



Urban Drainage and Flood Control District

Maintenance Eligibility Program Guidelines For Flood Control Facilities Constructed By Others August, 2017

Introduction

The Urban Drainage and Flood Control District's (UDFCD) policy with regard to the eligibility for UDFCD maintenance assistance of flood control facilities constructed by, or approved for construction by, local public bodies is as follows (Board Resolution No. 26, Series of 1983):

1. The design of the facility must be in accordance with the "Urban Storm Drainage Criteria Manual" (USDCM).
2. The design of the facility must be approved by UDFCD.
3. A certification acceptable to UDFCD must be provided which certifies that construction of the completed facility has been accomplished in accordance with the approved design.
4. Satisfactory maintenance access and public access easements or rights-of-way must be provided in order to adequately maintain the facility.

All document references are available on UDFCD's website, www.udfcd.org.

When Approval of Design is Required

Any flood control facility constructed by, or approved for construction by, a local public body after March 1, 1980, must be approved by UDFCD to be eligible for UDFCD maintenance assistance (Board Resolution No. 67, Series of 1979). UDFCD funded projects do not follow this process as they are automatically eligible for UDFCD maintenance assistance.

Flood control facilities generally include components of the major drainage system. Major drainage, for the purposes of the Maintenance Eligibility Program, is defined as the system that collects, detains and conveys storm runoff for tributary basins exceeding 130 acres. Major drainage designation may also be considered for elements of a UDFCD sponsored drainageway master plan or outfall systems plan.

Approval Procedure

Local public bodies have the responsibility to submit to UDFCD designs for proposed flood control facilities to be constructed by, or approved for construction by, the local public body. Submittal documents will be accepted in digital format only, unless other arrangements have been made.

It is required that preliminary and final drainage studies be submitted to UDFCD for review and comment prior to beginning final design. Early coordination with various federal, state, regional, and local permit programs is essential to the success of any design proposal. Apparent conflicts between permit requirements and UDFCD guidelines should be resolved as soon as possible in order to provide an acceptable solution. Additional permit programs include, but are not limited to:

1. Department of the Army's Section 404 permit;
2. Local government stormwater BMP requirements;
3. State / local government construction erosion control requirements;
4. Local government floodplain development permit;
5. State Engineer's Dam Safety requirements; and
6. FEMA conditional and final Letter of Map Revision processes.

Local public bodies must submit written requests to UDFCD for review of drainage studies and design plans. UDFCD will not review drainage studies or design plans initially submitted by anyone other than the appropriate local public body. **UDFCD staff is available for consultation regarding design concepts and procedures and meeting with staff early in the design process is highly encouraged.**

UDFCD encourages maintaining and restoring the stream corridor. The stream corridor is the greenbelt within which natural processes of the stream may occur, which is often not equal to the mapped floodplain. This approach can enhance a development project and increase profitability while allowing for sustainable flood conveyance in low maintenance streams. Early integration of these ideals may add value to the proposed development, help with site grading earthwork balance, utilize readily available materials, and hasten the entitlement and approval process.

As an aid to the design review, construction certification and final acceptance process, submitted final designs and engineering studies should conform to generally accepted standard of care. This means plans should:

1. Be prepared in a professional, organized and coordinated manner.
2. Include location map of development and watershed (can use recent Google Earth image). Existing photos of the existing channel are encouraged.
3. Include an Overall Site Plan illustrating the relationship of the labeled major drainage improvements to the site.
4. Include Landscaping and Planting plans.
5. Include hydrologic and hydraulic data on plan, profile and section views:
 - a. Plans should include the proposed 100-year floodplain;
 - b. Profiles should be stationed in an upstream direction and coordinated with UDFCD studies;
 - c. Profiles should include the hydraulic grade line and design discharge;
 - d. Closed conduit profiles should also include the energy grade line, exit velocity and Froude number; and
 - e. Sections should include design discharge, Manning's n value, water surface elevation and velocity.
6. Include hydrologic routing data on regional detention basin plans:
 - a. Tributary watershed area;
 - b. Stage/volume (or stage/area) and stage/discharge data presented in tabular or graphical form;
 - c. Required storage volume for critical events such as 100-year, EURV and water quality;
 - d. Critical water surface elevations in plan and profile views; and
 - e. Peak inflow and outflow for critical events.
7. Include enlarged details for all hydraulic features (outfalls, drop structures, etc.) including plan, profile and cross-section views (drawn at 1" = 20' minimum with existing and proposed contours).

