



# Post Construction Program

Stormwater Program

*Revision 0, 7-2019*  
*Revision 1, 11•2019*

## Contents

Introduction.....	2
Purpose of Document.....	2
Definition of Terms.....	2
Section 1: Excluded Sites .....	4
Section 2: Regulatory Mechanisms (Part I.E.4.a.ii, iii) .....	7
Section 3: Control Measure Requirements – Design Standards (Part I.E.4.a.iv) .....	8
Section 4: Site Plans (Part 1.E.4.a.v) .....	11
Section 5: Construction Inspection and Acceptance (Part I.E.4.a.vi) .....	12
Section 6: Long-Term Operation and Maintenance and Post Acceptance Oversight (Part I.E.4.a.vii).....	14
Section 7: Enforcement Response (Part I.E.4.a.viii) .....	15
Section 8: Tracking (Part I.E.4.a.ix) .....	16
Section 9: Training (Part I.E.4.a.x).....	16
Section 10: Overlapping Permit Areas (Part I.E.4.a.xi) .....	17
APPENDIX A - POST-COSTRUCTION RECORDKEEPING.....	18
APPENDIX B - CONSTRUCTION INSPECTIONS AND ACCEPTANCE .....	23
APPENDIX C – LONG TERM OPERATION AND MAINTENANCE .....	29
APPENDIX D – OVERLAPPING AGREEMENT.....	38

## Introduction

---

Protecting the quality of stormwater runoff is required by the Colorado Discharge Permit System (CDPS) Regulations. The procedures described in this document detail compliance with requirements of the Municipal Separate Storm Sewer System (MS4) Permit issued by the Colorado Department of Public Health and Environment (CDPHE). The CDPHE, Water Quality Control Division (WQCD), through the MS4 permit issued to the City of Thornton, requires the city to control and reduce the discharge of pollutants to protect stormwater quality and to satisfy the appropriate water quality requirements of the Colorado Water Quality Control Act and the Colorado Discharge Permit Regulations (Colorado Regulation 61). Specifically, 61.8(11) Conditions for Phase II Municipal Stormwater Permits. The city is to regulate, develop, implement, and enforce a stormwater management program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the Colorado Water Quality Control Act (25-8-101 et seq., C.R.S.). The city must implement post-construction stormwater management for new development and redevelopment program including an enforcement to address stormwater 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, that discharge to the MS4. The program must ensure adequate long-term operation and maintenance of these control measures.

## Purpose of Document

---

This procedure documents the process for complying with the MS4 Permit requirements for Post-Construction Stormwater Management for New Development and Redevelopment Projects.

The procedure may change without notice if it is found to no longer be effective and/or compliant with the MS4 permit requirements. Unless significant changes warrant, this document is periodically reviewed and updated as necessary.

## Definition of Terms

---

Several definitions are printed here for convenience, but this is not intended to be an all-inclusive list. Terms in the procedure shall generally have the meaning assigned to them in the Code of Colorado Regulations.

**Base Design Standard:** The minimum design standard for new and redevelopment before applying exclusions or alternative standards.

**Best Management Practices:** Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "state surface waters". BMPs also include treatment requirements, operating procedures and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. The term BMP is used interchangeably with the term control measure, and can include other methods such as the installation, operation, and maintenance of structural controls and treatment devices.

**Common Plan of Development or Sale:** A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules, but remain related. The Division has determined that "contiguous" means construction activities located in close proximity to each other (within ¼ mile).

**Control Measures:** Any best management practice or other method used to prevent or reduce the discharge of pollutants to waters of the state. Control measures include, but are not limited to best management practices. Control measures can include other methods such as the installation, operation, and maintenance of structure controls and treatment devices.

**Division:** The Water Quality Control Division of the Colorado Department of Public Health and Environment.

**Exemption:** An exemption, waiver, or variance implemented by the permittee for permittee control measures used to meet the effluent limits in this permit.

**Impervious Area:** Developed areas with covering or pavement that prevents the land's natural ability to absorb and infiltrate typical precipitation and irrigation events. Impervious areas include, but are not limited to; roof tops, walkways, patios, driveways, parking lots, impervious storage areas, impervious concrete and asphalt, and any other continuous watertight pavement or covering.

