

WATER RESOURCES
TECHNICAL MEMORANDUM

FOR THE

Federal Boulevard Improvements between
West 7th Avenue and West Howard Place
Environmental Assessment

Prepared for

CITY AND COUNTY OF DENVER

COLORADO DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

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October 2014

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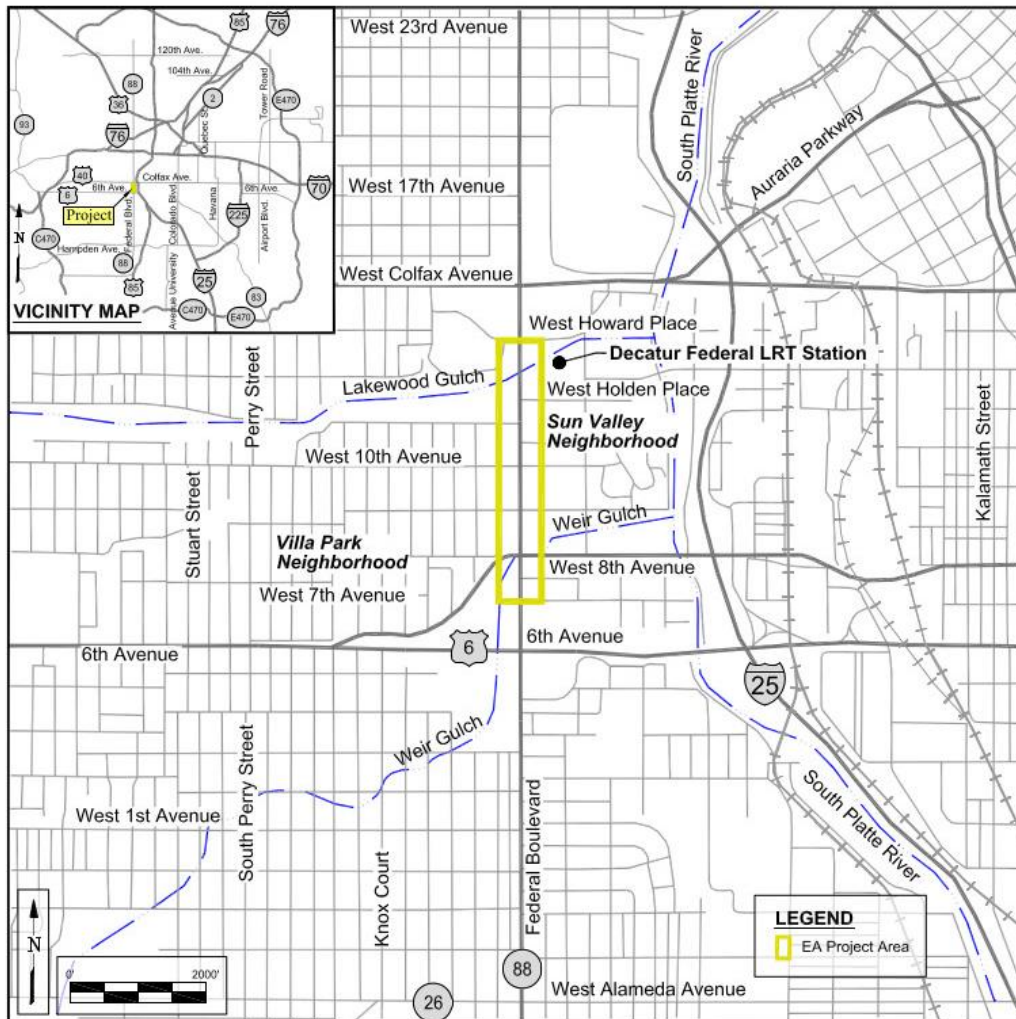
ACRONYMS

ADA	Americans with Disability Act
AASHTO	American Association of State Highway and Transportation
BMP	Best Management Practice
CASMP	Construction Activities Stormwater Management Plan
CCD	City and County of Denver
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System
CDOT	Colorado Department of Transportation
CWA	Clean Water Act
EA	Environmental Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FHU	Felsburg Holt and Ullevig
LRT	Light Rail Transit
MS4	Municipal Separate Storm Sewer Systems
NDPES	National Pollutant Discharge Elimination System
NDRD	New Development/Redevelopment
PEL	Planning and Environmental Linkages
RTD	Regional Transportation District
TMDL	Total Maximum Daily Loads
TSH	Tsiouvaras Simmons Holderness Consulting Engineers
SWMP	Stormwater Management Plan
SPCC	Spill Prevention, Control and Countermeasure Plan
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WQCD	Water Quality Control Division

INTRODUCTION

This Technical Memorandum has been prepared in support of the *Federal Boulevard Improvements Environmental Assessment (EA)*. The general project area extends from West 7th Avenue to West Howard Place along Federal Boulevard (“Project Area”, Figure 1). This Memorandum evaluates the effects of the Federal Boulevard Improvement Project (Proposed Action) and the No-Action Alternative with respect to water resources. The Study Area used in this assessment includes the new impervious surface that would result from implementation of the Proposed Action (“Study Area”).

Figure 1. EA Project Area



Federal and Local Regulations and Policies

This Memorandum has been prepared to evaluate potential impacts to water quality by the Proposed Action and No-Action Alternative in accordance with the following Federal, State, and local regulations and policies:

- The Clean Water Act (CWA) of 1977 as amended by the Water Quality Act of 1987, establishes a framework for protecting and improving the Nation’s water quality. The CWA is administered by the United States (U.S.) Environmental Protection Agency (USEPA). The broad purpose of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” The emphasis of the CWA is to declare unlawful the unregulated discharge of pollutants into all waters of the U.S. The CWA makes States and the USEPA jointly responsible for identifying and regulating both point and non-point sources of pollution. Point sources are controlled by a permit-based system (National Pollutant Discharge Elimination System [NDPES] permits to ensure that in-stream water-quality standards are met), while non-point sources are managed by a technology-based management strategy (treatment processes and best management practices [BMPs]).
- The Colorado Water Quality Control Act (“the Act”, CRS 1973, 25-8-101, as amended) provides regulations specifying classifications and numeric water-quality standards for Colorado by specific river basins. The Act is administered by the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division (WQCD). Water quality is regulated in the South Platte River Basin under Regulation No. 38 (as amended May 2013, effective September 2013) which classifies the River’s uses as Warm-Water Aquatic-Life Class 1, Recreation Class E, Water Supply, and Agriculture (CDPHE, 2014a).
- State regulations (5 CCR 1002-61) pertains to discharges from specific types of industries, including construction sites, and storm-sewer systems for certain municipalities. In Colorado, this program is under the CDPHE WQCD. The Colorado program is referred to as the “Colorado Discharge Permit System (CDPS),” and regulated stormwater discharges from construction activities are permitted under the CDPS “General Permit for Stormwater Discharges Associated with Construction Activities” (the “Stormwater Construction Permit”) (CDPHE, 2007).
- The *City and County of Denver (CCD) Construction Activities Stormwater Manual*, dated June 2010, establishes the standards and requirements used to regulate stormwater-plan preparation, permitting, field implementation, and enforcement of the CCD’s Stormwater Criteria for Construction Activities (CCD, 2010).

PEL STUDY SUMMARY

A Planning and Environmental Linkages (PEL) Study was conducted in October 2009 by Felsburg Holt and Ullevig (FHU, 2009). The study area of the PEL Study was defined as Federal Boulevard between West 5th Avenue and West Howard Place. The study area at that time was documented as a highly urbanized area, comprised primarily of commercial properties with a few residential properties, located within the South Platte River Basin. Inspections of the appropriate U.S. Federal Emergency Management Agency (FEMA) and U.S. Urban Drainage and Flood Control District (UDFCD) maps indicated that the study

area for the PEL Study was not in the 100-year floodplain at that time. In addition, Lakewood Gulch, Weir Gulch, and the segment of the South Platte River in the study area were not on the CDHPE's Section 303(d) list of "Water-Quality-Limited Segments" requiring specification of total maximum daily loads (TMDLs) at the time of the PEL Study. Stormwater from the adjacent impervious areas (roadways, parking lots) discharged directly to Weir Gulch and Lakewood Gulch.

Based upon the Study's project description, location, and observations made within its study area, the PEL Study concluded the following:

- The proposed action identified in the PEL Study included design elements that would improve water quality as stormwater runoff would be captured and retained prior to discharge to Weir Gulch or Lakewood Gulch.
- Several construction stormwater permits and the preparation of a stormwater management plan (SWMP) would be required if the proposed action identified for the PEL Study were to be implemented.
- Under the no-action alternative for the PEL Study, stormwater would continue to discharge directly into Weir Gulch and Lakewood Gulch, both of which ultimately discharge to the South Platte River.

FINAL WATER-QUALITY DESIGN REPORT SUMMARY

The design elements of the proposed action identified for the PEL Study were refined between 2009 and 2011 to provide additional detail as to the anticipated impacts and potential improvements. This effort was undertaken, in part, to provide the level of detail required for funding and grant solicitations that the CCD intended to pursue. As a part of the water-quality design refinement, Pinyon Environmental, Inc. (Pinyon) conducted a site visit in October 2011 to assess the general water quality in the Study Area, which is defined for water-quality resource evaluation in this EA, and to collect pertinent, related information. During the site visit, Pinyon personnel documented general site conditions by walking the entire Study Area and by taking notes and photographs. Pinyon staff also reviewed the relevant FEMA floodplain maps and UDFCD maps, which indicated that the Project would not extend into the 100-year floodplain of the South Platte River.

A report prepared by Tsiouvaras Simmons Holderness Consulting Engineers (TSH) in 2012, *Final Water Quality Design Report Federal Boulevard for Federal Boulevard Reconstruction: 5th Avenue to Howard Place (Final Water Quality Design Report)*, documented the existing conditions for the study area defined in the PEL Study (TSH, 2012). The TSH Report focused on the volume and treatment of stormwater runoff, the existing drainage system, and the anticipated new, impervious surface and the associated runoff as well as how water quality could be addressed if the Proposed Action were to be implemented.

At the time, the TSH Report noted that, should the Proposed Action be implemented, 100 percent of the stormwater runoff from the new impervious surface would need to be

captured and treated to comply with the existing CCD and Colorado Department of Transportation (CDOT) Municipal Separate Storm Sewer Systems (MS4) permit requirements. Based upon the topography, the existing drainage system, and the water volume that would need to be treated, the treatment structure selected for this Project was an extended detention basin located at the northeast corner of West 8th Avenue and Federal Boulevard. The treatment structure was selected because the parcels that would need to be acquired would provide an adequate area for an aboveground water-quality basin. The water-quality basin would contain the full design water-quality capture volume for the Project Area to the south of West 11th Avenue and would meet the requirements of the CCD's and CDOT's Municipal Separate Stormwater Sewer System (MS4) permits at that time. Two storm-sewer lines would drain to this basin, capturing water-quality runoff from the pavement on the east side of Federal Boulevard and a portion of West 8th Avenue. A new outfall structure for this basin would be constructed, releasing directly to Weir Gulch. The facility would be owned and maintained by the CCD.

In the Proposed Action, Federal Boulevard to the north of West 11th Avenue would be restriped for consistency, but no new impervious surface would be added. Stormwater runoff from this portion of the Study Area is discharged to the existing stormwater-quality facility constructed by the Regional Transit District (RTD) for the West Corridor Light Rail Transit (LRT) Line. Planning and design by RTD for this stormwater-quality facility included the necessary volume to handle runoff from this area of Federal Boulevard.

It should be noted that water-quality requirements for this Project have changed, based upon the modification of the CDOT MS4 permit, which would no longer require a permanent water-quality feature as discussed in the section below. The Project would still be required to comply with the CCD's MS4 requirements as noted in the section above. The TSH Report is provided as Appendix A.

WATER-QUALITY REQUIREMENTS MEMORANDUM

The CDPHE issued a memorandum in May 2014 that accepted CDOT's request for new standards and requirements to their existing MS4 permit, as documented in the *CDPS Permit—New Development/Redevelopment (NDRD) Program Modification—Conditional Approval Memorandum* (CDPHE, 2014b). As a result of the negotiated permit terms, the Project team met with CDOT and CCD personnel in June 2014 to discuss the implications of these changes as well as any specific Project requirements with which the Project would need to comply. Based upon the agency coordination, a *Water Quality Requirements Memorandum* was prepared for the Project by TSH, which documented the following conditions as pertains to the modified requirements set forth by CDPHE.

The Project does have an associated EA; however, the two remaining conditions for qualification as a "Priority Development Project" were not met:

- a. The two receiving streams are on the CDHPE's Section 303(d) list of Water-Quality-Limited Segments requiring a TMDL for E. coli; however, they are not listed for the specified constituents of concern (i.e., arsenic, chloride,

chromium, copper, manganese, zinc, and/or sediment). The streams' 303(d) designations were determined by review of CDPHE's Regulation No. 93, Colorado's Section 303(d) List of Impaired Waters, and Monitoring and Evaluation List (TSH, 2014). Transportation projects do not further this impairment as they are not a source of E.coli.