Engineering studies should present detailed findings, as opposed to simply directing the reader to the appendix. Technical backup data should be indexed and tabbed in order to facilitate review. Within the technical appendix, include photos representative of the existing stream corridor and erosion and depositional features.

The design consultant is responsible for quality control review prior to submittal. UDFCD staff will review submitted drainage studies and construction documents for the following:

1. Conformance with the USDCM, including but not limited to Volume 1 Chapter 8 Open Channels, when the project includes channel creation or construction of structures in an existing channel.
2. Provision of adequate maintenance access;
1. Meeting the intent of UDFCD master plans;
 - Where preservation is included in master Plan, the natural and beneficial function of

the stream be preserved and stream improvements implemented to accommodate for hydrologic and hydraulic changes from the developed watershed.

- Where mitigation or preservation is included in the master Plan, low maintenance stream design is required.

3. Availability of adequate public right-of-way and stream corridor preservation;
2. Compliance with local floodplain regulations; and
3. Good floodplain management practice (minimize future flood risk).

Any deficiencies with respect to the foregoing in the drainage studies or construction documents will be identified in a letter to the referring agency. The deficiencies must be corrected and revised documents submitted for review and approval. UDFCD review is limited in scope with respect to technical backup and hydrology / hydraulic models. The design consultant is responsible for the quality and completeness of submittals. A professional engineer registered in Colorado and qualified in the area of water resources and structures where applicable must sign and seal the final plans and reports.

Acceptable final designs (construction plans and specifications) will be approved by an "Approval of Design" memorandum (Attachment 1). **Design approval will expire when construction does not begin within two years after the date of the approval.**

Certification Procedure

The flood control facility must be constructed in substantial conformance with UDFCD approved design before it will be deemed eligible for UDFCD maintenance assistance. The following procedure will be utilized to assure satisfactory construction.

The local public body must provide:

1. An electronic set of the approved plans;
2. A Maintenance Site Plan (Attachment 4), if applicable;
3. Notification to UDFCD of the proposed date of start of construction; and
4. Names, addresses and phone numbers of the contractor and owner (developer).

The District Construction Manager shall be included in a preconstruction meeting. UDFCD will have a representative visit the site from time to time as deemed necessary to observe construction for conformance with the approved final design. Typical elements for construction inspection are documented in Attachment 5. All grouted boulder installations must receive a pre-grout sign-off prior to grout placement. **Please give 48-hours' notice for observation requests.** Construction deficiencies will be reported in writing to the local public body, which will be responsible for taking the necessary steps to have the deficiencies corrected. Such visits will not relieve the contractor or owner of the obligation to construct the project in accordance with the approved design. Site visits are not a substitute for local public body construction observation. **It is important and expected that the design consultant maintain a construction phase presence in order to clarify design intent, and verify construction surveys and layout.**

Upon completion of the project, representatives from UDFCD, local public body, contractor, design consultant and owner (developer) shall conduct a walk-through inspection of the project and shall prepare a list of deficiencies (punch list). The local public body is responsible for arranging the inspection. When the punch list items have been corrected the owner (developer) or local public body should notify UDFCD, and the UDFCD representative will conduct a final inspection. **As-built documents and a [Site Maintenance Plan](#) will be required consistent with local public body requirements.**

If the construction is satisfactory, a memorandum of "Acceptance of Construction of Project for Maintenance Eligibility" (Attachment 2) will be sent to the local public body. This memorandum does not yet make the project eligible; eligibility is contingent on a successful revegetation effort.