**Land Disturbing Activity:** Any activity that results in a change in the existing land surface (both vegetative and non-vegetative). Land disturbing activities 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. Compaction that is associated with stabilization of structures and road construction shall also be considered a land disturbing activity.

**New Development:** Land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision for a site that does not meet the definition of redevelopment.

**Redevelopment:** Includes a site that is already substantially developed and has 35% or more of existing hard surface coverage, the creation or addition of hard surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including construction, installation or expansion of a building or other structure; replacement of hard surface that is not part of a routine maintenance activity; and land disturbing activities.

**Site Plans:** Also known as construction stormwater site plans, sediment and erosion control plans, stormwater pollution prevention plans, drainage reports, drainage plans, stormwater management plans, drainage and erosion control plans, etc.

**Waters of the State:** Any and all surface waters 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. This definition can include water courses that are usually dry. Note: the MS4 Permit is only applicable to discharges to surface waters of the state.

## Section 1: Excluded Sites

This section documents the requirements for sites that can be excluded from the Post-Construction Stormwater Management in New Development and Redevelopment Program ensuring the exclusions meet the requirements of the MS4 Permit.

MS4 Permit requirements:

Excluded Sites – (Part I.E.4.a.i): Requirements for excluding applicable development sites. (See MS4 Permit for complete requirements)

(A) *Pavement Management Sites*: Sites, or portions of sites, for the rehabilitation, maintenance, and reconstruction of roadway pavement, which includes roadway resurfacing, mill and overlay, white topping, black topping, curb and gutter replacement, concrete panel replacement, and pothole repair.

(B) *Excluded Roadway Redevelopment*: Redevelopment sites for existing roadways, when one of the following criteria is met:

- 1) The site adds less than 1 acre of paved area per mile of roadway to an existing roadway, or
- 2) The site does not add more than 8.25 feet of paved width at any location to the existing roadway.

(C) *Excluded Existing Roadway Areas*: For redevelopment sites for existing roadways, only the area of the existing roadway is excluded from the requirements of an applicable development site when the site does not increase the width by two times or more, on average, of the original roadway area.

(D) *Aboveground and Underground Utilities*: Activities for installation or maintenance of underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity.

(E) *Large Lot Single Family Sites*: A single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling and having a total lot impervious area of less than 10 percent. A total lot imperviousness greater than 10 percent is allowed when a study specific to the watershed and/or MS4 shows that expected soil and vegetation conditions are suitable for infiltration/filtration of the WQCV for a typical site, and the permittee accepts such study as applicable within its MS4 concentrated flow.

(G) *Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped*: Permittees may exclude sites with land disturbance to undeveloped land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the site.

(H) *Stream Stabilization Sites*: Permittees may exclude stream stabilization sites.

(I) *Trails*: Permittees may exclude bike and pedestrian trails.

(J) *Oil and Gas Exploration*: Permittees may exclude facilities associated with oil and gas exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be an applicable construction activity.

### Pavement Management Sites

These are sites or portions of sites, for the rehabilitation, maintenance, and reconstruction of roadway pavement, which includes roadway re-surfacing, mill and overlay, white topping, black topping, curb and gutter replacement, concrete panel replacement, and pothole repair.

The purpose of the site must be to provide additional years of service life and optimize service and safety. The site must also be limited to the repair and replacement of pavement in a manner that does not result in an increased impervious area nor a substantial change to the infrastructure.

The types of sites covered under this exclusion include day-to-day maintenance activities, rehabilitation, and reconstruction of pavement. Roadways include roads and bridges that are improved, designed or ordinarily used

for vehicular travel and contiguous areas improved, designed or ordinarily used for pedestrian or bicycle traffic, drainage for the roadway, and/or parking along the roadway.

### **Excluded Roadway Redevelopment**

Existing roadway can be excluded when one of the following criteria is met.

- a. When less than 1 acre of pavement is added per mile of roadway, or
- b. When no more than 8.25 feet of pavement width is added at any location.

### **Excluded Existing Roadway Area**

Only the area of the existing roadway is excluded, when the site does not increase the width by two (2) times or more, on average, of the original roadway area. The entire site is not excluded from being considered an applicable development site for this exclusion. The area of the site that is part of the added new roadway area is still an applicable development site.