- b. The Project will not result in a 20 percent increase or more of impervious surfaces. The total imperviousness of the Project area will rise from 92.5 percent prior to the Project, and 96.7 percent post-project, which is a 4.2 percent increase and well below the 20-percent threshold in the criteria (Impervious Area Comparison Figure, Appendix B).

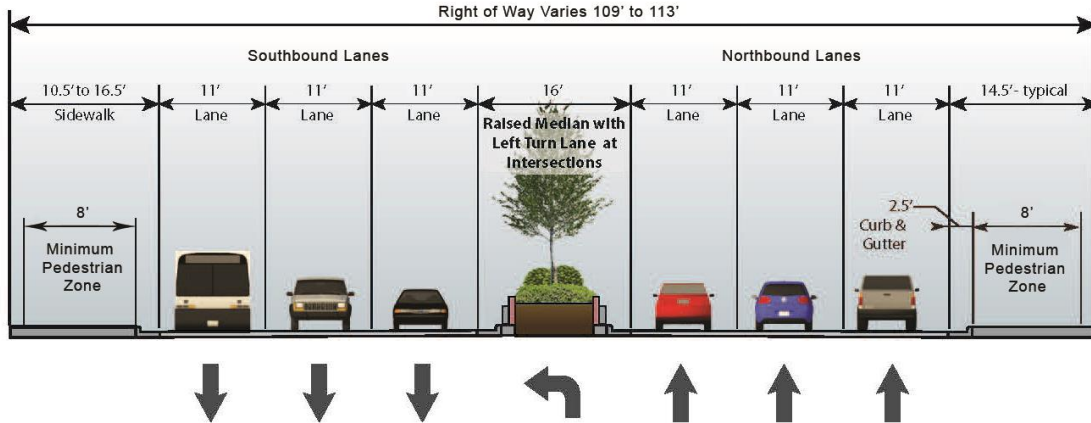
Therefore, the Proposed Action does not meet the requirements of "Priority Development Projects" as defined in the *CDPS Permit—NDRD Program Modification-Conditional Approval Memorandum, Attachment A, a.iii (A) (i) (a) and (b)*. The Proposed Action will therefore be covered under the "Permanent Water-Quality Mitigation Fund," as defined under Attachment A, a.iv., and it would also fall under the CCD's MS4 permit. The *Water Quality Requirements Memorandum* and associated "Impervious Area Comparison Figure" have been provided as Appendix B.

PROPOSED ACTION

The Proposed Action is to add a third northbound lane between West 7th Avenue and West 10th Avenue and a raised median throughout the Project Area to improve mobility and safety (Figure 2). North of West 10th Avenue, the width of the existing three northbound lanes would be brought up to standard (11 feet). The existing southbound lanes would also be brought up to standard width in areas where they are currently substandard.

Note that this Project Area differs from that of the PEL Study as the portion of Federal Boulevard to the south of West 7th Avenue, including the interchange with United States Highway 6 (US 6), is being addressed by the US 6 Bridges Design-Build project. However, the proposed improvements are consistent with the Proposed Action in the PEL Study.

Figure 2. Proposed Action



The widening of Federal Boulevard during the Proposed Action will meet American Association of State Highway and Transportation Officials (AASHTO) and CDOT standards. Access will be limited by controlling left-turns at non-signalized points. In the Proposed Action, the existing signalized crosswalks at the intersections of Federal Boulevard with West 8th Avenue and West 10th Avenue will be upgraded with new traffic and pedestrian signal indications and enhanced concrete crosswalks. Sidewalks on the west and east sides of the street will be brought up to Americans with Disabilities Act (ADA) standards; this will match the existing sections of Federal Boulevard to the north and south.

Access to bus service, which connects to local and regional destinations as well as the greater transit system, including the nearby West Line of RTD’s LRT system, will be improved by upgrading the sidewalk to be consistent and compliant with ADA standards. Additionally, connectivity to the Weir Gulch Trail would be enhanced with better signage for the trail, reducing the curvature of the “T” intersection where the trail and sidewalk connect along West 8th Avenue, signage for the Trail, and a wider sidewalk along West 8th Avenue, all of which support the CCD’s Bicycle Master Plan (CCD, 2001) and Denver Moves (CCD, 2011). These improvements are anticipated to improve mobility, safety, and enhance multi-modal options within the Project Area.

In summary, the Proposed Action consists of the following elements:

- Federal Boulevard roadway alignment and improvements
 - Widening Federal Boulevard from the ROW boundary on the west side of Federal Boulevard toward the east between West 7th Avenue and approximately West 10th Avenue with an additional 11-foot northbound lane
 - Restriping and widening the three northbound lanes on Federal Boulevard between approximately West 10th Avenue to approximately West Howard Place to be 11 feet wide

- Restriping and widening the three southbound lanes on Federal Boulevard between approximately West 7th Avenue and West 10th Avenue to be 11 feet wide
- Bicycle and pedestrian improvements
 - Improving the sidewalks on the east side of Federal Boulevard between West 7th Avenue and West 10th Avenue to meet ADA standards and better accommodate pedestrians
 - Standardizing inconsistent sidewalk widths on both the east and west sides of Federal Boulevard with an 8-foot pedestrian zone consisting of either a detached 5-foot sidewalk with a 3-foot buffer or an attached 8-foot sidewalk with ADA-compliant curb ramps and driveway cuts
 - Enhancing access to the Decatur-Federal LRT station through improved multi-modal connectivity by improving the sidewalks throughout the Project Area
 - Upgrading existing pedestrian signals and constructing enhanced concrete crosswalks at the signalized intersections of Federal Boulevard with West 8th Avenue and West 10th Avenue
 - Enhancing bicycle and pedestrian connectivity to the Weir Gulch Trail with better signage, wider sidewalks, and access ramps
 - Enhancing bicycle connectivity to Routes D-10 and D-12 by adding signage in the Project Area that meets CCD and CDOT standards

NO-ACTION ALTERNATIVE

The No-Action Alternative would leave Federal Boulevard as it currently is configured and would not provide any improvements beyond typical maintenance activities. The roadway would remain the same, with 3 southbound and 2 northbound lanes (each 9.5 to 11 feet in width) and a continuous two-way, center, left-turn median between West 7th Avenue and West 10th Avenue (Figure 3). The segment of Federal Boulevard from West 10th Avenue to West Howard Place has three southbound and three northbound lanes, and a continuous two-way left-turn median over Lakewood Gulch (Figure 4). The existing sidewalks along the both sides of Federal Boulevard in the Project Area are either narrow or not well-defined, and the curb ramps at intersections do not meet current ADA or CDOT standards. As part of State Highway 88, normal maintenance of Federal Boulevard would continue to be performed by CDOT. This includes the current direct discharge of stormwater to the nearby gulches.

Figure 3. No-Action Alternative between West 7th Avenue and West 10th Avenue

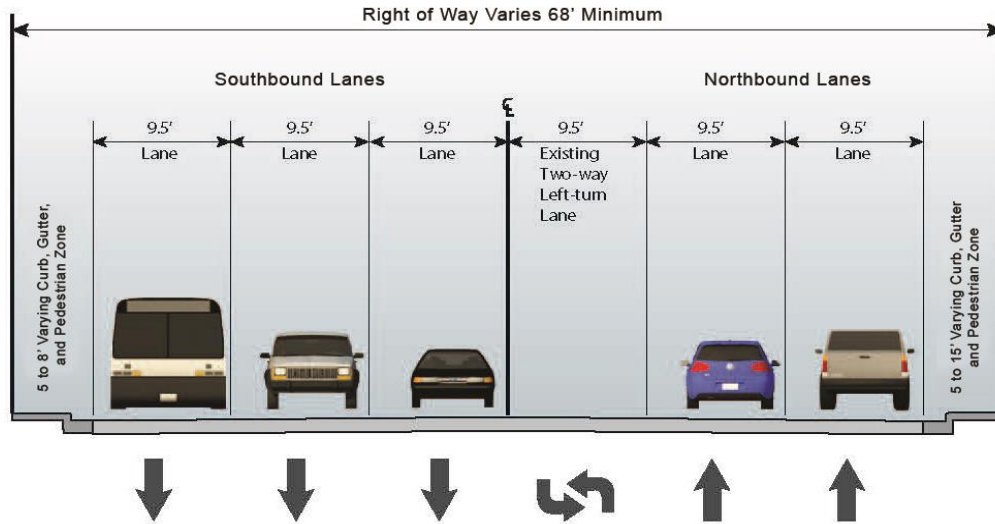
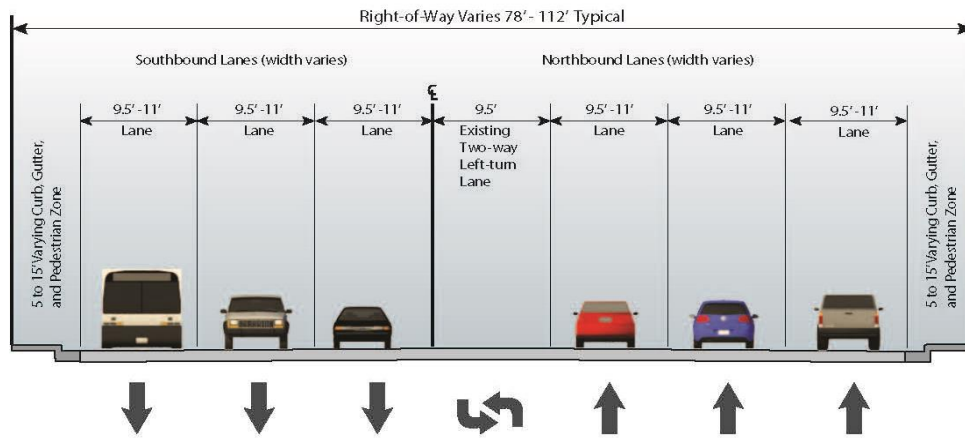


Figure 4. No-Action Alternative between West 10th Avenue and West Howard Place



METHODOLOGY

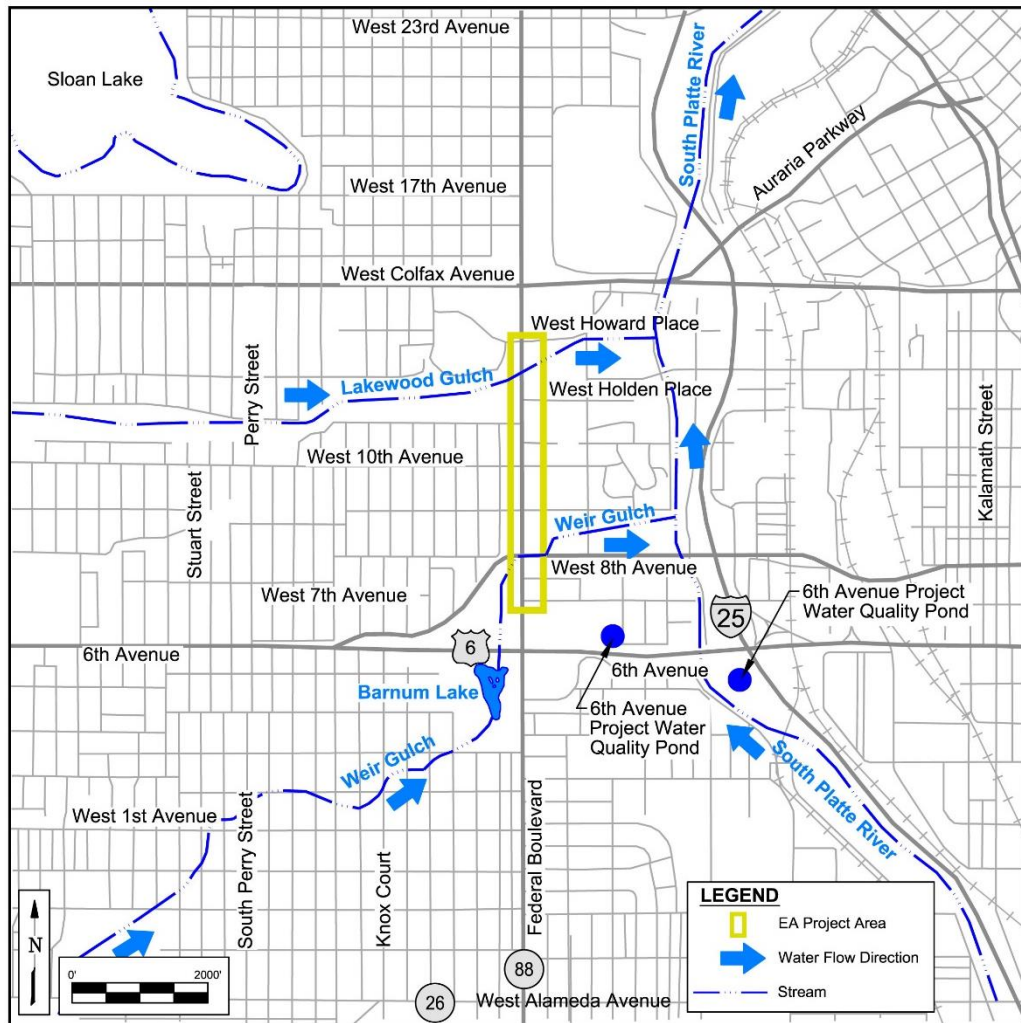
The water resources in this evaluation of the Proposed Action’s impacts on water quality have not changed nor has the design of the Proposed Action or the associated water-quality features since the earlier studies described above; therefore, portions of the PEL Study’s evaluation and the *Final Water Quality Design Report* are still valid resources for this Technical Memorandum (FHU, 2009 and TSH, 2012, respectively).