Grass-lined facilities will be eligible for maintenance assistance upon satisfactory completion of seeding in accordance with the REVEGETATION chapter of the USDCM and after an adequate vegetative cover has been established.

A final "Certification of Maintenance Eligibility" memorandum (Attachment 3) will be sent to the local public body after an adequate vegetative cover is established and evidence of maintenance access is in hand. Ongoing permit requirements, such as 404 wetland maintenance, are a project responsibility.

Flood Control Facility Ownership

UDFCD must have legal maintenance access to the flood control facility. Listed below are acceptable options for ownership and primary maintenance of the facility in order of UDFCD preference. :

1. Ownership of the facility by a public body accepting primary maintenance responsibility.
2. Ownership by a public body or private entity with drainage facility maintenance performed by a special or metropolitan district with a reliable funding source for long-term maintenance activities. Public body must also have a permanent public maintenance access easement allowing it to perform maintenance when the owner does not.
3. Ownership of the facility by a private entity (such as a homeowners association owning common areas) is acceptable provided the public body also has a permanent public maintenance access easement allowing it to perform maintenance when the owner does not. Easements crossing individual lots are not acceptable.

MEMORANDUM

TO:

FROM: Project Manager, Watershed Services

SUBJECT: Approval of Design

DATE:

The construction plans and specifications for _____
_____ dated _____, are hereby approved. The project will be eligible for District maintenance assistance upon satisfactory construction in accordance with the approved design, as determined by the District. Construction must begin within two years of the date of this memorandum, or the approval will expire. This project may require federal, state or local permits in addition to this design approval.

In order to facilitate observation of the proposed construction we ask that you provide the information requested below on the enclosed copy of this memorandum and return the copy to us with one set of approved construction plans and specifications as soon as possible. Half sized or electronic versions of the approved documents are preferred if readily available.

The District will follow the procedure listed below to ascertain the acceptability of the construction effort. Your assistance with this procedure will be necessary in order to qualify the project for District maintenance assistance. The District staff, or consultants retained by the District, will observe the construction.

1. The District and/or its consultant may conduct site visits during project construction as deemed necessary to observe construction for conformance with the approved plans and specifications. All grouted boulder installations must receive a pre-grout sign-off. Construction deficiencies will be reported to your contact who should take the necessary steps to have the deficiencies corrected. Such visits will not relieve you, the owner (developer) or the contractor of the obligation to construct the project in accordance with the approved design. The design consultant should maintain a construction phase presence in order to clarify the design intent, and verify construction surveys and layout.
2. Upon completion of the project, representatives from the District and/or its consultant, local public body, contractor, design consultant, and owner (developer) shall conduct a walk-through inspection of the project and shall prepare a list of deficiencies (punch list). You are responsible for arranging the inspection.

3. When the punch list items have been corrected, the local public body should notify the District, and the District representative will inspect the project again. If the project is satisfactory, written notice of acceptance of the facility for maintenance eligibility will be sent to you.
4. Grass-lined facilities will be eligible for maintenance assistance after an adequate vegetative cover has been established.
5. Changes to this approved design can only be made by use of the District's "Notice of Change to Approved Design" form (copy enclosed).

We look forward to working with you on this project.