### **Aboveground and Underground Utilities**

Activities for installation or maintenance of underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity. This exclusion includes, but is not limited to, activities to install, replace, or maintain utilities under roadways or other paved areas that return the surface to the same condition.

### **Large Lot Single Family Sites**

A single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling and having a total lot impervious area of less than ten percent (10%). A total lot imperviousness greater than ten percent (10%) is allowed when a study specific to the watershed and/or MS4 shows that expected soil and vegetation conditions are suitable for infiltration/filtration of the WQCV for a typical site, and the permittee accepts such study as applicable within its MS4 boundaries. The maximum total lot impervious covered under this exclusion shall be twenty percent (20%).

### **Non-Residential and Non-Commercial Infiltration Condition**

This exclusion does not apply to residential or commercial sites for buildings. This exclusion applies to applicable development sites for which post-development surface conditions do not result in concentrated stormwater flow during the 80th percentile stormwater runoff event. In addition, post-development surface conditions must not be projected to result in a surface water discharge from the 80th percentile stormwater runoff events. Specifically, the 80th percentile event must be infiltrated and not discharged as concentrated flow. For this exclusion to apply, a study specific to the site, watershed and/or MS4 must be conducted. The study must show rainfall and soil conditions present within the permitted area; must include allowable slopes, surface conditions, and ratios of impervious area to pervious area; and the permittee must accept such study as applicable within its MS4 boundaries.

### **Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped**

Sites with land disturbance but the disturbance is not for developing the land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the site is revegetated or returned to its original state to remain undeveloped.

## Stream Stabilization Sites

Sites with disturbance only for the purpose of stabilizing the stream.

## Trails

Bicycle and pedestrian trails. Bicycle lanes for roadways are not included in this exclusion, unless attached to a roadway that qualifies under another exclusion in this section.

## Oil and Gas Exploration

Facilities associated with oil and gas exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be an applicable construction activity.

MS4 Permit requirement:

*Part I.E.4.b.i. Recordkeeping - Excluded Sites: Maintain records for activities covered under Part I.E.4.a.i. Records must include the site name, owner name, location, completion date, site acreage, reason for exclusion, and any information required below. (See MS4 Permit for complete requirements)*

- (A) Pavement Management Sites – The acreage of the excluded impervious area for rehabilitation and reconstruction of pavement that are not maintenance sites.*
- (B) Excluded Roadway Redevelopment – The acreage of the excluded impervious area.*
- (C) Excluded Existing Roadway Areas for Roadway Redevelopment – The acreage of the excluded impervious area.*
- (D) Non-Residential and Non-Commercial Infiltration Conditions – The acreage of the excluded impervious area.*
- (E) Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped Redevelopment – The acreage of the excluded impervious area.*
- (F) Stream Stabilization Sites Redevelopment – The acreage of the excluded impervious area.*
- (G) Trails – The acreage of the excluded impervious area.*

## Excluded Sites Recordkeeping

Recordkeeping and tracking of the excluded sites shall be documented on the Post-Construction Recordkeeping form in Appendix A. This document shall be recorded and retained in the project file after the project is completed.

## Section 2: Regulatory Mechanisms (Part I.E.4.a.ii, iii)

This section, titled Post Construction Regulatory Mechanism, documents the regulatory mechanism used to meet the requirements of the Post-Construction Stormwater Management in New Development and Redevelopment Program.

Permit Requirement:

Part I.E.4.a.ii. Regulatory Mechanism: *To the extent allowable under state or local law, implement a regulatory mechanism to meet the requirements in Part I.E.4.a., including:*

*(A) Require control measures to be implemented for all applicable development sites.*

*(B) Enforce the conditions of the exclusions above if applicable.*

*(C) Require the long-term operation and maintenance of control measures*

*(D) Ensure that mechanisms are in place as necessary to meet this requirement for control measures used to meet the requirements of this permit by an applicable development site in the permit area that are located outside of the jurisdictional control of the permittee.*

*(E) Implement sanctions against entities responsible for applicable development sites and for the long-term operation and maintenance of the control measures.*

Part I.E.4.a.iii. Regulatory Mechanism Exemptions: *Procedures must be implemented to ensure that any exclusions, exemptions, waivers, and variances included in the regulatory mechanism are applied in a manner that complies with the terms and conditions of this permit.*

Post-construction control measures are required for all development sites that result in land disturbance of greater than or equal to one acre, including sites less than one acre that are part of a larger common plan of development or sale, unless excluded above under Excluded Sites.

