must not disturb emergent aquatic vegetation, unless authorized by an aquatic plant management permit from the Department of Natural Resources Division of Fisheries. Restoration shall be permitted only where:

1. The ice ridge resulted from ice action within the last year.
2. The total length of shoreline zone to be affected does not exceed 200 feet.
3. All ice ridge material that is composed of muck, clay, or organic sediment is deposited and stabilized at an upland site above the ordinary high water level of any public water.
4. All ice ridge material that is composed of sand or gravel is removed or graded to conform to the original cross-section and alignment of the lakebed, with a finished surface at or below the ordinary high water level.
5. No additional excavation or placement of fill material occurs on the site.
6. All exposed areas are immediately stabilized as needed to prevent erosion and sedimentation.

C. The placement of up to 2" of topsoil used for the purposes of establishing turf shall be allowed without the need for a permit.

D. Plans to place fill or excavated material on steep slopes must be reviewed by a qualified professional for continued slope stability and must not create finished slopes of 30% or greater.

E. Fill or excavated material must not be placed in bluff impact zones.

F. Fill placed in public water below the ordinary high water line requires a DNR Waters Permit and a Corps of Engineers Permit.

G. Excavation in the bed of public waters requires a DNR Waters Permit and/or a Corps of Engineers Permit. Maintenance of any excavation shall be the responsibility of the permittee.

H. Only clean fill consisting of sand, gravel, or rock will be allowed where contact with water is anticipated. Mineral soil may be allowed elsewhere.

I. Alterations to topography must only be allowed if they are accessory to permitted or conditional uses and do not adversely affect adjacent or nearby properties.

J. The owner of any shoreline is responsible for the maintenance and erosion prevention of that shoreline.

K. Wetland Alteration Criteria. Before authorizing any grading or filling activity in any type 2, 3, 4, 5, 6, 7, or 8 wetland, local officials must consider how extensively the proposed activity would affect the following functional qualities of the wetland:

1. sediment and pollutant trapping and retention;
2. storage of surface runoff to prevent or reduce flood damage;

3. fish and wildlife habitat;
4. recreational use;
5. shoreline or bank stabilization; or
6. noteworthiness, including special qualities such as historic significance, critical habitat for endangered plants and animals or others.; and
7. This evaluation must also include a determination of whether the wetland alteration being proposed requires permits, reviews, or approvals by other local, state, or federal agencies such as a watershed district, the Minnesota Department of Natural Resources or the United States Army Corps of Engineers.

L. Connections to public waters of man-made boat slips, canals, lagoons, harbors, and similar inland excavations is prohibited. Existing connections shall be considered Public Waters.

M. Public and private roads, driveways and parking areas must be designed to take advantage of natural vegetation and topography to achieve maximum screening from public waters.

N. Roads, driveways, and parking areas shall meet structure setbacks and shall not be placed within bluff and shore impact zones, when other reasonable and feasible placement alternatives exist. If no alternatives exist, they may be placed within these areas, and shall be designed to minimize adverse impacts.

O. Public and private watercraft access ramps, approach roads, and access-related parking areas may be placed within shore impact zones provided the vegetative screening and erosion control conditions of this subpart are met.

P. Steep Slopes. The potential for possible soil erosion impacts and development visibility from public waters must be evaluated before issuing a permit involving ground disturbance on steep slopes. Conditions must be attached to the permit to prevent erosion and to preserve maximum existing vegetation.

Q. No filling of areas inundated by the 100-year storm along drainage ways shall be allowed, except by conditional use permit.

R. All parking areas, heavy use areas, storage areas, and impervious areas shall be designed to allow entrapment of silts and nutrients prior to discharge to a natural drainage way or public water. New constructed stormwater outfalls to public waters must provide filtering or settling of suspended solids and skimming of surface debris before discharge.

S. Erosion control measures shall be provided where necessary in the opinion of the Engineer. All areas disturbed during any grading shall be covered with topsoil and seeded. Areas subject to concentrated runoff or steeper than 3:1 shall be sodded or seeded and protected with appropriate mulch cover as directed by the Engineer.

T. Riprap. The City of Nisswa encourages the use of riprap only as a last resort to control shoreline erosion. Other methods are generally preferred, including the planting of native, deep rooted vegetation. The use of riprap and retaining walls for ornamental purposes or for terracing natural slopes is discouraged within the shore and bluff impact zones. Where riprap is used, the installation shall be done to the following standards:

1. Gradation. A well-graded mixture of rock sizes not to exceed 9" in diameter or 50 lbs shall be used instead of one uniform size.
2. Quality of stone. Riprap must be durable so that freeze/thaw cycles do not decompose it in a short time; most igneous stones such as granite have suitable durability.
3. Riprap depth. The thickness of riprap layers shall be at least 2 times the maximum stone diameter.
4. Vegetation.
   a. Existing vegetation on the shoreline shall be maintained without disturbance.
   b. All bare soil on the slope above the riprap shall be stabilized with seed and mulch, or sod.
   c. Wooded, deep rooted vegetation shall be planted among the riprap to help stabilize and create wildlife habitat.
5. Filter material. Filter material is required between riprap and the underlying soil surface to prevent soil from moving through the riprap; a filter cloth material or a layer of gravel is usually used for the filter.
6. Leaching Protection. Leaching shall be controlled by installing a riprap gradation small enough to act as a filter against the channel base material, or a protective filter can be installed between the riprap and the base material.
7. Riprap Limits. The riprap shall extend for a maximum flow depth, or to a point where vegetation will be satisfactory to control erosion.
8. Curves. Riprap shall extend to five times the bottom width upstream and downstream of the beginning and ending of the curve as well as the entire curved section.
9. Riprap Size. The size of riprap to be installed depends on site-specific conditions.
10. Riprap Prohibitions. Slopes on which riprap is used to stabilize shorelines shall be no steeper than 2:1.
11. Maintenance. It shall be the property owner's responsibility to perform maintenance on installed riprap. Inspections shall be made of all sites immediately after the first rainfall following installation of riprap. Thereafter, riprapped sites should be checked following large storms, especially those which are near or exceed the storm frequency used in the design.

4.9.13 Controlled Access Lots

Controlled access lots, or any privately-owned lot, tract or parcel of land, however designated or