Project Manager, Watershed Services

Contact Address Phone

Local Government

Owner (Developer)

Contractor

Date of Start of Construction _____

UD ID _____

TP/

Enclosures: Copy of this memo
 Sample Notice of Change to Approved Design

NOTICE OF CHANGE TO APPROVED DESIGN



Change No. _____

Date: _____

Design Approval Date: _____

MEP ID: _____

NAME OF PROJECT: _____

Description of Change (attach appropriate drawings, specifications and calculations) made to the Approved Design:

Justification:

Impact of change on function of the facility:

APPROVALS REQUIRED:

_____	_____
DESIGN CONSULTANT	OWNER (DEVELOPER)
_____	_____
CONTRACTOR	LOCAL GOVERNMENT

	UDFCD

MEMORANDUM

TO:

FROM:

Project Manager, Watershed Services

SUBJECT:

Acceptance of Construction of Project for
Maintenance Eligibility

DATE:

The construction of _____

_____ (Project) at _____

_____ (Location) is accepted for District maintenance assistance. This acceptance is based upon visual inspection of those elements of the project which are visible to the naked eye, and should not be construed as a certification of the structural integrity of any element of the project. A final determination of maintenance eligibility will be made upon establishment of an adequate vegetative cover. It is your responsibility to advise the District in writing when you feel an adequate cover exists; and we will then arrange to inspect it with you or a representative.

Project Manager, Watershed Services

UD ID _____

TP/

Enclosure (completion report)

cc: David Bennetts, UDFCD

MEMORANDUM

TO:

FROM: Project Manager, Watershed Services

SUBJECT: Certification of Maintenance Eligibility, MEP Step ___ of 4

DATE:

The construction of _____
_____ in Section _____,
T_____, R_____, _____ County, Colorado is eligible for District maintenance assistance.
This approval is based upon visual inspection of those elements of the project which are visible to the
naked eye, and should not be construed as a certification of the structural integrity of any element of the
project.

Project Manager, Watershed Services

UD ID _____
TP/
cc: David Bennetts, UDFCD
Attachment: _____



MEMORANDUM

TO: Developers, Engineers and Contractors for MEP Projects

FROM: Watershed Services – Maintenance Eligibility Program (MEP)

SUBJECT: Typical Elements for UDFCD Construction Inspection for MEP Projects

DATE: October 1, 2018

UDFCD provides periodic construction observation in order to ensure conformance with the approved plans and specifications for maintenance eligibility certification. The UDFCD construction manager serves as a technical resource for construction to the local government and developers. UDFCD construction observation does not substitute for local government inspection. While the plans have received a general engineering review and approval by UDFCD, there may be instances where the plans may require revisions or clarification in order to meet USDCM criteria (example: where there are missing or incorrect detail sketches or where site conditions have changed since survey/design). In those instances, the contractor will be required to coordinate with the design engineer to update the plans and resolve the field issues. Substantial changes to the design will require the design engineer to submit a UDFCD Design Change Form, which must be signed by the Contractor, Developer, Design Engineer and UDFCD.

The contractor is responsible for notifying the UDFCD construction manager when the various components are ready for review. UDFCD construction observation will document that the contractor is in compliance with the plans and specifications. A construction observation report is sent to the local government and a courtesy copy may be provided to the contractor. The local government is responsible for ensuring that any deficiencies noted within the UDFCD construction observation report are resolved. This memorandum documents typical design elements that are eligible for the MEP and guidelines to adhere to during construction.

Grouted Boulder Drop Structures

Subgrade – compacted, stable, and dry – no ice, snow, frozen subgrade. No loose soil or clumps of soil. No bedding material (sand, crushed rock, “squeegee”) permitted below boulders. Requires review and approval.

Drop Structure Cutoffs

Concrete Cutoffs

Trench must be stable and evaluated by UDFCD to determine suitability for concrete placement. UDFCD to verify depth, width, stability, no loose material at trench bottom, no root protrusions into trench. UDFCD to verify that contractor has concrete vibrator and backup available. UDFCD to review approved concrete/grout mix design and document acceptable cutoff trench conditions prior to placing grout. Cutoffs are typically placed monolithically with the grouted boulders. Non-monolithic pours will require a roughened 2”x4” keyway and # 4 rebar dowels.

Sheet Pile Cutoffs

Contractor to provide material submittal for sheet pile. UDFCD to verify sheet pile type, length of cut piles, and observe pile driving effort. Piles that encounter refusal before achieving design depth must be verified and reported to UDFCD and the design engineer prior to acceptance or trimming of pile to meet finish grade.