The city's post-construction requirements rely on the following design documents; Urban Drainage Flood Control District Criteria Manual, City of Thornton Standards and Specifications and other proprietary control measures that meet the "base design standard" as defined by the MS4 Permit. The city's regulatory mechanisms for stormwater quality are defined by several city code sections as follows:

**Sec. 18-650. - Adoption of Storm Drainage Master Plans and Drainage Criteria Manuals**

**Sec. 18-654. - Compliance with State and Federal storm water quality control measures**

**Sec. 22-156. - Responsibilities of permittee.**

**Sec. 38-391. - Abatement of nuisance.**

**Sec. 22-191. - Suspension or revocation of permit**

The long-term operation and maintenance of a control measure is performed by the owner/operator as described on the plats for that particular development site. City Code Sec. 38-393 Nuisances Enumerated and other applicable codes are used to enforce the long-term operation and maintenance of these facilities.

The enforcement requirements apply to all control measures within the city boundary defining the jurisdictional control area.

### Section 3: Control Measure Requirements – Design Standards (Part I.E.4.a.iv)

This section documents the standards used for ensuring compliance with the Post-Construction Stormwater Management in Development and Redevelopment Program. It also documents the requirements for submittals to ensure procedures to determine the design standard are documented.

MS4 Permit Requirement:

Part I.E.4.a.iv. **Control Measure Requirements:** *The permittee’s requirements and oversight for applicable development sites must be implemented to address the selection, installation, implementation, and maintenance of control measures in accordance with requirements in Part I.B. The “base design standard” is the minimum design standard for new development and redevelopment.*

Part I.E.4.b.iv. **Control Measure Requirements:** *Procedures to determine which design standard applies to each applicable development site and the design specifications for each design standard (if applicable).*

Section 18-650 Adoption of Storm Drainage Master Plans and Drainage Criteria Manuals of the city code describes the standards and requirements to address the selection, installation, implementation and maintenance of control measures. The city’s post-construction design documents are; Urban Drainage Flood Control District Criteria Manual, City of Thornton Standards and Specifications and control measures that meet the “base design standard” as defined by the MS4 Permit.

The MS4 Permit requires applicable development sites to meet one of the following “base design standards” for Control Measures:

**WQCV Standard:** The control measure(s) is designed to provide treatment and/or infiltration of the WQCV and:

- 1) 100% of the applicable development site is captured, except the permittee may exclude up to 20 percent, not to exceed 1 acre, of the applicable development site area when the permittee has determined that it is not practicable to capture runoff from portions of the site that will not drain towards control measures. In addition, the permittee must also determine that the implementation of a separate control measure for that portion of the site is not practicable (e.g., driveway access that drains directly to street).
- 2) Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the control measure implemented. Consideration of drain time shall include maintaining vegetation necessary for operation of the control measure (e.g., wetland vegetation).

**Pollutant Removal Standard:** The control measure(s) is designed to treat at a minimum the 80th percentile storm event. The control measure(s) shall be designed to treat stormwater runoff in a manner expected to reduce the event mean concentration of total suspended solids (TSS) to a median value of 30 mg/L or less.

- 1) 100% of the applicable development site is captured, except the permittee may exclude up to 20 percent not to exceed 1 acre of the applicable development site area when the permittee has determined that it is not practicable to capture runoff from portions of the site that will not drain towards control measures. In addition, the permittee must also determine that the implementation of a separate control measure for that portion of the site is not practicable (e.g., driveway access that drains directly to street).

**Runoff Reduction Standard:** The control measure(s) is designed to infiltrate into the ground where site geology permits, evaporate, or evapotranspire a quantity of water equal to 60% of what the calculated WQCV would be if all impervious area for the applicable development site discharged without infiltration. This base design standard can be met through practices such as green infrastructure. “Green infrastructure” generally refers to control measures that use vegetation, soils, and natural processes or mimic natural processes to manage stormwater. Green infrastructure can be used in place of or in addition to low impact development principles.