However, since the PEL Study, a new water-quality pond was installed for West Line of RTD’s LRT system that accepts runoff from the section of Federal Boulevard to the north of West 11th Avenue, and water-quality basins were installed to the east, for the US 6 and Interstate-25 (I-25) transportation improvements projects (Figure 5); information for these local features were included as part of this updated evaluation. In addition, given the lapse in time since the PEL Study, Pinyon completed a review of any updated, relevant

materials (e.g., FEMA floodplain and UDFCD maps, CDHPE’s Section 303[d] List) and continued ongoing coordination with TSH, the team which designed the Project’s water-quality BMP and which is still involved in the Federal Boulevard Improvements Project.

Finally, included in this evaluation are the results of agency-coordination efforts regarding the 2014 modification to CDOT’s MS4 permitting requirements and the subsequent *Water Quality Requirements Memorandum* (TSH, 2014).

Figure 5. Existing Water Resources



EXISTING CONDITIONS

The Federal Boulevard Improvements Project extends from West 7th Avenue in the south to approximately West Howard Place in the north and is located within the South Platte River Basin. The Project crosses Weir Gulch and Lakewood Gulch, both of which flow approximately four-tenths of a mile northeast, into the South Platte River. These features are listed for E. coli on CDPHE’s 303(d) List of Impaired Waters (TSH, 2014). Weir Gulch flows through Barnum Lake, located at the southwest corner of Federal Boulevard and 6th

Avenue, and under Federal Boulevard at approximately 8th Avenue. This water feature was listed as “Impaired” for Warm-Water Aquatic-Life Class 2 (Fish, Shellfish, and Wildlife Protection and Propagation) and “Good” for Agriculture; the cause of the impairment was due to concentrations of selenium. However, TMDLs have not been reported for Weir Gulch (USEPA, 2010a). The Lakewood Gulch flows under Federal Boulevard between Holden Place and Howard Place (Figure 5). This water feature was also listed as “Impaired” for Warm-Water Aquatic-Life Class 2 (Fish, Shellfish, and Wildlife Protection and Propagation) as well as “Impaired” for Recreation; however, it was rated “Good” for Agriculture. The cause of the impairment was due to concentrations of selenium and E. coli (transportation projects do not further this impairment as they are not a source of E.coli.). However, TMDLs have not been reported for Lakewood Gulch (USEPA, 2010b).

Both Weir Gulch and Lakewood Gulch are classified features with associated 100-year floodplain areas which extend into the Study Area (FEMA, 2013). In addition, the portion of Lakewood Gulch that extends through the Study Area is designated as an “unofficial” 100-year floodplain on the UDFCD maps; Weir Gulch is an “unofficial” 100-year floodplain in areas adjoining the Study Area (UDFCD, 2014). It should be noted that the FEMA and UDFCD maps were updated in 2013 and 2012, respectively.

North of West 11th Avenue stormwater runoff from Federal Boulevard flows to the RTD water quality treatment facility. South of West 11th Avenue on Federal Boulevard stormwater currently drains from crowned roads into curb and gutter stormwater inlets along both sides of Federal Boulevard and the intersecting streets. Stormwater inlets discharge to the CCD storm sewer system via underground piping. The CCD storm sewer system discharges directly to either Lakewood Gulch or Weir Gulch. Roadway runoff typically contains the following pollutants:

- **Sediment:** Solids such as sand, silt, and clays that are washed from paved surfaces or eroded from roadway slopes and become suspended in water. Sediment due to construction is a common water-quality concern.
- **Heavy Metals:** Metals such as zinc and copper from fuels, brake pads, and vehicle wear. In the past, lead was a common pollutant, but the use of unleaded gasoline has now substantially reduced this roadway contaminant.
- **Magnesium chloride and Salt:** Deicers used on roads for winter maintenance contribute these compounds to runoff.
- **Oil and Grease:** Petroleum hydrocarbons are deposited by vehicles on roadways and parking lots.

IMPACT ASSESSMENT

The Proposed Action has the potential to impact water quality within the Study Area, as summarized in Table 1 below. Implementation of the Proposed Action would *improve* water quality, as it includes two potential water-quality improvements: 1) the construction of a water-quality basin at Weir Gulch (as described herein this Technical

Memorandum) or 2) the Project’s inclusion in the Regional Water Quality Exchange Program in lieu of constructing a water-quality basin at Weir Gulch. Through either improvement, control measures would be implemented to capture and treat stormwater runoff from the entire east side of Federal Boulevard, not just the new, impervious roadway surface as required by the CDOT MS4 permit program.

The No-Action Alternative would simply maintain the current, direct discharge of runoff from Federal Boulevard to the south of West 11th Avenue to Weir Gulch and Lakewood Gulch. Either Proposed Action improvement would ensure that the runoff from the portion of Federal Boulevard to the north of West 11th Avenue would continue to be captured and treated at the RTD’s facility.

Table 1. Water-Quality Impacts

Resource	Proposed Action	No-Action Alternative
<p>The Project crosses Weir Gulch and Lakewood Gulch, both of which join the South Platte River approximately four-tenths of a mile to the northeast. These features are listed for <i>E. coli</i> on the Colorado Department of Public Health and Environment’s (CDPHE’s) 303(d) list of impaired waters. Transportation projects do not further this impairment as they are not a source of <i>E.coli</i>.</p> <p>North of West 11th Avenue, stormwater runoff from Federal Boulevard flows to the RTD water quality treatment facility. South of West 11th Avenue, stormwater currently drains from crowned roads into curb and gutter stormwater inlets along both sides of Federal Boulevard and the intersecting streets and outlets to the gulches.</p>	<p><u>Permanent Impacts:</u></p> <p>Implementation of the Proposed Action would result in an increase of impervious surface by 4.2 percent resulting in higher amounts of runoff.</p> <p><u>Temporary Impacts:</u></p> <p>Temporary impacts to water quality could occur during construction due to ground disturbance, potential for spills or accidental release of pollutants, and runoff from the construction area.</p>	<p><u>Permanent Impacts:</u></p> <p>No change in impervious surface; however, there would be continued discharge of runoff directly to gulches if the No-Action Alternative is implemented.</p> <p><u>Temporary Impacts:</u></p> <p>No temporary impacts to water quality would occur if the No- Action Alternative is implemented.</p>

MITIGATION MEASURES

Temporary and permanent impacts to water quality could occur as a result of the Proposed Action. The recommended mitigation measures that will be implemented for the Proposed Action are summarized in Table 2 below.

Table 2. Water-Quality Mitigation Measures

Water Resources for the Federal Boulevard Improvements EA

Mitigation	Proposed Action
Temporary Construction Impacts – Stormwater Runoff	A Stormwater Management Plan (SWMP) will be developed and implemented to address temporary construction impacts as a result of the Proposed Action. A Transportation Erosion-Control Supervisor will inspect the construction site every seven days, and after any precipitation or snowmelt event with the potential to cause surface erosion, during active construction, and as necessitated by permit requirements. The Supervisor will document evidence of, or the potential for, pollutants entering the local drainage system. Any Best Management Practices (BMPs) not operating in accordance with the SWMP will be addressed immediately in order to minimize the discharge of pollutants.
Temporary Construction Impacts – Spills	A spill prevention, control, and countermeasure plan will be developed and implemented for the construction site that will establish standard operating procedures and required employee training to minimize the accidental release of pollutants which could contaminate stormwater runoff.
Run-off during Construction	Temporary stormwater-management controls will be implemented to keep pollutants from entering stormwater during concurrent construction activity and precipitation events. Control measures will reduce or eliminate water-quality impacts during the construction of the Proposed Action.
Increased Impervious Surface	<p>Either a permanent water-quality basin will be constructed to treat runoff from the Project, or the Project will be included in the Regional Water Quality Exchange Program. If the former is chosen, the extended detention basin will be constructed at the northeast corner of the intersection of West 8th Avenue and Federal Boulevard. It will collect runoff from the portion of the Project to the south of West 11th Avenue via the proposed storm-sewer system, ultimately discharging to Weir Gulch. The facility will contain the required water-quality capture volume and will meet the requirements of the CCD's Multiple Separate Sewer System (MS4) permit. If the variance is selected as the preferred strategy, then sufficient water-quality capture will occur and be treated at a regional facility</p> <p>There is an existing stormwater-quality facility under the jurisdiction of RTD constructed during the Decatur-Federal Street LRT Station project that currently captures and retains runoff from the portion of Federal Boulevard to the north of West 11th Avenue; it is sized to accommodate flows from that section of Federal Boulevard. That stormwater-quality facility discharges to Lakewood Gulch.</p>

REQUIRED PERMITS

The following permits and/or actions could be required as part of the Proposed Action:

- A water-quality report will be submitted by CCD to CDOT Water Quality personnel documenting compliance with their requirements the MS4 permit.

- A Colorado Discharge Permit System Permit, which includes the preparation of a SWMP, will be required to protect State waters and ensure the quality of stormwater runoff on any construction activity that disturbs at least 1 acre of land. CDOT or the contractor would obtain this Permit from CDPHE's Water Quality Control Division.
- A Construction Dewatering Operations Permit, if groundwater were to be discharged from an excavation to any waters of the State will be obtained by CDOT or the contractor.
- A Sewer Use and Discharge Permit will be obtained by the contractor from CCD.

STAKEHOLDER COORDINATION

The CCD has continued to provide opportunities for public involvement between the PEL Study in 2009 and initiation of this EA. A public meeting was held in August 14, 2014 prior to the completion of this EA to solicit further comment on and discussion of the Project. A Spanish-speaking translator was present at the open house, and materials were presented in both English and Spanish; Korean translation was available upon request. Stakeholder coordination will continue to take place throughout the Project's development and construction.

REFERENCES

- CCD, 2001. "Bicycle Master Plan Update 2001," City and County of Denver (CCD), adopted March 2002. Website accessed March 2014: <http://www.denvergov.org/bikeprogram/bicyclingindenver/streetsandtrails/planning/tabid/438250/default.aspx>.
- CCD, 2010. "CCD Construction Activities Stormwater Manual," prepared by CCD, dated June 2010.
- CCD, 2011. "Denver Moves: Making Bicycle and Multi-Use Connections in the Mile High City," prepared by CCD, adopted May 2011. Website accessed March 2014: <http://www.denvergov.org/bikeprogram/bicyclingindenver/streetsandtrails/planning/tabid/438250/default.aspx>.
- CDPHE, 2007. "Stormwater Fact Sheet – Construction," prepared by the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) Stormwater Program, July 2007.
- CDPHE, 2014a. "South Platte River Basin; Laramie River Basin; Republican River Basin; Smoky Hill River Basin (Regulation #38)," CDPHE. Website accessed March 2014: <http://www.colorado.gov/cs/Satellite?c=Page&childpagename=CDPHE-WQCC%2FCBONLayout&cid=1251590852409&pagename=CBONWrapper>.
- CDPHE, 2014b. "CDPS Permit –NDRD Program Modification-Conditional Approval Memorandum," prepared by CDPHE, May 2014.

- FEMA, 2013. "Flood Insurance Rate Map (FIRM), City and County of Denver, Colorado, Map Number 0800460182H," Federal Emergency Management Agency (FEMA), revised November 20, 2013.
- FHU, 2009b. "Federal Boulevard (5th Avenue to Howard Place) Planning Environmental Linkage Study," Felsburg Holt and Ullevig (FHU), October 2009.
- Pinyon, 2012. "City and County of Denver Construction Activities Stormwater Management Plan: Federal Boulevard Reconstruction (5th Avenue to Howard Place)," prepared by Pinyon Environmental, Inc. (Pinyon), 2012.
- TSH, 2012. "Final Water Quality Design Report, Federal Boulevard Reconstruction: 5th Avenue to Howard Place," prepared for CCD by Tsiovuvaras Simmons Holderness Consulting Engineers (TSH), December 2012.
- UDFCD, 2014. "Electronic Data Mapping, Unofficial 100-year Floodplains", Urban Drainage and Flood District Control (UDFCD), data updated November 2013. Website accessed June 2014: <http://www.udfcd.org/>.
- USEPA, 2010. "2010 Waterbody Report for Weir Gulch," United States Environmental Protection Agency (USEPA). Website accessed July 2014: http://ofmpub.epa.gov/tmdl/attains_waterbody.control?p_list_id=&p_au_id=COSPUS16c_0501&p_cycle=2010&p_state=CO.
- USEPA, 2010. "2010 Waterbody Report for Harvard, Harvard West, and Lakewood Gulch," USEPA. Website accessed July 2014: [http://ofmpub.epa.gov/tmdl/attains_waterbody.control?p_au_id=COSPUS16C_0502&p_cycle=2010&p_state=CO&p_report_type=.](http://ofmpub.epa.gov/tmdl/attains_waterbody.control?p_au_id=COSPUS16C_0502&p_cycle=2010&p_state=CO&p_report_type=)

Appendix A - Final Water Quality Design Report

FINAL WATER QUALITY DESIGN REPORT

FOR

Federal Boulevard Reconstruction 5th Avenue to Howard Place

December 18, 2012

Prepared for:

**Colorado Department of Transportation/
City and County of Denver**

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TSH Project No. 1102188

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III. Maintenance and Operations..... 6
IV. References 8
APPENDIX A – Supporting Documentation

I. INTRODUCTION

This report presents the basis of design for water quality improvements for the reconstruction of Federal Boulevard from 5th Avenue to Holden Avenue. This report is a companion to the final hydraulics report by Tsiouvaras Simmons Holderness (December 2012), “Final Hydraulic Design Report for City and County of Denver Federal Boulevard Reconstruction 5th to Howard Place” for technical aspects of the design. This report demonstrates compliance of the Federal Boulevard Reconstruction project with the requirements of CDOT’s MS4 permit issued by the Colorado Department of Health and Environment (CDPHE).

