COLORADO DISCHARGE PERMIT SYSTEM (CDPS) GENERAL PERMIT COR400000

Guidance for Diversion of State Waters

The Water Quality Control Division (division) issued a permit modification of the COR400000 General Permit for Stormwater Discharges Associated with Construction Activity (the permit) on December 31, 2020. The division-initiated modification included the addition of the diversion of surface water within the permitted site as an allowable non-stormwater discharge. A section was also added to ensure that diversion structures were designed and implemented to minimize or prevent pollutants from mixing with the diversion waters before discharging offsite.

The addition of diversions to the modified permit was done to provide more clarity to permittees and explicitly allow for diversions to be included under the permit. The intent of this addition was to allow for a practice based approach to controlling potential pollutants from diverting water at a construction site by ensuring a stable diversion and driving the implementation of good engineering, hydrologic and pollution control practices when designing, installing and removing diversions. This guidance has been developed to help clarify these modifications.

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Diversion Requirements and Definitions

In accordance with Part I.A.1.b(iv) of the CDPS General Permit for Stormwater Discharges Associated with Construction Activity (COR400000) discharges associated with the diversion of state waters within the permitted site are authorized as an allowable non-stormwater discharge.

Part I.B.1.a.i(i) of the permit specifies effluent limitation requirements related to diversions:

"Diversion control measures must minimize soil transport and erosion within the entire diversion, minimize erosion during discharge, and minimize run-on into the diversion. The permittee must minimize the discharge of pollutants throughout the installation, implementation and removal of the diversion. Diversions must meet one or more of the following conditions:

(1) Lined or piped structures that result in no erosion in all flow conditions.

(2) Diversion channels, berms, and coffer dams must be lined or composed of a material that minimizes potential for soil loss in the entire wetted perimeter during anticipated flow conditions (e.g. vegetated swale, non-erosive soil substrate). The entire length of the diversion channel must be designed with all of the following considerations: maximum flow velocity for the type of material(s) exposed to the anticipated flows to ensure that the calculated maximum shear stress of flows in the channel is not expected to result in physical damage to the channel or liner and result in discharge of pollutants. Additionally, the conditions relied on to minimize soil loss must be maintained for the projected life of the diversion (i.e. a vegetated swale must be limited to a period of time that ensures vegetative growth, minimizes erosion and maintains stable conditions).

(3) An alternative diversion criteria, approved by the division prior to implementation. The diversion method must be designed to minimize the discharge of pollutants and prevent the potential for pollution or degradation to state waters as a result of the diverted flow through the diversion structure. In addition, the alternative diversion method must minimize the discharge of pollutants throughout the installation, implementation and removal of the diversion."

The permit provides the following definitions:

Diversion – Discharges of state waters that are temporarily routed through channels or structures (e.g. in-stream, uncontaminated springs, non-pumped groundwater, temporary rerouting of surface waters).

State Waters – Any and all surface and subsurface waters which are contained in or flow in or through this state, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.

Good Engineering, Hydrologic and Pollution Control Practices – Methods, procedures, and practices that:

- **a.** Are based on basic scientific fact(s).
- **b.** Reflect best industry practices and standards.
- **c.** Are appropriate for the conditions and pollutant sources.
- **d.** Provide appropriate solutions to meet the associated permit requirements, including practice based effluent limits.

This guidance also provides the following definitions:

Wetted Perimeter – Surface of the channel bottom and sides in direct contact with the diverted water.

Maximum Flow Velocity – Greatest velocity that will not cause the channel boundary to erode.

Maximum Shear Stress – Greatest shear stress that will not cause the channel boundary to erode.

Diversion vs. Dewatering

Sites implementing diversion structures will often require additional dewatering activities to create dry work areas. It is important to understand the difference between the diversion of state waters and construction dewatering, as the latter may require additional CDPS permitting. Construction dewatering is defined as the discharge to state waters of groundwater, surface water, and stormwater that has mixed with groundwater and/or surface water (i.e. commingled stormwater runoff) that has come into contact with construction activities. These types of activities would require a separate CDPS construction dewatering permit. If surface water/springs/seeps are diverted around construction activities and no pollutants are introduced once the diversion is implemented, the dewatering permit would not be required for the diversion. This applies to both pumped diversions and diversions relying on gravity. However, if construction dewatering effluent (e.g., groundwater, surface water, and stormwater that has mixed with groundwater and/or surface water that has come in contact with construction activities) or other pollutants are discharged into the diversion, then this discharge into the diversion requires coverage under a dewatering permit. In addition, if the diversion itself comes in contact with pollutants (e.g., disturbed soils, fuels) then the discharge (re-entry) of the diversion to downstream surface waters requires coverage under a discharge permit.

For example, a site implements a channel diversion structure to re-route a stream around construction activities in the streambed. After implementing the diversion, the site experiences groundwater intrusion in the area of the streambed where construction activities are occurring. The groundwater is collected through pumps and will ultimately be discharged back into the state water. In this case, the discharge of effluent from the area of construction to the diversion requires dewatering permit coverage.

In summary, a diversion can be used as a control measure to minimize pollutants associated with construction stormwater and is considered an allowable non-stormwater discharge authorized by the construction stormwater permit. The collection and discharge of groundwater, surface water, and stormwater that has mixed with groundwater and/or surface water that has come in contact with construction activities into a diversion (or other surface waters) would be considered dewatering activities and requires a separate dewatering permit.