Boulders

UDFCD will inspect a representative sample of boulders to ensure compliance with USDCM criteria. If the contractor is having difficulty meeting the specified boulder sizes, it is recommended that the contractor upsize/downsize the material until the proper boulder dimension/design requirements are met. 18-inch boulders for grouted boulder drop structures are no longer permitted by UDFCD. Boulders must be block-shaped. Eccentric shaped boulders, cracked boulders, calcite intrusions or undersized boulders will be rejected. When placing boulders, the vertical dimension is critical to ensure proper grout depth. Boulders should be placed with the flattest surface up. Boulders should be placed within 2" to 4" of each other to allow verification of grout penetration and concrete vibration. It is permissible to use one or two pieces of riprap below and at the edge of a boulder to help level the top surface, however, mass use of riprap or other material (perching) to achieve grade is not acceptable and will be cause for rejection. UDFCD recommends that the contractor place a representative section of the boulders and call for an approval. All mud, dirt, snow, etc. must be removed and boulders inspected 2 business days prior to grouting.

The design engineer is responsible for determining whether the placement of boulders must be in a stair-step or sloping pattern. The contractor is responsible for ensuring that all design grades are achieved or notifying the design engineer/municipality/UDFCD of any conflicts.

Grout

Grout design mix submittals must be reviewed for conformity with UDFCD criteria. Along the perimeter of the grouted boulder drop structure the grout levels must be raised to within 1-2" of the top of boulders in order to prevent soil erosion from lateral slopes. Grout elevations should be clarified prior to placement and marking of grout elevations on boulders is recommended. Grout must be vibrated with a pencil (0.75-in) vibrator. Grout should have a smooth (gloved or brushed) finish with no voids within the structure. Soil riprap/riprap must not be placed prior to grouting.

Riprap and Soil Riprap Installation

UDFCD will inspect prepared subgrade. Contractor is responsible for attaining design grades or notifying design engineer/municipality/UDFCD if there is a conflict or design error. UDFCD will verify riprap size, soil riprap mix ratio, bedding material (if specified) and placement depths. All soil riprap placement will require a 6-inch topsoil layer unless specified by the engineer. Topsoil layering is generally not required within the channel flow line limits.

Riffle Drop Structures

UDFCD will inspect the materials, mixing, and placement of the VFR mix.

Box Culverts, Culverts, and Bridges

UDFCD will inspect the upstream and downstream portions including headwalls, wingwalls, footers, cutoffs, aprons, handrails, etc.

Inspection will include water control, subgrade compaction and stability, toewalls, cutoffs, forms, rebar,

etc. Forms and rebar will be observed for general conformance with the plans and specifications. Rebar and Forms inspection must be coordinated with the municipality/local government.

Storm Sewer Outfalls

UDFCD requires both joint fasteners and cutoff walls per **UDSCM** criteria. UDFCD will inspect toewall trenches, rebar placement, and footer stability (when required). The interior threads of all joint fasteners must be trimmed flush with the interior bolts.

UDFCD will inspect all outfall end treatments including riprap and bedding installation, soil riprap pads, low tail water basins, and grouted boulder rundowns.

Maintenance Trail and Access Roads

UDFCD will observe grading, compaction and materials installation. Subgrade must be compacted and sloped to prevent water ponding.

Regional Detention Ponds/Local Detention Ponds/Emergency Spillways

UDFCD will observe all components for regional detention ponds including grading, outfalls including water quality forebays, structures, emergency spillways, etc.

For local detention, UDFCD will observe construction of the emergency spillway only when the spillway is a part of the receiving stream embankment. Emergency spillways will be observed for construction of cutoff walls, riprap/soil riprap placement, and outfalls as noted above.

Channel and Bank Grading

UDFCD will observe channel and bank grading to ensure general conformance with the plans and specifications.