Section 23:

Paved Side Ditch, Riprap, and Geosynthetics

SECTION 23 – PAVED SIDE DITCH, RIPRAP, AND GEOSYNTHETICS

23.1 PAVED SIDE DITCH

If the grade of a ditch is such that erosion cannot be controlled effectively using sod, paved side ditches may be reviewed for possible installation. Reinforcement is required for all paved side ditches, cut-off walls, and lugs as shown on the plans or Standard Drawings. A strip of sod should be placed along each side of paved side ditch to help prevent the potential for erosion along the edge of the paved side ditch.

If paved side ditch is placed on a steep grade, there is the possibility of surface drainage flowing parallel alongside the side ditch causing erosion and scour under it. When such condition is likely, lugs should be constructed, as shown on the plans, with the upstream edge of the lug lowered so water will be diverted into the paved side ditch.

The spacing of these lugs will depend on the conditions encountered and intervals set out in the Standard Drawings. On steep grades it is necessary to lower the paved side ditch so that the slope from the pavement to the ditch is greater than the grade of the road. In exceptionally rough country, it may also be advisable to use sections of slopewall or riprap to contain the water in the paved side ditch or to direct the water into the paved side ditch at the outlet end of a cross-pipe. A short section of flat bottom paved side ditch, at the outlet end of a cross-pipe, has also been successfully used as a settling basin to direct the cross-pipe water into the V shaped paved side ditch.

Compaction of the soil under the paved side ditch must not be neglected. Without the proper compaction, the ground under the paved side ditch will settle and cause the ditch to break up. Any break in the paved side ditch will allow water to flow under and around the paved section of the ditch and create severe erosion and scour issues.

23.2 RIPRAP

Riprap is specified to help protect slopes or ditches against erosion or scour where vegetation or other methods would be ineffective or impracticable. Future maintenance of ripraped areas should be considered prior to adding large quantities of riprap to a slope. Riprap should never be placed within regulated waterways, unless indicated within the waterway permit.

There are several different types of riprap. The SS and plan documents detail the different types and the material required for their construction. Occasionally, material such as broken concrete or stone may be available from within the contract ROW. These materials could be used for dumped, revetment, class 1, or class 2 riprap. Riprap obtained from within contract ROW will be paid at the contract unit price per square yard.

For riprap to be effective, it should be placed on appropriate geotextile on a stable slope. Careful investigation should be made prior to staking out the proposed riprap area to determine the exact locations where it will be most effective.

When placing riprap within the clear zone of a project, uniform riprap must be used and made as traversable as possible. If a potential for vandalism of the riprap exists, grouted riprap should be considered.

23.3 GEOSYNTHETICS

Geosynthetics may be utilized for many applications including:

- as drainage blankets,
- for pavement, subgrades, or embankments,
- with underdrains,
- under riprap,
- silt fence, or
- as specified.

Geosynthetics shall be placed in accordance with the Geotechnical Report, the contract documents, the SS, and the recommendations of the manufacturer. Geosynthetic material is required to meet the requirements of 918 of the SS for the specific material use. It must be stored appropriately to prevent exposure to direct sunlight and damage from other construction activities. Proofrolling of earth grades and correction of any rutting must occur prior to placement of the geosynthetics. Any damage to geotextiles shall be repaired in accordance with 214 of the SS.

When used as drainage blankets, geosynthetic acts as an encapsulation material for a coarse aggregate drainage layer. Initially and after all wheel rutting has been corrected, the geosynthetic shall be spread taut on the selected area. It shall be overlapped a minimum of 3 ft and sewn in accordance with the manufacturer's requirements. Coarse aggregate No. 2 or 5 should be placed in accordance with the contract documents or as directed, and then covered and encapsulated using the geotextiles.

When used for pavement, subgrade, or embankment, the geosynthetic shall be spread and held tight. Placement of any further lift, whether coarse aggregate or additional fill, must be placed with minimal disturbance to the grade.

When the plans indicate geosynthetic use with underdrains, the material should be placed loosely, with no wrinkles or folds. Ends shall be overlapped a minimum of 1 ft with the upstream end overlapping the downstream end.

When geosynthetic is used under riprap, the receiving surface shall be prepared to a relatively smooth condition, free from obstructions. Geosynthetics used along channels shall be placed parallel with the channel. Geosynthetics placed on slopes of 2:1 or steeper shall be placed perpendicular to the toe of slope. All overlaps must be installed with the upstream end overlapping the downstream end and the upstream sheet overlapping the downstream sheet. This allows water to flow over the geosynthetic much like water flows over shingles on a roof.