Design Considerations

Several design factors should be evaluated when considering the diversion of state waters. First consider if the project can be completed without the diversion. Although not feasible for all types of projects, alternatives such as directional boring can by implemented for utility projects to avoid having to divert water and potentially reduce environmental impacts.

Methods of Diversion

When a diversion must be implemented the method used to divert water should be selected based on project and site specific factors (volume of base flow, timing of project, environmental impacts, etc.). In general, a diversion must either be piped or lined with a material that allows no erosion as required in Part 1.B.1.a.i(i)(1), or constructed in a way that controls erosion in the channel to meet the requirements of Part 1.B.1.a.i(i)(2) of the permit. Alternative methods of ensuring a stable diversion may be approved by the division as authorized by Part 1.B.1.a.i(i)(3) of the permit, however the two methods referenced above are expected to address almost all diversion needs. The Mile High Flood District (MHFD) Temporary Diversion Method (TDM) Fact Sheet (https://mhfd.org/wp-content/uploads/2019/12/SM-08-Temporary-Diversion-

Methods.pdf) provides design criteria for several types of diversions. The division is not prescriptive in the types of diversions that may be utilized, but does require the diversion to be designed, implemented and removed in accordance with good engineering, hydrologic and pollution control practices.

Common methods of diversions:

- Channel Diversion – Temporary open channel used to divert the entire waterway. Channel diversions shall be designed for stable, laminar flow with the maximum flow velocity and shear stress not to exceed that of the channel lining material.
- Berm or Coffer Dam – Intended to isolate a portion of the stream from the construction area. Utilizing the existing streambed can provide a stabilized channel to divert the water and limit the area of disturbance. The berm or coffer dam itself must also be constructed to be non-erosive given the flow conditions at the site.
- Piped Diversion – Gravity piped diversions to bypass the construction area. Piped diversions rely on following the natural stream alignment or having sufficient grade to maintain drainage via gravity.
- Pumped Diversion – Suitable for projects with limited space. It is critical that the pumped diversion be designed with adequate pump capacity and a backup pump available if mechanical issues occur. The pumped diversion must also outfall in a way that does not cause erosion as flows are returned to the receiving water.

Sizing of Diversion:

The size of diversion will depend on multiple design considerations. The timing and duration of the project will play a significant role in the size of the diversion. The period of November through March is typically a dry period with lower base flows. If available, hydrometeorology data, such as that available from the United States Geological Survey (USGS), should be analyzed to determine an appropriate design flow and diversion size.

Work Area Considerations:

When implementing the diversion avoid areas that are prone to flooding. Design diversion flow paths to limit the areas of disturbance and prevent potential contact with construction activities.

Stormwater Run-On into Diversion

Permittees must limit run-on into the diversion to reduce the potential risk of overwhelming the diversion and flooding the surrounding area. Berms along a diversion channel can prevent localized flows from entering the diversion. In the event stormwater creates run-on to the diversion and that stormwater flows through construction activities (i.e. areas of disturbance), control measures must be implemented in compliance with the construction stormwater permit to treat the construction stormwater prior to it entering the diversion structure. For example, silt fence or straw wattle may be placed along a diversion channel to treat construction stormwater flows discharging from the slopes of the channel. Failure to implement such control measures would be a violation of the permit.

Diversion Emergency Action Plan

With any type of diversion, the potential risks of the diversion capacity being exceeded must be evaluated. It is not uncommon to exceed the planned time and duration for the project or for the site to experience an unexpected hydrologic event. The possibility of larger precipitation events resulting in increased stream flow must be considered when designing and implementing the diversion. The consequences of failure, including damages to the work area and overflow paths that could affect nearby property or structures and carry pollutants off of the construction site must be carefully evaluated.

As a precaution, consider developing an emergency action plan to be implemented in the event the diversion capacity is exceeded. The emergency action plan should designate an onsite individual with the authority to halt work and carry out the plan. The plan should address moving equipment and materials to high ground outside of the active channel, implementing any new control measures that may be needed to minimize pollutants in the discharge, initiating site cleanup and following up with any required permit notification requirements.

Stormwater Management Plan Requirements

In accordance with Part I.C.2.a of the permit, the stormwater management plan (SWMP) must include design specifications that contain information on the implementation of the diversion in use in accordance with good engineering, hydrologic and pollution control practices. These specifications may include: drawings, dimensions, installation information, materials, implementation processes, control measure specific inspection expectations, and maintenance requirements.

The SWMP shall also document the diversion in the site description as an allowable non-stormwater discharge (Part I.C.2.a.vii(f)) and, if applicable, include a description of the alternative diversion criteria as approved by the division (Part I.C.2.a.vii(j)). In addition, the active site map must identify the diversion as currently installed.

Federal Permit Requirements

The division understands that there may be some overlap between the U.S. Army Corps of Engineers (USACE) Section 404 permitting structure and language for diversions and the CDPS COR400000 permit definition of diversions. The division is using the term "diversion" in a different manner than USACE, and does not propose that the inclusion of diversions in the COR400000 permit supersede that of USACE or change permittee actions required under the USACE permit. The division's definition and requirements do not conflict with the USACE definition of a diversion. Each permitting action is separate and must be complied with. The USACE regulates discharges of dredged or fill material into waters of the United States and structures, including structures from construction activities occurring in those waters. The COR400000 permit regulates discharges from construction activity to state waters. Due to this difference there may be times that a project has both a USACE and COR400000 permit or only need one of the permits.