A. LOCATION

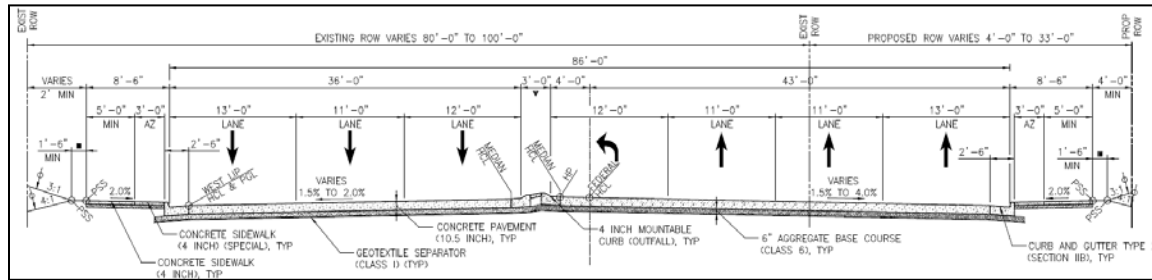
The project is located within the right-of-way of Federal Boulevard between approximately 7th Avenue to the approach to the bridge over Lakewood Gulch at approximately Holden Avenue (see next page).

Figure 1: Site Location Map

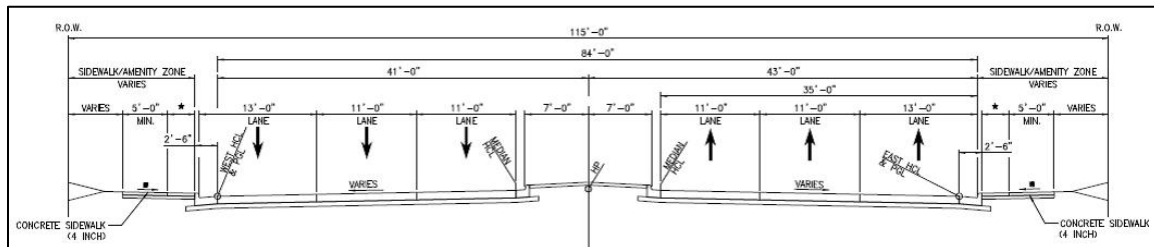


B. DESCRIPTION OF PROPERTY

The project consists of widening improvements to Federal Boulevard, improvements to intersection turn lanes, placement of a raised median in Federal and improvements to the sidewalks (see typical section below and summary of site information in Table 1). The surrounding area is fully developed as commercial and residential. The outfall for the north portion of the project is Lakewood Gulch (CCD Basins 4801-01 and 4800-01) and for the southern portion the outfall is Weir Gulch (CCD Basin 4900-01).



FEDERAL BOULEVARD TYPICAL SECTION WITH TURN LANE



FEDERAL BOULEVARD TYPICAL SECTION

Table 1: Corridor Information	
Bridge	None within project limits
Street/Highway	Federal Blvd, SH 88
Major Drainageways within Project Limits	Weir Gulch, Lakewood Gulch just north of project.
Location	Between 7 th and Holden
Nearest City	Within Denver City Limits
MS4 Boundary	CDOT face of curb to face of curb; CCD remaining ROW
Existing Structures	Inlets, storm sewer, cross culvert

II. CDOT MS4/NDRD Requirements

Technical and design details regarding the design of permanent water quality facilities are described in this report. The project drainage and water quality design were based on CDOT, the City and County of Denver and Urban Drainage and Flood Control District (UDFCD) Criteria.

There are numerous options for treatment of runoff that originates on city streets. These include infiltration basins, infiltration trenches, vegetated filter strips, grassed swales, porous pavement, sand filter basins, water quality inlets, underground water quality vaults and extended detention basins. The permanent water quality BMP's selected for the Federal Boulevard design contain the water quality capture volume from the reconstructed area of the project that is south of 11th Avenue. The existing Federal Boulevard is the original roadway footprint and only additional impervious areas outside of this footprint are required to be treated per the latest interpretation by CDOT, see Appendix A Supporting Documentation. The treatment structure selected for this project was an extended detention basin that was located at the northeast corner of 8th Avenue and Federal Boulevard. The treatment structure was selected because the parcels that were obtained for the project provided an adequate area for an above ground water quality pond. The water quality pond contains the full design water quality capture volume and meets the requirements of CDOT's MS4 permit.

For the area of the project that is north of 11th Avenue, water quality treatment flows are discharged, the existing storm water quality facility constructed by RTD for the West Corridor portion of Federal Boulevard project north is used. Planning by RTD for this storm water quality facility included the necessary volume to handle runoff from this area of Federal Boulevard.

There are no existing water quality features that were abandoned, reconfigured or incorporated into this project. Integration of the Federal Boulevard drainage system with the RTD storm water quality facility was evaluated and found to meet CDOT requirements.

The goal for this project was to treat 100% of the water quality capture volume from the additional area of pavement resulting from the widening of Federal Boulevard. The project drainage system north of 11th Avenue captured all runoff within the right-of-way limit and transported it to the RTD water quality facility that provided water quality capture volume for this project.

South of the highpoint in Federal there are two drainage systems, a west and east system. The east system was designed to capture all of the water quality runoff originating from the east side of Federal and transport it to the water quality facility. This system also captured a portion of the west side of Federal north of 10th Avenue due to utility conflicts. The water quality facility was design to provide adequate water quality capture volume in the pond. There are small portions of reconstructed City streets that drain away from Federal

Boulevard. The lower portion of these streets were not captured and treated by the Federal Boulevard storm water quality facilities. These areas are under jurisdiction of the City and County of Denver’s MS4 permit.

The majority of the area on the west side of Federal was captured in a storm sewer system and bypassed the water quality facility, discharging directly to Weir Gulch. This area of the project is the original roadway footprint and was not included in the water quality capture volume calculations.

Table 2: Water Quality Facility Summary

ID	Type of Permanent BMP	Required Impervious Area to be treated (AC)	Actual Impervious Area Treated (AC)	Area Not Treated: Impervious Area Not Provided (AC)	Area Treated in Addition to Required (AC)	Comments
WQ-1	Extended Detention Basin	2.28	4.31	0	2.03	Extended Detention Basin to be placed on property acquired for the project and outfall to Weir Gulch.
WQ-2	Extended Detention Basin/Underground Vault	0.33	1.25	0	0.92	The RTD facility is designed to treat an area that included the tributary area on Federal.
WQ-3	Extended Detention Basin	0.04	0.04	0	0	Directly Tributary to Extended Detention Basin
WQ-4	Not Applicable	0	0	0	0	CCD Area Downstream of Storm Sewer System
EX-1	Not Applicable	0	0	0	0	Existing Impervious Area

Impervious areas that were added to the original footprint for Federal Boulevard within the project limits were treated by a water quality facility. CDOT’s permit requires a moderate to high level of removal of suspended solids and metals; and, a low to moderate level of removal for nutrients. Pollutant removal rates were expected to be approximately 80% for the extended detention basins and it was designed with a 40 hour drain time to meet this requirement. RTD has verified that their pond has enough capacity to treat the water that the Federal Boulevard Reconstruction project is sending to it.

The pond at the northeast corner of 8th Avenue and Federal Boulevard is designed in compliance with CDOT and CCD criteria. Table 3 provides a summary of the operational information for the pond.

Federal and 8 th Pond - Operational Information	
Drainage Area	5.09 Acres
Imperviousness	85.4%
WQCV	0.22 Ac-ft
Design Treatment Volume	0.23 Ac-ft
EURV Drain Time	40 Hrs
Design Water Quality Stage	5235.0 ft
100-Year Inflow	29.2 cfs

III. MAINTENANCE AND OPERATIONS

The extended detention basin water quality pond was designed to have a forebay, micro-pool and water quality outlet structure. The outlet structure for this pond releases directly to Weir Gulch. Two storm sewer lines drain to this pond capturing water quality runoff from the pavement on the east side of Federal Boulevard and a portion of 8th Avenue. These storm sewer lines enter the forebay of the water quality pond.

Maintenance and operation of the pond will consist of the following activities:

- Lawn mowing and lawn care: Mowing the native grass in the water quality basin and surrounding area.
- Debris and litter removal: removing vegetation/debris and litter that may clog the outlet structure
- Nuisance control: address odor, insects and overgrowth issues associated with standing water in the bottom zones.
- Clear orifice holes so that water can continue to flow.
- Sediment removal from forebay and micro-pool: Remove sediment from the basin when levels reach the lowest hole or the forebay outlet pipe is blocked. This can be done with hand shovels, bobcats or skid steers. Remove the material off-site to prevent re-polluting the pond.
- Erosion and sediment control: Repair and re-vegetate eroded areas.
- Sediment removal: Removal of sediment from bottom of pond when sediment occupies 20% of the water quality capture volume.
- Structural: Repair of pond inlets, outlets, low flow channel linings, energy dissipation structures whenever damage is noted.

- Inspection: Inspection of basins from time to time to insure that they continue to function as initially intended. Inspections shall include examination of the outlet for clogging, erosion, slumping, excessive sedimentation levels, overgrowth, embankment and spillway integrity and damage to any structural element.

The facility is owned and maintained by CCD. The storm sewer line from the outlet to Weir Gulch is owned by the City and County of Denver.

IV. REFERENCES

1. Drainage Design Manual, Colorado Dept. of Transportation, 2004.
2. Urban Drainage and Flood Control District. Drainage Criteria Manual Vols I and II. Revised August 2008.
3. Urban Drainage and Flood Control District. Drainage Criteria Manual, Volume III. November 2010.
4. Region 6 Permanent Water Quality Documentation, April 19, 2011.
5. City and County of Denver, Storm Drainage Design and Technical Criteria, Revised January 2006.
6. CDOT MS4 Permit New Development and Redevelopment Program, Colorado Department of Transportation, February 2004.

APPENDIX A - SUPPORTING DOCUMENTATION

Design Procedure Form: Extended Detention Basin (EDB)

Sheet 1 of 4

Designer: BJC
Company: Tsiouvaras Simmons Holderness
Date: September 18, 2012
Project: 1102188D - Federal - 5th to Howard
Location: Weir Gulch WQ Pond (8th and Federal)

1. Basin Storage Volume

- A) Effective Imperviousness of Tributary Area, I_a
- B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)
- C) Contributing Watershed Area
- D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm
- E) Design Concept
(Select EURV when also designing for flood control)
- F) Design Volume (1.2 WQCV) Based on 40-hour Drain Time
($V_{DESIGN} = (1.0 * (0.91 * i^2 - 1.19 * i + 0.78 * i) / 12 * Area * 1.2)$)
- G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume
($V_{WQCV\ OTHER} = (d_6 * (V_{DESIGN} / 0.43))$)
- H) User Input of Water Quality Capture Volume (WQCV) Design Volume
(Only if a different WQCV Design Volume is desired)
- I) Predominant Watershed NRCS Soil Group
- J) Excess Urban Runoff Volume (EURV) Design Volume
For HSG A: $EURVA = (0.1878i - 0.0104) * Area$
For HSG B: $EURVB = (0.1178i - 0.0042) * Area$
For HSG C/D: $EURV_{C/D} = (0.1043i - 0.0031) * Area$

$I_a =$ 100.0 %

$i =$ 1.000

Area = 4.310 ac

$d_6 =$ 0.43 in

Choose One

- Water Quality Capture Volume (WQCV)
- Excess Urban Runoff Volume (EURV)

$V_{DESIGN} =$ 0.216 ac-ft

$V_{DESIGN\ OTHER} =$ 0.216 ac-ft

$V_{DESIGN\ USER} =$ _____ ac-ft

Choose One

- A
- B
- C / D

EURV = ac-ft

2. Basin Shape: Length to Width Ratio

(A basin length to width ratio of at least 2:1 will improve TSS reduction.)