**Applicable Development Site Draining to a Regional WQCV Control Measure:** The regional WQCV control measure must be designed to accept the drainage from the applicable development site. Stormwater from the site must not discharge to a water of the state before being discharged to the regional WQCV control measure. The regional WQCV control measure must meet the requirements of the WQCV Standard above.

**Applicable Development Site Draining to a Regional WQCV Facility:** The regional WQCV facility is designed to accept drainage from the applicable development site. Stormwater from the site may discharge to a water of the state before being discharged to the regional WQCV facility. Before discharging to a water of the state, at least 20 percent of the upstream imperviousness of the applicable development site must be disconnected from the storm drainage system and drain through a receiving pervious area control measure comprising a footprint of at least 10 percent of the upstream disconnected impervious area of the applicable development site. The control measure must be designed in accordance with a design manual identified by the permittee. In addition, the stream channel between the discharge point of the applicable development site and the regional WQCV facility must be stabilized.

The regional WQCV facility must meet the following requirements:

- 1) The regional WQCV facility must be implemented, functional, and maintained following good engineering, hydrologic and pollution control practices.
- 2) The regional WQCV facility must be designed and maintained for 100% WQCV for its entire drainage area.
- 3) The regional WQCV facility must have capacity to accommodate the drainage from the applicable development site.
- 4) The regional WQCV facility must be designed and built to comply with all assumptions for the development activities planned by the permittee within its drainage area, including the imperviousness of its drainage area and the applicable development site.
- 5) Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the facility. Consideration of drain time shall include maintaining vegetation necessary for operation of the facility (e.g., wetland vegetation).
- 6) The permittee shall meet the requirements in Parts I.E.4.a.v. and vii. and Part I.E.4.b. for the regional WQCV facility consistent with requirements and actions for control measures.
- 7) The regional WQCV facility must be subject to the permittee's authority consistent with requirements and actions for a Control Measure in accordance with Part I.E.4.a.iv.
- 8) Regional Facilities must be designed and implemented with flood control or water quality as the primary use. Recreational ponds and reservoirs may not be considered Regional Facilities. Water bodies listed by name in surface water quality classifications and standards regulations (5 CCR 1002-32 through 5 CCR 1002-38) may not be considered regional facilities.

**Constrained Redevelopment Sites Standard:**

- 1) **Applicability:** The constrained redevelopment sites standard applies to redevelopment sites meeting the following criteria:
  - a. The applicable redevelopment site is for a site that has greater than 75% impervious area.
  - b. The permittee has determined that it is not practicable to meet any of the design standards in the permit. The permittee's determination shall include an evaluation of the applicable redevelopment sites ability to install a control measure without reducing surface area covered with the structures.
- 2) **Constrained Redevelopment Sites Design Standard:** The control measure(s) is designed to meet one of the following:
  - a. Provide treatment of the WQCV for the area captured. The captured area shall be 50% or more of the impervious area of the applicable redevelopment site. Evaluation of the minimum drain time

shall be based on the pollutant removal mechanism and functionality of the control measure implemented,

- b. The control measure(s) is designed to provide for treatment of the 80th percentile storm event. The control measure(s) shall be designed to treat stormwater runoff in a manner expected to reduce the event mean concentration of total suspended solids (TSS) to a median value of 30 mg/L or less. A minimum of 50% of the applicable development area including 50% or more of the impervious area of the applicable development area shall drain to the control measure(s). This standard does not require that 100% of the applicable redevelopment site area be directed to control measure(s) as long as the overall removal goal is met or exceeded (e.g., providing increased removal for a smaller area), or
- c. Infiltrate, evaporate, or evapotranspire, through practices such as green infrastructure, a quantity of water equal to 30% of what the calculated WQCV would be if all impervious area for the applicable redevelopment site discharged without infiltration.

### **Acceptable Post-Construction CMs**

All post-construction CMs within the city shall be designed and maintained to meet erosion control, groundwater recharge and stormwater runoff quantity and quality standards from the; the Urban Drainage and Flood Control District's Urban Storm Drainage Criteria Manual, Volume 3 as amended.

The city allows, but is not limited to, the following types of stormwater quality permanent Control Measures (CMs):

- 1) Grass Buffer
- 2) Grass Swale
- 3) Extended Detention Basin
- 4) Retention Pond
- 5) Other stormwater quality post-construction CMs will be considered on a case by case basis. Refer to section below, Proprietary or Alternative Post-construction CMs.

