Introduction

Adequate drainage is an essential component of any agricultural operation in Whatcom County. Maintaining drainage in open watercourses can have detrimental effects on aquatic life and water quality. Drainage maintenance is also expensive. Removing sediments (dredging) from a modified watercourse can cost as much as $3.00/linear foot of channel when excavation, fish protection and water quality protection Best Management Practices (BMPs) are included. Mitigation for the impacts to fish habitat can add considerably more expense to any maintenance project.

The most cost effective action that a Drainage Improvement District (DID) or landowner can take is to prevent sediments from reaching the watercourse in the first place. To do this, a landowner can implement appropriate farm practices and a DID can proactively encourage landowners within their districts to adopt farm practices that prevent runoff and sedimentation. The result of better farm practices will be less channel maintenance expenditures and less need for high assessments to fund channel maintenance.

Impacts can come from urban development as well as from agricultural operations. Often the urban sources are upstream from an individual farm or DID boundary. Adopting polices that will encourage those landowners to follow best management practices to prevent sediment are to everyone’s benefit.

Agricultural Operations

The natural and modified natural watercourses that are often a part of a DID system are considered critical areas and are protected under Whatcom County’s Critical Areas Ordinance. Like DIDs, farmers have responsibility under the ordinance to ensure that their actions do not negatively impact these environmentally sensitive areas. Farmers can do this by developing and implementing Conservation Farm Plans.

A conservation farm plan identifies farming and ranching activities and the practice(s) necessary to avoid potential negative impacts (resource concerns) from those activities. Practice selection depends upon the types of livestock raised and crops grown. Some examples of common practices that will help to prevent farm related sediments from reaching watercourses include:

Filter Strips

A filter strip is a width of herbaceous vegetation located between crop land, pastures, or disturbed land and environmentally sensitive areas such as watercourses and wetlands and is designed to trap sediments and other contaminants.

- Used along the down slope edge of crop fields to protect an adjacent watercourse.
- Generally planted with perennial grass species.
- Traps and filters sediment and other contaminants before they reach the watercourse.
- Filter strip widths should be determined based on hydrologic soil characteristics, density and height of

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- Filter strip widths should be determined based on hydrologic soil characteristics, density and height of
the filter strip vegetation, and runoff volume. The minimum width for sediment control is 20 feet.
- Size the width of filters to match seeding and harvesting equipment.
- Choose grass species that are able to take up high amounts of nitrogen and phosphorus, grow fast, and tolerate frequent mowing.
- Inspect the filter strip after major storm events and repair any gullies that have formed. Redistribute unevenly deposited sediment accumulation greater than 6 inches. Reseed disturbed areas.
- To maintain filter strip function, periodically regrade the filter strip area and re-establish the vegetation when needed.
- Filter strips are most effective when combined with watercourse re-vegetation using native trees or shrubs.

**Field Border**
A field border is strip of permanent vegetation established at the edge of or around the perimeter of a crop field.
- Use perennial grasses or shrubs.
- Minimum border width may be mandated by Nutrient Management Plans.
- Locate borders around the entire perimeter of the field, or as a minimum, in areas where runoff enters or leaves the field.

**Watercourse Re-vegetation**
Watercourse re-vegetation is the removal of noxious weeds and planting of native trees and shrubs on the banks and land adjacent to watercourses. Woody plants once existed along all natural and modified natural watercourses and even colonized many constructed watercourses. These plants provided many functions for fish and other wildlife and helped to buffer the water from adjacent land uses. Over the last few decades, these trees and shrubs have been systematically removed in an effort to improve drainage because fallen trees or broken limbs can fall in the channel and impede flow. The unintended result however has been decreased drainage capacity and the need for frequent maintenance due to increased field runoff and the invasion of Reed canarygrass.
- Public or private funding is often available for watercourse re-vegetation through government agencies and non profit groups.
- Native trees or shrubs protect or improve water quality by creating shade that lowers the water temperature and helps to maintain or raise dissolved oxygen levels. Native plants also buffer the stream from land based contaminants such as sediment, nutrients and pesticides.
- Native trees or shrubs provide food and habitat for fish including Endangered Species Act listed Salmon species.
- Roots from woody plants create a dense mat that prevents erosion and bank failure.
- Trees or shrubs dissipate concentrated overland flow, filter sediment and increase infiltration away from
• Shade created by native trees and shrubs also helps to control shade intolerant invasive weeds, primarily Reed canarygrass, that trap sediments and impede drainage.
• Riparian Forest Buffers include both native trees and shrubs and are a minimum of 35’ wide.
• Hedgerows consist of native shrub species and are 15’ wide. Hedgerows are usually combined with a filter strip to ensure watercourse protection.

Livestock Exclusion
Livestock erode stream banks, releasing sediments and other contaminants that negatively affect water quality, fish habitat and drainage.
• Fences should be designed to contain the animal species targeted.
• Clean livestock watering sources should be provided well away from the watercourse.
• Plan for a buffer area (filter strip, field border, riparian forest buffer, hedgerow) between fences and watercourses.

Cover Crops & Relay Crops
Grasses and other herbaceous plants established for seasonal cover protect field soils in the rainy season. Unprotected soils can erode into watercourses impairing water quality, degrading fish habitat and impeding drainage.
• Reduces erosion from wind and water.
• Increases soil organic matter.
• Prevents weed invasions.
• Provides supplemental forage.

• The cover crop should be harvested or tilled in as late as feasible to maximize plant growth and still prepare for the new crop.

Manure Management
Livestock operations of all sizes generate manure. When managed properly, manure is the best fertilizer for crop ground. But when managed poorly, manure can be a significant source of contaminated runoff.
• Dairies and other concentrated animal feeding operations are required to have custom Farm Conservation Plans that prescribe a system of collection, transfer, storage, containment and handling facilities. Protocols are identified to test and land apply manure. All of these practices help to keep waste out of surface and ground waters.
• Low-impact agricultural operations, defined by not exceeding one animal unit per acre of grazable pasture, are not required to have custom farm plans but should store, compost and utilize manure according to the Whatcom County “Tips on Land & Water Management” booklet available from Whatcom County Planning & Development Services or the Whatcom Conservation District.
Urban Growth & Stormwater Runoff

With increasing frequency, agricultural watercourses are impacted by stormwater runoff from upland development.

- Impervious surfaces (roads, driveways, roofs, etc.) prevent rainwater from naturally infiltrating the soil and instead send it downstream as stormwater.
- Increased flows may contain sediment and other contaminants that can impact drainage, water quality and fish habitat downstream.
- Increased flows can also erode watercourse banks, causing more impacts downstream.

Downstream landowners and elected DID commissioners should become involved early on in the planning stage of urban developments to help ensure that adequate consideration is given to their potential impacts on DID watercourses. This can be done by letting City and County planning departments know that the DID wants to weigh in on new development and by providing the contact information for where to send notices of permit requests. In addition, commissioners may determine that by receiving new stormwaters from upland developments they are providing an unfunded benefit to those developments. A DID may then choose to pursue collection of the operational maintenance costs from those developments. 85.32.050 RCW.