L : W = 3.0 : 1

3. Basin Side Slopes

- A) Basin Maximum Side Slopes
(Horizontal distance per unit vertical, 4:1 or flatter preferred)

Z = 4.00 ft / ft

4. Inlet

- A) Describe means of providing energy dissipation at concentrated inflow locations:

Design Procedure Form: Extended Detention Basin (EDB)

Designer: BJC
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Location: Wier Gulch WQ Pond (8th and Federal)

5. Forebay

A) Minimum Forebay Volume
 ($V_{FMIN} =$ 2% of the WQCV)

$V_{FMIN} =$ 0.004 ac-ft

B) Actual Forebay Volume

$V_F =$ 0.017 ac-ft

C) Forebay Depth
 ($D_F =$ 18 inch maximum)

$D_F =$ 18.0 in

D) Forebay Discharge

i) Undetained 100-year Peak Discharge

$Q_{100} =$ 29.21 cfs

ii) Forebay Discharge Design Flow
 ($Q_F = 0.02 * Q_{100}$)

$Q_F =$ 0.58 cfs

E) Forebay Discharge Design

Choose One

- Berm With Pipe
- Wall with Rect. Notch
- Wall with V-Notch Weir

(flow too small for berm w/ pipe)

DESIGN WEIR TO PASS D_f AT Q_f

F) Discharge Pipe Size (minimum 8-inches)

Calculated $D_p =$ in

G) Rectangular Notch Width

Calculated $W_N =$ in

6. Trickle Channel

A) Type of Trickle Channel

Choose One

- Concrete
- Soft Bottom

F) Slope of Trickle Channel

$S =$ 0.0100 ft / ft

7. Micropool and Outlet Structure

A) Depth of Micropool (2.5-feet minimum)

$D_M =$ 2.5 ft

B) Surface Area of Micropool (10 ft² minimum)

$A_M =$ 46 sq ft

C) Outlet Type

Choose One

- Orifice Plate
- Other (Describe):

D) Depth of Design Volume (EURV or 1.2 WQCV) Based on the Design Concept Chosen Under 1.E.

$H =$ 2.40 feet

E) Volume to Drain Over Prescribed Time

WQCV = 0.180 ac-ft

F) Drain Time
 (Min T_D for WQCV= 40 hours; Max T_D for EURV= 72 hours)

$T_D =$ 40 hours

G) Recommended Maximum Outlet Area per Row, (A_o)

$A_o =$ 0.41 square inches

H) Orifice Dimensions:

- i) Circular Orifice Diameter or
- ii) Width of 2" High Rectangular Orifice

$D_{orifice} =$ 11 / 16 inches
 $W_{orifice} =$ inches

I) Number of Columns

$n_c =$ 1 number

J) Actual Design Outlet Area per Row (A_o)

$A_o =$ 0.37 square inches

K) Number of Rows (nr)

$n_r =$ 7 number

L) Total Outlet Area (A_{ot})

$A_{ot} =$ 2.7 square inches

M) Depth of WQCV (H_{wocv})
 (Estimate using actual stage-area-volume relationship and V_{wocv})

$H_{wocv} =$ feet

N) Ensure Minimum 40 Hour Drain Time for WQCV

$T_{D wocv} =$ hours

Design Procedure Form: Extended Detention Basin (EDB)

Designer: BJC
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Date: September 18, 2012
Project: 1102188D - Federal - 5th to Howard
Location: Wier Gulch WQ Pond (8th and Federal)

<p>8. Initial Surcharge Volume</p> <p>A) Depth of Initial Surcharge Volume (Minimum recommended depth is 4 inches)</p> <p>B) Minimum Initial Surcharge Volume (Minimum volume of 0.3% of the WQCV)</p> <p>C) Initial Surcharge Provided Above Micropool</p>	<p>$D_{IS} =$ <u>4.0</u> in</p> <p>$V_{IS} =$ <u> </u> cu ft</p> <p>$V_s =$ <u>15.3</u> cu ft</p>
---	---

<p>9. Trash Rack</p> <p>A) Type of Water Quality Orifice Used</p> <p>B) Water Quality Screen Open Area: $A_t = 38.5 * (e^{-0.095D}) * A_{ot}$</p> <p>C) For 2", or Smaller, Circular Opening (See Fact Sheet T-12):</p> <p> i) Width of Water Quality Screen and Concrete Opening ($W_{opening}$)</p> <p> ii) Height of Water Quality Screen (H_{TR})</p> <p> iii) Type of Screen, Describe if "Other"</p>	<p>Choose One</p> <p><input checked="" type="radio"/> Circular (up to 2" diameter)</p> <p><input type="radio"/> Rectangular (2" high)</p> <p>$A_t =$ <u>96</u> square inches</p> <p>$W_{opening} =$ <u>12.0</u> inches</p> <p>$H_{TR} =$ <u>56.8</u> inches</p> <p>Choose One</p> <p><input checked="" type="radio"/> S.S. Well Screen with 60% Open Area*</p> <p><input type="radio"/> Other (Describe):</p> <hr/> <hr/>
---	--

<p>D) For 2" High Rectangular Opening:</p> <p> i) Width of Rectangular Opening ($W_{orifice}$)</p> <p> ii) Width of Water Quality Screen Opening ($W_{opening}$)</p> <p> iii) Height of Water Quality Screen (H_{TR})</p> <p> iv) Type of Screen, Describe if "Other"</p> <p>v) Cross-bar Spacing</p> <p>vi) Minimum Bearing Bar Size</p>	<p>$W =$ <u> </u> inches</p> <p>$W_{opening} =$ <u> </u> ft</p> <p>$H_{TR} =$ <u> </u> ft</p> <p>Choose One</p> <p><input type="radio"/> Aluminum Amico-Klemp SR Series (or equal)</p> <p><input type="radio"/> Other (Describe):</p> <hr/> <hr/> <p><u> </u> inches</p> <hr/>
--	---

Design Procedure Form: Extended Detention Basin (EDB)

Sheet 4 of 4

Designer: BJC
Company: Tsiouvaras Simmons Holderness
Date: September 18, 2012
Project: 1102188D - Federal - 5th to Howard
Location: Wier Gulch WQ Pond (8th and Federal)

<p>10. Overflow Embankment</p> <p>A) Describe embankment protection for 100-year and greater overtopping:</p> <p>B) Slope of Overflow Embankment (Horizontal distance per unit vertical, 4:1 or flatter preferred)</p>	<p>_____</p> <p>_____</p> <p>_____</p> <p><math>Z_E = \underline{0.02} \text{ ft / ft } \text{ TOO STEEP (< 3)}</math></p>
<p>11. Vegetation</p>	<p>Choose One</p> <p><input type="radio"/> Irrigated</p> <p><input type="radio"/> Not Irrigated</p>
<p>12. Access</p> <p>A) Describe Sediment Removal Procedures</p>	<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>Notes: _____</p> <p>_____</p> <p>_____</p> <p>_____</p>	

Computational Method

Description: Weir Gulch Pond - Emergency Spillway

Calc by: Brendan Carroll

Last Revised: 10/2/2012 15:31

Data:

Length	20.0 ft
Flanking Length	0.0 ft
Fraction Clear	80.0%
Design Discharge	29.2 cfs
Weir Coefficient	2.6

Results:

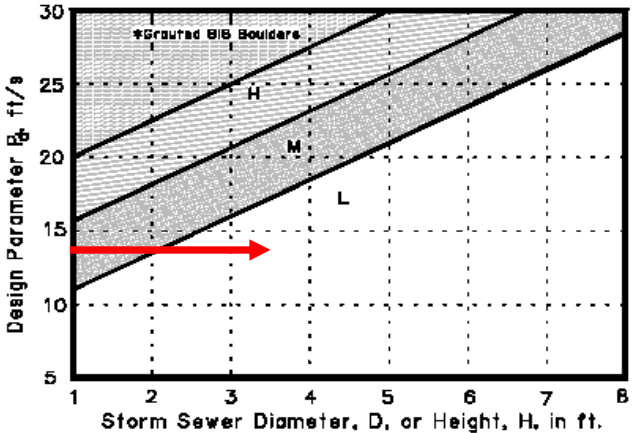
Weir Length	20.0 ft
Unobstructed Length	16.0 ft
Brink Depth	0.8 ft
Brink Velocity	2.3 ft/s
Critical depth	0.4 ft

Water Surface Elevation

Allowable Stage	5236.50
Weir Crest	5235.50
Crest Stage	5236.29
Ponded Stage	5236.37

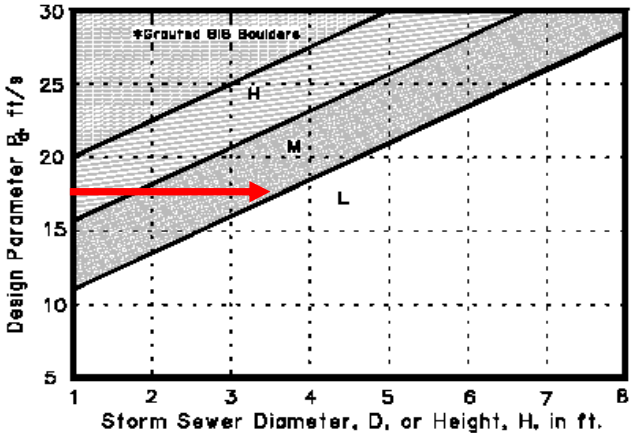
Project Name : Federal Boulevard - 5th to Howard
Job No. : 1102188
Date : 18-Dec-12
By : BJC
Checked By :

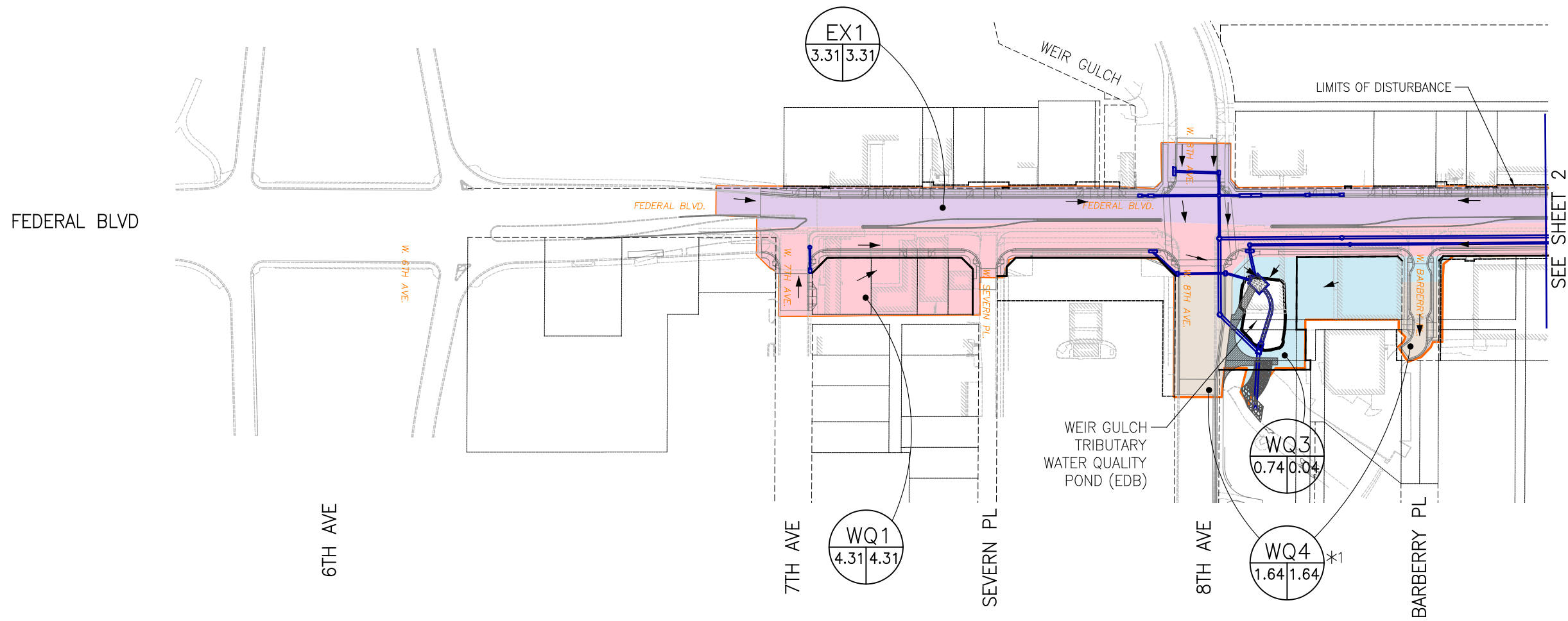
CDOT CULVERT OUTLET PAVING

Hydraulic Data	Riprap Sizing
Structure ID = INO 5-yr Flow = 35.35 cfs Pipe Type = RCP (CMP, ACMP, RCP, CBC, HDPE) Diameter, Span or Rise = 3.50 ft Outlet Velocity = 13.30 fps Outlet Depth = 0.83 ft Outlet Froude Number = 2.57	
Quantity Estimate	
P_d (Riprap Sizing Parameter) = 14.27 Riprap Classification = L (per UDFCD Figure HS-20) Riprap d_{50} = 9.00 inches Minimum Riprap Thickness = 15.75 inches Diameter (CMP) = 42.00 inches Span x Rise (inches) (ACMP) = N/A End Section Length = 96.00 inches (per CDOT M-603-10) End Section Width at End = 78.00 inches (per CDOT M-603-10) End Section Area = 40.00 sf Riprap Thickness = 1.31 ft Outlet Paving Length = 22.00 feet (4 x D + End Section Length) Outlet Paving Width at End Section = 10.50 feet (3 x D) Outlet Paving Width at End of Apron = 21.50 feet [2 x (L x .25) + (3 x D)] Riprap Area = 312.00 sf Riprap = 15.17 cy 9 -inch Geotextile (Erosion Control) (Class A) = 34.67 sy	