### **Proprietary or Alternative Post-Construction Control Measures:**

The technology of post-construction CMs is constantly changing. New innovations are developed and existing technologies are refined to be more effective. The acceptable post-construction CMs listed above are not meant to be comprehensive. Should the owner or engineer desire to use other post-construction CMs, it will be necessary to provide documentation that adequately demonstrates an alternative post-construction CM option can meet the minimum “base design standard” described above or the Urban Drainage and Flood Control District’s Urban Storm Drainage Criteria Manual, Volume 3 as amended. Proprietary or alternative post-construction CM options will be reviewed on a case-by-case basis.

MS4 Permit requirement:

Part 1.E.4.b.iv. Recordkeeping – Control Measure Requirements: The applicable codes, resolutions, ordinances and program documents used to meet the permit requirements, including the procedures to determine which design standard applies to each applicable development site and the design specifications for each design standard (if applicable).

## Control Measure Recordkeeping

Recordkeeping and tracking of the applicable “base design standard” shall be documented on the Post-Construction Recordkeeping form in Appendix A. This document shall be recorded and retained in the project file after the project is completed.

## Section 4: Site Plans (Part 1.E.4.a.v)

This section documents the requirements for site plan submittals to ensure compliance with Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part 1.E.4.a.v. (A) Site Plan Requirements, *Site plans that include control measures for the applicable development sites must include the following:*

- 1) *Design details for all structural control measures implemented to meet the requirements of Part 1.E.4.*
- 2) *A narrative reference for all non-structural control measures for the site, if applicable. “Non-structural control measures” are control measures that are not structural control measures, and include, but are not limited to; control measures that prevent or reduce pollutants being introduced to water or that prevent or reduce the generation of runoff or illicit discharges.*
- 3) *Documentation of operation and maintenance procedures to ensure the long term observation, maintenance, and operation of the control measures. The documentation shall include frequencies for routine inspections and maintenance activities.*
- 4) *Documentation regarding easements or other legal means for access of the control measure sites for operation, maintenance, and inspection of control measures.*

## Site Plan Requirements:

Applicable sites shall include the following information on the plan through inclusion of the COT MS4 Construction Notes in the plan document. Inclusion of these notes shall be confirmed prior to the development or redevelopment of any site:

- 1) Design details for all structural post-construction CMs shall be included in the design site plans.
- 2) A narrative for all non-structural CMs for the site including measures to prevent or reduce pollutants being introduced to stormwater, or that prevent or reduce the potential for pollutant discharges. COT MS4 Construction Notes includes a link to the City’s Post Construction O&M webpage which contains information about Non Structural CMs.
- 3) Operation and Maintenance Plan describing procedures to ensure long-term function and integrity of the stormwater post-construction CMs. The O&M plan shall include frequency for routine inspections and maintenance. COT MS4 Construction Notes includes a link to the City’s Post Construction O&M webpage which contains O&M guides and SOPs for CMs used.

- 4) Recorded Easement or other legal means to allow the city access to the post-construction CM. COT MS4 Construction Notes states that Maintenance Agreements and Easements can be found in Plats which are recorded with the County.

MS4 Permit Requirement:

Part I.E.4.a.v (B) Site Plan Review: *The permittee shall implement a site plan review process for applicable development sites. The site plan review shall include the following minimum requirements designed to prevent inadequate control measures from being implemented or modified:*

- 1) *Confirmation that control measures meet the requirements of Part I.E.4.*
- 2) *Confirmation that site plans meet the requirements of Part I.E.4.a.v.*

*(C) The permittee must meet the requirements of Part I.E.4.a.v(A) and (B) before approving any modifications to the site plan.*

### **Site Plan Review:**

- 1) Documentation and confirmation to show the post-construction CM was designed according to minimum “base design standards” and meets the minimum site plan requirements is to be documented on the Post-Construction Recordkeeping form in Appendix A.
- 2) If any modification proposed to the approved Site Plan, the Site Plan must be re-submitted for review and approval prior to construction or modification of the proposed changes.

MS4 Permit requirement:

Part I.E.4.b.v. Recordkeeping – Site Plans: Copies of final site plans for all applicable development sites.

