

Maintenance Eligibility Notes

By

David Mallory, P.E., Senior Project Engineer, Floodplain Management Program

Low mortgage rates continue to fuel robust development

Home mortgage rates hit a 40-year low in 2002. The result was a continued boom in land development activities. Residential development has slowed somewhat in the southern tier of the Denver Metropolitan Area and commercial development in general. However, all other areas continue to experience strong growth. We processed 240 construction plan submittals this year, a 10% increase over last year. Seventy of those reviews resulted in approval letters. Doing the math tells me we averaged 3.4 review cycles for each design approval letter.

The review cycle rate is down slightly from last year, which is the direction we want to move. In September, we were happy to welcome Terri Fead, P.E., on a part-time basis to help with plan reviews. It's been a real challenge to keep up with the workload this year and Terri's involvement has been a tremendous benefit to the program. Our goal for next year is to review original submittals within three weeks and re-submittals within two weeks.

In last year's *Flood Hazard News I* suggested meeting with District review staff as a strategy for reducing the number of review cycles. A number of development applicants have taken us up on the offer. Meetings prior to plan submittal and as a means to provide direction in addressing review comments has proved helpful in obtaining design approval. We believe the practice is helpful in moving projects through the system. We are also available by e-mail, fax or telephone to answer questions on design criteria or the maintenance eligibility program.

A new feature for 2002 was online access to the District's maintenance eligibility database, updated bi-monthly. The *Guidelines for Maintenance Eligibility Of Flood Control Facilities Constructed By Others* (Maintenance Eligibility Guidelines) will be posted on the District's web site in the near future.

One of the main goals in reviewing development proposals for the Maintenance Eligibility Program is implementing District master plans. Consider for example the Brantner Gulch basin in the City of Thornton. In 1998, the District, Thornton and Adams County completed the *Northern Tributary Watersheds Major Drainageway Planning Study*. This year development pressure affected almost the entire drainage basin. The area in question is located between 124th and 140th Avenues, and Holly Street to Riverdale Road. Some 14-quarter section development proposals are in process or are under construction. Many of these proposals have different development groups and/or design engineers. All of the public major drainageway infrastructure will be constructed by private groups and in tandem with on-site development.

Major drainageway components include grade control and drop structures, flood attenuation and water quality ponds, and roadway crossings. In some cases the development applicant has requested revisions to the District's master plan. The overarching drainageway strategy is floodplain preservation coupled with stream stabilization. All of these tributaries to Brantner Gulch are stable in their pre-development condition. In stark contrast is Brantner Gulch east (downstream) of Holly Street. This reach has been heavily impacted by adjacent development that stayed out of the floodplain, but failed to install adequate stream controls. Fortunately, one of the current development proposals will stabilize this stream reach



Brantner Gulch looking upstream (West) approximately one-half mile downstream of Holly Street

and mitigate past damage. The development community has generally been very cooperative through this effort. Public review agencies have also worked together in order to achieve a positive and coordinated outcome. Only through a public/private sector partnership, based on a comprehensive master plan and using proven design principals can "historic" conditions be preserved. The benefit is reduced public burden in terms of maintenance costs, increased community assets in terms of open space, trails, recreation, and habitat preservation, and improved product marketability for the housing projects.

Trash rack design notes

The District issued updated Volumes 1 & 2 of the *Urban Storm Drainage Criteria Manual* (USDCM) in June of 2001. Trash rack design criteria was further updated through revisions posted on the District's web site in July, 2001. This update addressed the need for trash racks at detention pond outlet structures, storm sewer outfalls and roadway culverts. Several plan submittals this past year demonstrated some confusion relative to trash rack design. The following discussion is a summary of District design guidelines taken from Section 8.0 of the Culvert Chapter and Section 4.8 of the Storage Chapter, Volume 2, USDCM, and the

Maintenance Eligibility Guidelines. An update to Volume 3 of the USDCM was issued and posted on our web site in June, 2002. Please refer to that document for appropriate design guidance for trash racks located at water quality outlet works.

Trash racks are recommended for:

1. Entrances to long culverts and storm sewers,
2. Entrances to all culverts that have a drop, impact basin or other dangerous outlet condition,
3. Roadway culverts with improved entrances, and
4. Entrances to detention pond outlet structures.

Trash racks are not recommended for:

1. Short, larger diameter culverts (generally if one can see "daylight" through the culvert, a 48-inch object can pass through the culvert, and the culvert outlet is not likely to trap or injure a person, a trash rack is not necessary),
2. Detention pond outlets upstream from roadway embankments that meet the above criteria for short, large-diameter pipes, and
3. Exit or outlet of any structure.

Trash rack design criteria:

1. The ratio of trash rack net open area to total outlet (or conduit) area must conform to Figure SO-7. Generally, the minimum ratio is 4 to 1 for outlets 24 inches in diameter and larger and increases dramatically for smaller diameters.
2. The maximum allowable face slope is 3H:1V (see other recommendations for water quality detention outlets).



An example of a trash rack (from the USDCM)

3. A bottom clear opening of 9 to 12 inches is required to permit passage of low flow debris.
4. The bars on the trash rack face should generally be parallel to the direction of flow and spaced to provide 4.5 to 5 inches of clear opening between bars. Transverse support bars should be as few as possible, but sufficient to support full hydrostatic loads.
5. Collapsible trash racks or gratings should not be used.

In the field

An integral part of the maintenance eligibility process is construction oversight. Construction activity has increased this year over past years. At any given time, we typically have 120 to 150 projects approved for construction spread out over 1600 square miles in many different local jurisdictions. We heavily depend on networking and

partnerships developed with local governments and various engineering consultants over the years to adequately cover construction oversight. In some cases, local government inspection staff have conducted construction observations on the District's behalf. Field reports and/or digital photos are typically provided to us through e-mail. We also rely upon local inspection staff, engineering consultants and in some instances, contractors to keep us apprised of construction progress and the need for District construction site visits. During 2002, District staff completed 150 construction site visits. Over 75 current projects were completed and recommended for construction acceptance during the preceding 12 months. Another 20 previously approved projects were re-inspected for adequate vegetative cover and received final approval.

Scott Tucker named Friend of the River

Executive Director Scott Tucker received the Greenway Foundation's Friend of the River Award at a dinner held on November 21 at Platte River Station. Approximately 300 people attended the event. The featured speaker was noted Denver history expert, Dr. Tom Noel.



Scott Tucker visits with well wishers and shows his award to the audience.