Project Name : Federal Boulevard - 5th to Howard
Job No. : 1102188
Date : 18-Dec-12
By : BJC
Checked By :

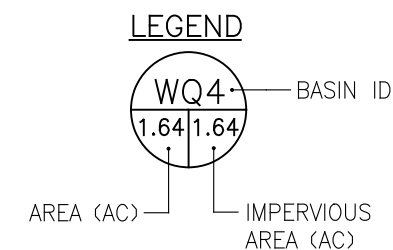
CDOT CULVERT OUTLET PAVING

Hydraulic Data	Riprap Sizing
Structure ID = INO 100-yr Flow = 135.74 cfs Pipe Type = RCP (CMP, ACMP, RCP, CBC, HDPE) Diameter, Span or Rise = 3.50 ft Outlet Velocity = 14.11 fps Outlet Depth = 2.73 ft Outlet Froude Number = 1.50	
Quantity Estimate	
P_d (Riprap Sizing Parameter) = 16.94 Riprap Classification = M (per UDFCD Figure HS-20) Riprap d_{50} = 12.00 inches Minimum Riprap Thickness = 21.00 inches Diameter (CMP) = 42.00 inches Span x Rise (inches) (ACMP) = N/A End Section Length = 96.00 inches (per CDOT M-603-10) End Section Width at End = 78.00 inches (per CDOT M-603-10) End Section Area = 40.00 sf Riprap Thickness = 1.75 ft Outlet Paving Length = 22.00 feet (4 x D + End Section Length) Outlet Paving Width at End Section = 10.50 feet (3 x D) Outlet Paving Width at End of Apron = 21.50 feet [2 x (L x .25) + (3 x D)] Riprap Area = 312.00 sf Riprap = 20.22 cy 12 -inch Geotextile (Erosion Control) (Class A) = 34.67 sy	

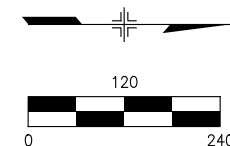


PERMANENT WATER QUALITY BMPs					
BASIN COLOR	BASIN ID	TYPE OF BMP	REQUIRED IMPERVIOUS AREA TO BE TREATED	ACTUAL IMPERVIOUS AREA TREATED	COMMENTS
	WQ-1	EXTENDED DETENTION BASIN	2.28	4.31	WEIR GULCH EXTENDED DETENTION BASIN
	WQ-2	EXTENDED DETENTION BASIN	0.33	1.25	TREATED BY RTD FACILITY
	WQ-3	EXTENDED DETENTION BASIN	0.04	0.04	DIRECTLY TRIBUTARY TO EXTENDED DETENTION BASIN
	WQ-4	NOT APPLICABLE	0	0	CCD DRAINAGE AREAS DOWNSTREAM OF STORM DRAIN SYSTEM
	EX-1	NOT APPLICABLE	0	0	EXISTING IMPERVIOUS AREA
	TOTAL		2.65	5.60	

LEGEND	
	LIMITS OF DISTURBANCE
	STORM SEWER TO BE CONSTRUCTED BY FEDERAL - 6TH TO HOWARD
	CDOT R.O.W.
➔	WATER QUALITY FLOW ARROWS



- NOTES**
- *1. AREA FOR FIVE AREAS THAT COMPRISE WQ4 IS 1.64 ACRE TOTAL.
 - 2. CDPS CONSTRUCTION STORMWATER PERMIT CERTIFICATION NUMBER: PENDING.



TSIOUVARAS SIMMONS HOLDERNESS
CONSULTING ENGINEERS

brendan.carroll
12/7/2012
3:56:48 PM
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Last Modification Date: 7/10/2011	Init.: DJH
Drawing File Name: 1102188-Water Quality Plans.dgn	
Horizontal Scale: 1:200	Vert. Scale: As Noted

Sheet Revisions		
Date:	Comments	Init.

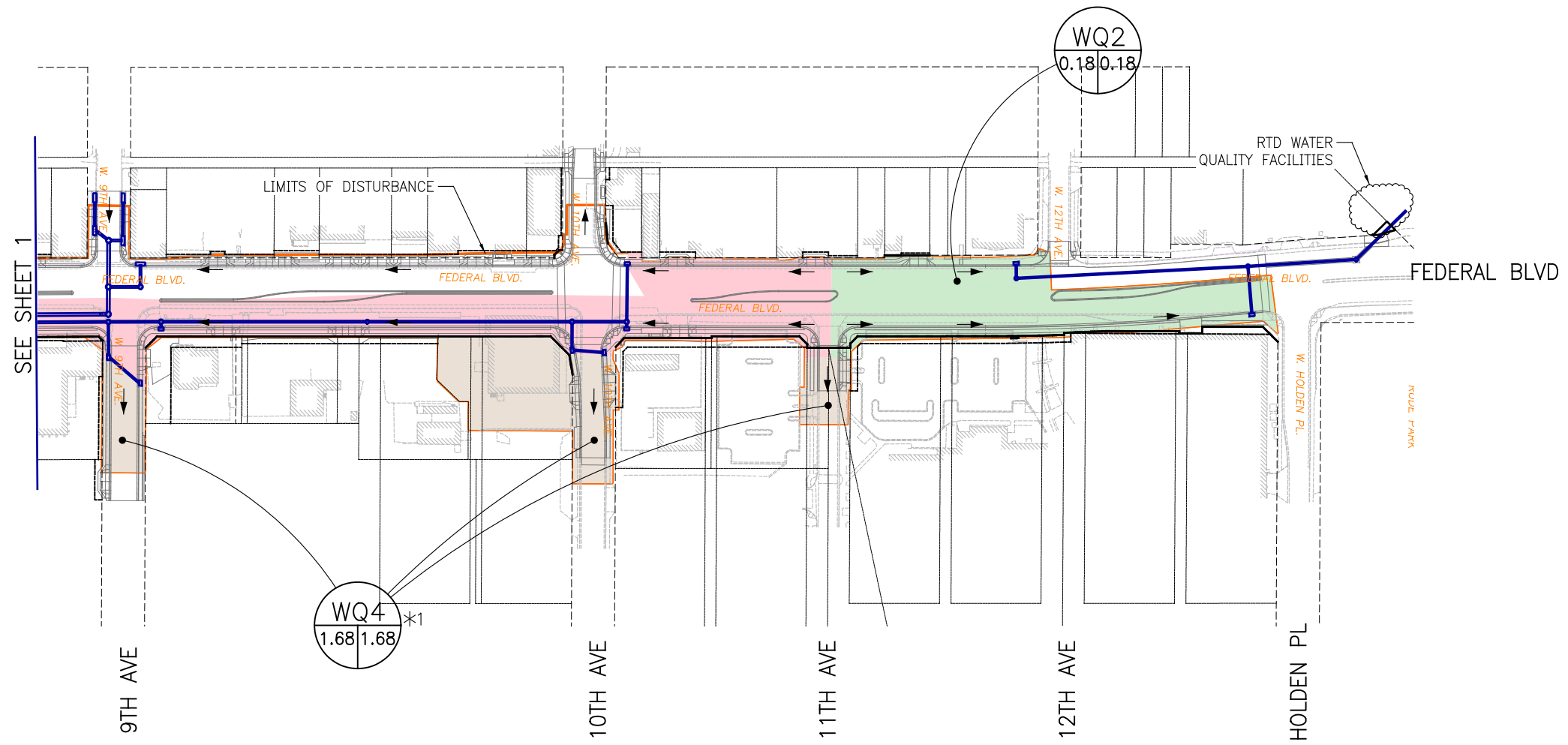
City and County of Denver
Department of Public Works
Engineering Division
201 W. Colfax, Dept 506
Denver, CO. 80202

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-3914
FAX: 303-757-9053
Region 6 MP

As Constructed
No Revisions:
Revised:
Void:

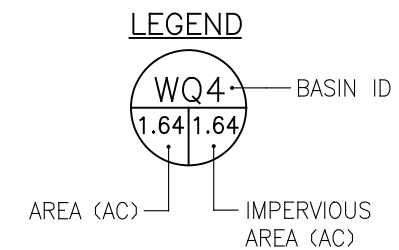
FEDERAL BLVD. RECON. - 5TH AVE. TO HOWARD PLACE			
WATER QUALITY CONCEPT PLAN			
Designer:	HJS	Structure	
Detailer:	DJH	Numbers	
Sheet Subset:	Subset Sheets: 1 of 2		

Project No./Code
CC 0881-025 SA 18365
CE02011
Sheet Number



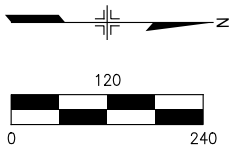
PERMANENT WATER QUALITY BMPs					
BASIN COLOR	BASIN ID	TYPE OF BMP	REQUIRED IMPERVIOUS AREA TO BE TREATED	ACTUAL IMPERVIOUS AREA TREATED	COMMENTS
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	WQ-3	EXTENDED DETENTION BASIN	0.04	0.04	DIRECTLY TRIBUTARY TO EXTENDED DETENTION BASIN
	WQ-4	NOT APPLICABLE	0	0	CCD DRAINAGE AREAS DOWNSTREAM OF STORM DRAIN SYSTEM
	EX-1	NOT APPLICABLE	0	0	EXISTING IMPERVIOUS AREA
	TOTAL		2.65	5.60	

LEGEND	
	LIMITS OF DISTURBANCE
	STORM SEWER TO BE CONSTRUCTED BY FEDERAL - 6TH TO HOWARD
	CDOT R.O.W.
	WATER QUALITY FLOW ARROWS



NOTES

- *1. AREA FOR FIVE AREAS THAT COMPRISE WQ4 IS 1.64 ACRE TOTAL.
- 2. CDPS CONSTRUCTION STORMWATER PERMIT CERTIFICATION NUMBER: PENDING.



TSIOUVARAS SIMMONS HOLDERNESS
CONSULTING ENGINEERS

Last Modification Date: 7/10/2011 Init.: DJH
 Drawing File Name: 1102188-Water Quality Plans.dgn
 Horizontal Scale: 1:200 Vert. Scale: As Noted

Sheet Revisions		
Date	Comments	Init.

City and County of Denver
 Department of Public Works
 Engineering Division
 201 W. Colfax, Dept 506
 Denver, CO. 80202

Colorado Department of Transportation
 2000 South Holly Street
 Denver, CO 80222
 Phone: 303-757-9914
 FAX: 303-757-9053
 Region 6 MP

As Constructed
 No Revisions:
 Revised:
 Void:

FEDERAL BLVD. RECON. - 5TH AVE. TO HOWARD PLACE
 WATER QUALITY CONCEPT PLAN
 Designer: HJS Structure Numbers
 Detailer: DJH
 Sheet Subset: Subset Sheets: 2 of 2

Project No./Code
 CC 0881-025
 SA 18365
 CE02011
 Sheet Number

From: Smith, Susan K [<mailto:Susan.Smith@dot.state.co.us>]

Sent: Thursday, May 10, 2012 4:12 PM

To: Randal Lapsley

Cc: Mollendor, Darren M. - WMD; Geist, James - PW City Engineering; Dawson, Katie; Leiker, Scott; Kloska, Jeff; Paulmeno, Jim (Jim.Paulmeno@RTD-Denver.com); Chesser, Jonathon

Subject: RE: New WQ rules

Randal (and crew),

Sorry for the delay. Once we received the January 20, 2012 memo and started implementing on projects, CDPHE and CDOT-HQ verbally told us that the "letter" was not valid for CDOT. CDOT and CDPHE have been in discussions over the interpretations. I was hesitant to give any type of directions, waiting until the dust has settled. What I have learned is that the dust will not settle and those of us at the project level need to keep moving on with project delivery.

So...as of today...CDOT still is implementing "original roadway footprint" for those projects like yours which has progressed past FIR.

Q: CDPHE is now allowing the existing roadway from back of curb to back of curb to be excluded in the treatment water quality capture volume. So on Federal from 7th to Holden, we can take our total WQ capture volume from the limits of disturbance and subtract out the existing roadway volume to come up with the total WQ required to be treated. Do you concur?

A: CDOT is interpreting the January 20, 2012 memo to read that the existing roadway footprint is exempt from the need for treatment, however disturbances beyond the traveled way (like widening of the roadway and sidewalks) are to be treated. I think we are saying the same things here.

Q: Secondly the WQ pond RTD is constructing west of Federal for the West corridor project is large enough that it should be able to accommodate follows from our Federal Blvd project. Assuming the volume going to the RTD pond is large enough for our whole project, can we write a variance to use this as our sole point for treating WQ for the project. The variance would be from the Project to the Denver requesting that the RTD pond be used rather than another location. Within the WQ report we would document the justification and state RTD's pond is being constructed with both RTD and CDOT funds and will be maintained by RTD. Federal Blvd being a State roadway is eligible to use the pond because of CDOT 's funding of the pond construction.

A: Yes, we can count that the RTD Pond is treating our project water. How far does the water from the Federal, 7th to Holden project have to travel to be treated by RTD's pond? What kind of documentation will be provided about how much treatment is being given to the Federal, 7th to Holden water? I don't like the "should be able to accommodate flows". Does the pond have enough room or not? Please be decisive.

Was that all you had? I will be out of the office from 5/11 returning 5/23.

Thanks,
Susie

From: Randal Lapsley [<mailto:Randal.Lapsley@tshengineering.com>]
Sent: Wednesday, April 18, 2012 8:42 AM
To: Smith, Susan K
Cc: Mollendor, Darren M. - WMD; Geist, James - PW City Engineering; Dawson, Katie
Subject: RE: New WQ rules

Susie

Has CDOT resolved the issues that would allow you to advise on the WQ issues? This is the only design issue remaining to be resolved and our FOR will be delayed until we get it resolved.

Randal

From: Smith, Susan K [<mailto:Susan.Smith@dot.state.co.us>]
Sent: Tuesday, February 21, 2012 4:24 PM
To: Geist, James - PW City Engineering; Dawson, Katie
Cc: Mollendor, Darren M. - WMD; Randal Lapsley
Subject: RE: New WQ rules

Hi all,

Just responding to you that I received this e-mail. I don't feel like I should comment right now, because of some other things going on with the 6th & Federal project. If I told you advice, I may have to reverse it, and it would waste your time, energy and design costs. How long can you hold off on my comments until I'm holding up the project?

Susie

From: Geist, James - PW City Engineering [<mailto:James.Geist@denvergov.org>]
Sent: Wednesday, February 15, 2012 10:36 AM
To: Dawson, Katie
Cc: Mollendor, Darren M. - WMD; Smith, Susan K; 'Randal Lapsley'
Subject: RE: New WQ rules

Hi Katie,

Please see Randal's e-mail below regarding the need for the proposed Water Quality Pond at the northeast corner of 8th and Federal.....

Thanks,

-Jim

James Geist, P.E.
Senior Engineer/Project Manager

City and County of Denver
Department of Public Works
Capital Projects Management
201 W. Colfax Ave., Dept. 506
Denver, CO 80202
Phone: (720) 913-4504

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Email: james.geist@denvergov.org

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From: Randal Lapsley [<mailto:Randal.Lapsley@tshengineering.com>]
Sent: Wednesday, February 15, 2012 10:01 AM
To: Smith, Susan K
Cc: Mollendor, Darren M. - WMD; Geist, James - PW City Engineering
Subject: New WQ rules

Susie,

I spoke with Darren Mollendor yesterday about WQ on our Federal Blvd project and the changes from CDPHE. He conveyed the following:

- 1) CDPHE is now allowing the existing roadway from back of curb to back of curb to be excluded in the treatment water quality capture volume. So on Federal from 7th to Holden, we can take our total WQ capture volume from the limits of disturbance and subtract out the existing roadway volume to come up with the total WQ required to be treated. Do you concur?
- 2) Secondly the WQ pond RTD is constructing west of Federal for the West corridor project is large enough that it should be able to accommodate follows from our Federal Blvd project. Assuming the volume going to the RTD pond is large enough for our whole project, can we write a variance to use this as our sole point for treating WQ for the project. The variance would be from the Project to the Denver requesting that the RTD pond be used rather than another location. Within the WQ report we would document the justification and state RTD's pond is being constructed with both RTD and CDOT funds and will be maintained by RTD. Federal Blvd being a State roadway is eligible to use the pond because of CDOT 's funding of the pond construction.

We want to make sure our revised approach on WQ will be acceptable with CDOT.

Randal Lapsley, P.E.
Tsiouvaras Simmons Holderness, Inc.

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STATE OF COLORADO

John W. Hickenlooper, Governor
Christopher E. Urbina, MD, MPH
Executive Director and Chief Medical Officer

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Located in Glendale, Colorado (303) 692-3090

<http://www.cdphe.state.co.us>



Colorado Department
of Public Health
and Environment

January 20, 2012

MEMO

Re: MS4 Permit New Development and Redevelopment Requirements for Roadways
COR-0700000, COR-0800000, COR-0900000, COS-000001, COS-000002, COS-000003, COS-000004, and
COS-000005

The Colorado Water Quality Control Division (the Division) previously distributed the attached memo, dated March 14, 2011, to representatives from the Colorado Stormwater Council regarding construction stormwater and the above referenced MS4 permits' requirements associated with road resurfacing and replacement. The memo contained the Division's interpretations and guidance on language in the Colorado Discharge Permit System Regulation 61 (Regulation 61) and in the above referenced CDPS permits (the MS4 permits) regarding requirements associated with roadway projects. The Division met with representatives from several MS4s on April 26 and November 11, 2011 to discuss the Division interpretations in the memo. In addition to other topics addressed during these meetings, the MS4 permittee representatives present expressed that they did not agree with the Division's interpretations included in the March 14th memo regarding what constituted a disturbed area from new development and redevelopment projects. The Division acknowledges that the current MS4 permits lack clarity in regards to the associated permit requirements cited in the discussion below. Following the April 26 meeting, the Division contacted Holly Piza, Urban Drainage and Flood Control District, who was acting as a point of contact for the MS4 representatives, to communicate that the Division agreed that the permits lacked clarity, and that the Division intended to limit oversight in the manner discussed further below. At that time, the Division also proposed documenting this Division decision. At the November 11 meeting, the Division committed to further consider interpretation of the relevant provisions in Regulation 61 and the referenced permit language as part of the permit renewal process, and provide additional clarity in the permit. The Division also committed to provide this documentation regarding compliance oversight, which is included below.

For the remainder of this permit term (including time during which the permit is administratively continued), the Division has determined it will not assess permittee compliance with current permit requirements in the permit sections referenced in the table below that specifically pertain to the permittees' program development, implementation and/or enforcement for projects, or common plan of development or sale, that disturbs **less than** one acre **outside** of the original footprint of roadways' driving surfaces. This commitment would apply to projects where the total area of disturbance would be one acre or greater if the disturbances within the roadways' driving surfaces were accounted for. In addition, the Division will not assess compliance with current permit requirements for notification or documentation of permit compliance directly associated with such projects. Disturbances within the roadway's driving surface include activities that disturb or expose the road surface, subgrade, and/or directly underlying soils. The permittee's program development, implementation, and enforcement for new development and redevelopment projects, or common plans of development or sale, that disturb **greater than or equal** to one acre **outside** of the original footprint of roadways' driving surface are not subject to this commitment, and full compliance with all associated permit requirements remain subject to the Division's compliance assurance oversight. All Permit conditions other than those in the sections listed in the above table remain subject to the Division's compliance assurance oversight, including requirements for implementation of the permittees' construction sites programs permit for disturbances at roadway projects in accordance with the permit requirements.

Relevant Permit Sections and Version

MS4 Permits	Permit Section	Permit(s) Effective Dates	Permit(s) Expiration Dates
COR-070000, Nonstandard General Permit COR-080000, Cherry Creek General Permit COR-090000, Statewide General Permit	Part I.B.5	March 10, 2008	March 9, 2013
COS-000001, Denver COS-000002, Lakewood COS-000003, Aurora	Part I.B.1.a(2)	March 1, 2009	April 30, 2014
COS-000004, Colorado Springs	Part I.B.1.a(2)	November 1, 2011	October 31, 2016
COS-000005, CDOT	Part I.B.1.b	February 1, 2007	January 31, 2012 (This permit will be administratively extended)

If you have any questions, please contact me at nathan.moore@state.co.us or 303-692-3555.

Sincerely,



Nathan Moore
Construction, MS4, and Pretreatment Unit Manager
Permits Section
WATER QUALITY CONTROL DIVISION

Enclosure

CC: File Copy – MS4s individual permit and general permit certification files.
MS4 Permit Legal Contacts
MS4 Permit Local Contacts (electronic)
Holy Piza, UDFCD
Natasha Davis, EPA Region 8
Amy Clark, EPA Region 8

STATE OF COLORADO

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Colorado Department
of Public Health
and Environment

**PLEASE REFER TO THE WATER QUALITY
CONTROL DIVISION MEMO REGARDING MS4
PERMIT NEW DEVELOPMENT AND
REDEVELOPMENT REQUIREMENTS FOR ROADWAYS,
DATED 1/20/2012, FOR ADDITIONAL INFORMATION
RELEVANT TO THE CONTENT OF THIS DOCUMENT**

March 14, 2011

Re: Road Resurfacing and Replacement
Construction Stormwater Permit and MS4 Permit

During the Colorado Stormwater Council quarterly meeting at UDFCD on January 26, 2011, several participants requested that the Division provide guidance to MS4 permittees on determining applicability of stormwater construction permit requirements and MS4 permit construction sites and post construction requirements for road replacement and resurfacing projects. This memo is intended to provide clarification on the Division's current interpretations regarding this activity. The Division acknowledges additional stakeholder discussion may be warranted regarding these interpretations and implication on permit compliance.

Two different definitions must be examined regarding this topic. The regulations separates the criteria for coverage (i.e., scale of "disturbance") from the scope of pollutant sources covered (i.e., "construction activity" or "new development and redevelopment"). The following guidance addresses both of these topics.

This guidance is specifically intended to address requirements associated with roadway reconstruction projects that result in exposure of the subgrade. The Division is referring to all material below the asphalt or concrete layer as the "subgrade," including prepared and unprepared native soils as well as imported materials such as crushed asphalt and aggregate. Full reconstruction of a roadway occurs typically as a result of need to rework the subgrade or to significantly alter the existing roadway (e.g., realignment, expansion, etc.). Exposure of the subgrade may also occur as part of the process of full depth reclamation of the roadway. Full depth reclamation is also a major reconstruction of the roadway and results in exposure, and typically modification or augmentation of the subgrade. Exposure of the subgrade does also occur during less substantial roadway projects to spot repair portions of subgrade or unintentionally during resurfacing projects from milling deeper than intended or overestimating the pavement depth. In most cases the spot repairs or unintended exposure during milling should result in under an acre of disturbance and should not be affected by this guidance.

1. **Determining Area of Disturbance and defining Construction Activities for Stormwater Construction Permit Requirements and the MS4 Permits Construction Sites program:**

The MS4 permits and the Colorado Discharge Permit System Regulation 61 (Regulation 61) require that permittees implement a construction sites program for construction activities that result in a land disturbance of one or more acres, and disturbing less than one acre if that construction activity is part of a larger common plan of development or sale that would disturb one or more acres. The requirement for stormwater construction permits in Regulation 61 is the same.

Because the term "disturbance" is used in Regulation 61 for determining applicability for stormwater permitting requirements for construction activity and applicability of MS4 permit requirements for construction sites, the Division applies a consistent definition to "disturbance" for both of these requirements. The definition of Construction Activities from the CDPS Construction Activities Discharge Permit is "*Construction activity refers to ground surface disturbing activities, which include, but are not limited to, clearing, grading, excavation, demolition, installation of new or improved haul roads and access roads, staging areas, stockpiling*

of fill materials, and borrow areas. Construction does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.” The definition is based on the Regulation 61, Federal Phase II regulations, including the *Description of Program* section (II.I.1.a) to those regulations.

1.a. For road resurfacing and replacement projects, “disturbance” associated with construction for the roadway portion of the projects has occurred when the subgrade is exposed. Exposure of the subgrade during road projects results in the exposure and disturbance of the underlying erodible materials. Defining the exposure of the roadway subgrade as “land disturbance” is consistent with the overall intent of the regulation in defining disturbed areas, and is comparable to removing other stable land covers such as vegetation during grading and building structures in demolition. In making this interpretation, the Division is differentiating exposure of subgrade from other activities that do not expose erodible materials, such as rotomilling that does not go all the way through the concrete or asphalt or demolishing a building but leaving the foundation. In addition, all roadway replacement projects and the majority of roadway resurfacing projects do not meet the exclusion for routine maintenance, which require that the activity both be “maintenance” and “routine.” Roadway projects resulting in exposure of subgrade involves essentially the full replacement of the structural surface of the road and is properly classified as roadway reconstruction or replacement, and not as maintenance. Exposure of subgrade is associated only with significant road projects that are clearly not “routine” in nature. For resurfacing, only projects that are more associated with ongoing maintenance of a roadway surface are routine maintenance, such as filling potholes and isolated overlays. A typical resurfacing projects is a isolated, large scale project that even when it is being done as part of maintenance of the existing surface, is not routine in nature. These determinations are consistent with definitions used by the Federal Highway Administration (see “Pavement Preservation Definitions” in references). Therefore, the total area disturbance includes all areas where the subgrade is exposed, and other associated land disturbance for the project or common plan of development (e.g., land disturbance from shoulders and the median grading, curb and sidewalk replacement, additions/improvement, etc.)

1.b. For road resurfacing and replacement projects, “construction activity” for the roadway portion includes, but is not limited to, all areas where the removal of the road surface is occurring, including areas where asphalt or concrete is being removed but the subgrade is not exposed. If a disturbance of one acre or more occurs, as determined in accordance with the guidance in Part 1.a, then all construction activities that are part of the same common plan must be addressed by water quality controls required and implemented in accordance with stormwater construction permits and MS4 permit construction sites programs. Construction activities are not limited only to land disturbance activities and the areas where land disturbance have occurred. In addition to the removal of road surface as discussed in the introduction to this section, pollutants associated with demolition and construction materials must be covered, even when located in areas with undisturbed land.

An example would be a road project that, within the same a common plan, resulted in one acre of land disturbance from roadway replacement and/or associated land disturbance (e.g., stockpiling, grading shoulders, etc) and one additional acre of surface asphalt rotomilling that does not expose subgrade. For this project, all pollutant sources associated with this two acre project must be addressed in accordance with the requirements of the stormwater construction permit and the MS4 permit, even though the rotomilling portion of the project would be not be covered if it was a stand-alone project since it does considered maintenance if it occurred as an independent project and would not require construction site permitting if conducted as a standalone project.

2. Determining Area of Disturbance and defining New Development and Redevelopment for the MS4 Permits Post-Construction Program:

The MS4 permits and regulations require that permittees implement a new development and redevelopment program to ensure controls are in place for runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale. Redevelopment is commonly defined as development on previously developed land. The regulations do **not** further limit the scope of redevelopment projects covered by the MS4 permit requirements beyond acreage criteria for disturbance. Specifically, the regulations do **not** exclude redevelopment projects that do not change the use, increase the impervious area, or increase the potential for stormwater pollution.

Because the term “disturbance” and “disturb” are used in regulations to determine the applicability associated with construction activity, as discussed above, and the applicability of MS4 permit requirements for new development and redevelopment, the Division applies a consistent definition to “disturbance” for both of these requirements. EPA does provide some additional guidance on determining the disturbance associated with redevelopment. The *Description of Program* section of the Federal Phase II regulations (see section II.H.3.b v) states that “EPA intends the term ‘redevelopment’ to refer to alterations of a property that change the ‘footprint’ of a site or building in such a way that results in the disturbance of equal to or greater than 1 acre of land. The term is not intended to include such activities as exterior remodeling, which would not be expected to cause adverse storm water quality impacts and offer no new opportunity for storm water controls.”

Note that although the above EPA guidance discusses changes to a site “footprint,” the context is in determining if a disturbance has occurred, and does not require that the post development “footprint” be different than the predevelopment “footprint” as a criterion for being considered a redevelopment land disturbance, And therefore requiring permanent water quality controls.

- 2.a. For road resurfacing and replacement projects, “disturbance” associated with new development and redevelopment for the roadway portion of the projects has occurred when the subgrade is exposed.** The trigger for applicability is based on the total land disturbance associated with new development and redevelopment activity, and is identical to the trigger discussed above for construction activities. The total area disturbance includes all areas where the subgrade is exposed, and other associated land disturbance for the project or common plan of development (e.g., land disturbance from shoulders and the median grading, curb and sidewalk replacement, additions/improvement, etc.). For example, if 0.5 acres of roadway is replaced and exposes subgrade, and an additional 0.5 acres is disturbed for shoulder grading, drainage improvements, etc, the new development and redevelopment permanent water quality requirements in the MS4 permit are triggered because total disturbance is one acre.
- 2.b. For road resurfacing and replacement projects, “new development and redevelopment” for the roadway portion includes the areas of the roadway where the subgrade was exposed and all other areas of associated land disturbance and demolition.** For projects and common plans that meet the disturbance criteria discussed above, permanent water quality controls must be implemented for runoff from the entire new development and redevelopment project in accordance with the requirements of the MS4 permits. Therefore, if a disturbance of one acre or more occurs, then permanent water quality controls are required for all areas of new development and redevelopment, including areas of roadway replacement that exposes the subgrade.

References:

- Stormwater Construction Permit:
<http://www.cdphe.state.co.us/wq/PermitsUnit/PERMITS/SWpermitsrats/SWConstructionPermit.pdf>
- The Colorado Discharge Permit System, Regulation 61 (5 CCR 1002-61)
<http://www.cdphe.state.co.us/regulations/wqccregs/100261dischargepermitsystemnew.pdf>
- Federal Phase II Regulations (Federal Register / Vol. 64, No. 235, Pages 68721-68851)
<http://www.epa.gov/npdes/regulations/phase2.pdf>
- FHWA memorandum “Pavement Preservation Definitions” (9/12/05)
<http://www.fhwa.dot.gov/pavement/preservation/091205.pdf>

If you have any questions, please contact me at nathan.moore@state.co.us or 303-692-3555.

Sincerely,

Nathan Moore
Construction, MS4, and Pretreatment Unit Manager
Permits Section
WATER QUALITY CONTROL DIVISION

Appendix B - Water Quality Requirements Memorandum

Memorandum

Date: June 9, 2014
To: Randal Lapsley
From: Harry Strasser
Project: Federal Blvd 5th to Howard Reconstruction
Subject: Water Quality Requirements

The City and County of Denver requested that TSH determine what requirements from the new MS4 Permit for CDOT are required for the Federal Boulevard Improvement project. The Colorado Discharge Permit System (CDPS) Permit has a conditional approval from the Water Quality Control Division of the Colorado Department of Public Health and Environment (CDPHE), as detail in the letter dated May 22, 2014 from CDPHE to CDOT.

A meeting was held with CDOT and CCD on May 30, 2014 to review the Response from CDPHE and determine the appropriate action for the project. It was agreed at the meeting that the project could be covered under the Permanent Water Quality Mitigation Fund if it was **not** a Priority Development Project. To be classified as a Priority Development Project a project must fall under one of the following classifications:

Priority Development Projects. Permanent water quality projects must be installed for priority new development projects as follows.

- (A) **Priority Development Projects shall include new development and redevelopment projects in the Permit Area:**
- (i) For which associated covered construction activities result in a land disturbance of one or more acres, or projects disturbing less than one acre that are part of a larger common plan of development or sale that collectively disturb one or more acres, for which one of the following criteria are met:
 - (a) *The project requires an environmental assessment (EA) or an environmental impact statement (EIS) in accordance with the National Environmental Policy Act and has a 20 percent or more increase of impervious surface.*
 - (a) *The project discharges to a stream segment that is on 303(d) list for arsenic, chloride, chromium, copper, manganese, zinc, and/or sediment; and has a 20 percent or more increase of impervious surface. Only the portion of the project discharging to the stream segment that is on the 303(d) list shall be a Priority Development Project.*

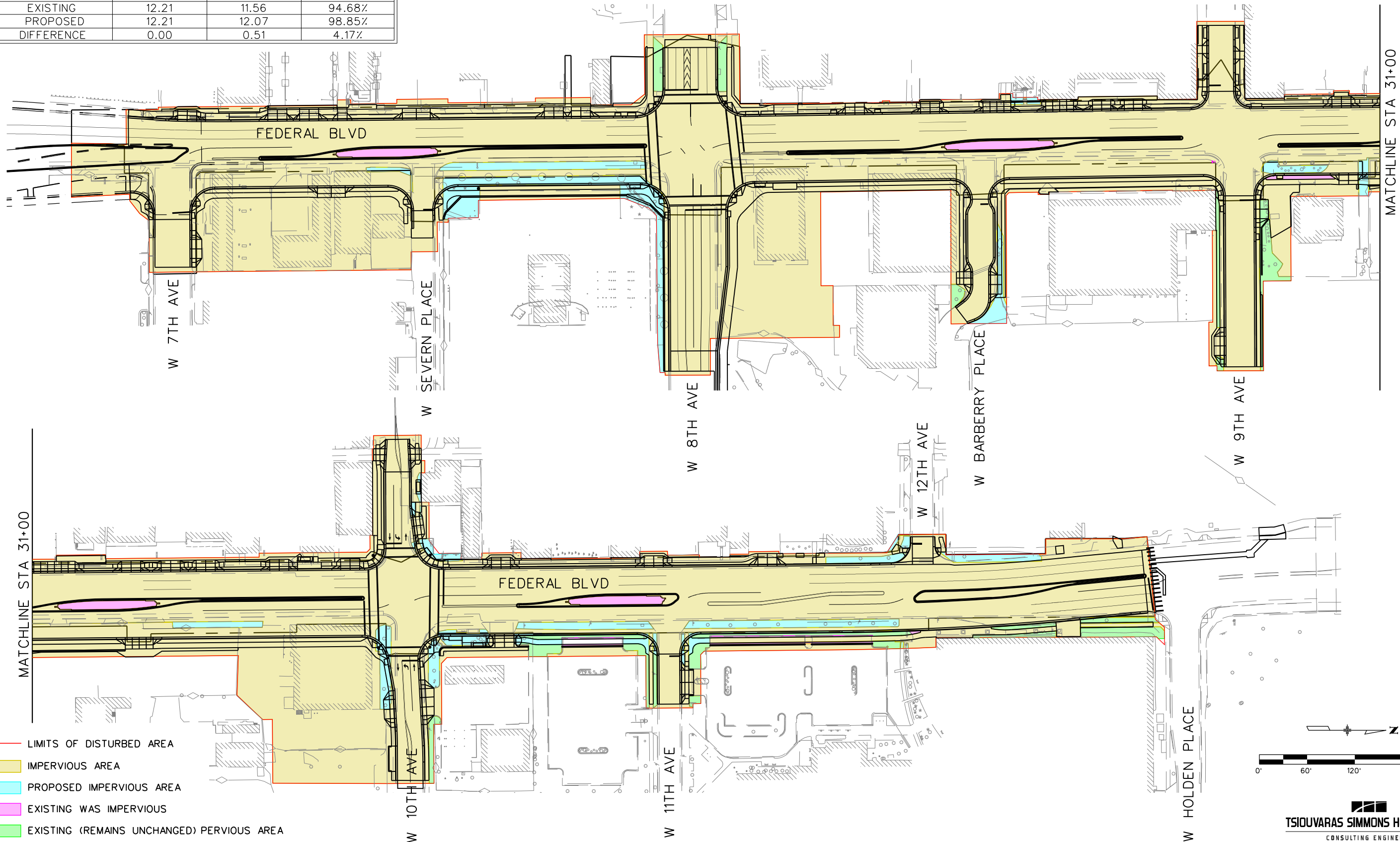
- (i) That result in the development or redevelopment of land that discharges to the Cherry Creek Reservoir drainage basin, unless excluded in accordance with the Cherry Creek Reservoir Control Regulation (5 CCR 1002-72), Part 72.7.2(c)(4). Only the portion of the project discharging to the Cherry Creek Reservoir drainage basin shall be a Priority Development Project.

CLASSIFICATION OF PROJECT

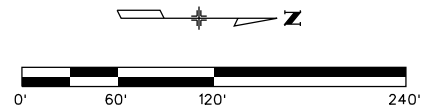
This project does have an Environmental Assessment associated with it and both Weir Gulch and Lakewood Gulch, receiving streams, are both on the 303 (d) list for E. coli. However E coli is **not** one of the constituents of concern for the permit. The stream 303(d) designation was determined by review of CDPHE's Regulation #93, Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List.

The total imperviousness pre-project is 92.5%. Post project the imperviousness rises to 96.7% which is a 4.2% increase and well below the 20% threshold in the criteria. Therefore this project does not meet the requirements of Priority Development Projects as defined in Attachment A, a.iii (A) (i) (a) &(b) and will be covered under the Permanent Water Quality Mitigation Fund as defined under Attachment A, a.iv. and would fall under the City and County of Denver MS4 Permit.

	TOTAL AREA (ACRE)	IMPERVIOUS AREA (ACRE)	%IMPERVIOUS
EXISTING	12.21	11.56	94.68%
PROPOSED	12.21	12.07	98.85%
DIFFERENCE	0.00	0.51	4.17%



- LIMITS OF DISTURBED AREA
- IMPERVIOUS AREA
- PROPOSED IMPERVIOUS AREA
- EXISTING WAS IMPERVIOUS
- EXISTING (REMAINS UNCHANGED) PERVIOUS AREA



TSIOUVARAS SIMMONS HOLDERNESS
CONSULTING ENGINEERS

larry.nichols
 7/17/2014
 2:57:40 PM
 P:\11021880 - Federal 5th to Howard\CAD\User\LAN

Last Modification Date:	Init.:
Drawing File Name: ImperviousArea-Exhibit.dgn	
Horizontal Scale: 1:120	Vert. Scale: As Noted

Sheet Revisions		
Date:	Comments	Init.



City and County of Denver
 Department of Public Works
 Engineering Division
 201 W. Colfax, Dept 506
 Denver, CO. 80202



Colorado Department of Transportation
 2000 South Holly Street
 Denver, CO 80222
 Phone: 303-757-3914
 FAX: 303-757-9053
 Region 6 MP

As Constructed
No Revisions:
Revised:
Void:

FEDERAL BLVD. RECON. - 5TH AVE. TO HOWARD PLACE	
IMPERVIOUS AREA COMPARISON	
Designer: B. Carroll	Structure Numbers
Detailer: L. Nichols	
Sheet Subset: WQ	Subset Sheets: 1 of 1

Project No./Code
CC 0881-025 SA 18365
CE02011
Sheet Number 1