(A) For all sites for which the stormwater runoff going to a regional WQCV control measure or facility is applied: The name and location of the regional WQCV control measure or facility.

(B) For all sites for which the constrained redevelopment sites standard is applied:

The site plan and the permittee’s written determination that it is not practicable to meet any of the other design standards in Parts I.E.4.a.iv(A)(B) or (C). The permittee’s written determination shall include an evaluation of the applicable redevelopment sites ability to install a control measure without reducing surface area covered with the structures.

(C) For all sites for which the previous permit term standard is applied: Date of the start of the permittee’s review process, the permittee’s approval of the site plan (if applicable), the control measure implementation, and any modifications to the site plan.

(D) The applicable documentation for the operation and maintenance procedures that ensure the long-term observation, maintenance, and operation of control measures, including routine inspection frequencies and maintenance activities.

(E) The applicable documentation regarding easements or other legal means for access to the control measure for operation, maintenance, and inspection of control measures.

### **Site Plan Recordkeeping:**

The city will require copies of the final site plans for all applicable development sites and the copies shall be retained in electronic form in city’s document storage data base.

## **Section 5: Construction Inspection and Acceptance (Part I.E.4.a.vi)**

This section documents the requirements for site inspections to ensure compliance with Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part I.E.4.a.vi. Construction Inspection and Acceptance: *The permittee must implement inspection and acceptance procedures to ensure that control measures are installed and implemented in accordance with the site plan and include the following:*

*(A) Confirmation that the completed control measure operates in accordance with the approved site plan.*

*(B) All applicable development sites must have operational permanent water quality control measures at the completion of the site. In the case where permanent water quality control measures are part of future phasing, the permittee must have a mechanism to ensure that all control measures will be implemented, regardless of completion of future phases or site ownership. In such cases, temporary water quality control measures must be implemented as feasible and maintained until removed or modified. All temporary water quality control measure must meet one of the design standards in Part I.E.4.a.iv.*

*For the purpose of this section, completion of a site or phase shall be determined by the issuance of a certificate of occupancy, use of the completed site area according to the site plan, payment marking the completion of a site control measure, the nature of the selected control measure or equivalent determination of completion as appropriate to the nature of the site.*

### **Construction Inspection and Acceptance:**

Proper construction of permanent stormwater Control Measures (CMs) is essential to ensure CMs achieve their treatment objectives; namely reducing the amount of stormwater runoff and pollution discharged to local lakes, rivers and streams.

The construction inspections are intended to reduce construction errors for the CMs. These errors can result in inadequate CM performance and/or expensive maintenance and rehabilitation costs for the CM owner and the city. This inspection Post-Construction Inspection form (Appendix B) should be filled out by an inspector during construction of the CM to assure that the CM is installed correctly according to the site plans. The CM must be inspected at least once during construction, preferred during the construction of the forebay, trickle channel and the outlet structure. These are key components to be verified for proper operation of the facility.

A final inspection shall be completed during construction and at initial acceptance to verify the facilities installation according to plan and is operating as designed.

MS4 Permit requirement:

Part I.E.4.b.vi. Recordkeeping – Construction Inspection and Acceptance: Maintain records of inspections conducted during construction and the permittee’s acceptance of the control measure(s).

### **Construction Inspection and Acceptance Recordkeeping:**

Maintaining records of the inspections conducted during construction and final acceptance shall be documented on the Construction Inspection and Acceptance form in Appendix B. This document shall be recorded and retained in the project file after the project is completed.

## Section 6: Long-Term Operation and Maintenance and Post Acceptance Oversight (Part I.E.4.a.vii)

This section documents the requirements for site inspections to ensure compliance with Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part I.E.4.a.vii. Long-Term Operation and Maintenance and Post Acceptance Oversight:

*(A) Procedures to enforce the requirements for the owner or operator to implement and maintain control measures when necessary.*

Permanent post-construction CMs located on private property shall be operated, repaired, maintained as necessary by the landowner of the property on which the post-construction CM is located, unless a written Operation and Maintenance Manual or recorded document exists stating that a person other than the landowner shall be responsible for the operation, repair, maintenance and replacement of such post-construction CM.

The city requires maintenance of all private storm sewer systems, including permanent post-construction CMs. The obligation to maintain post-construction CMs and the city's legal right to enforce that obligation is a requirement of city code. It may also be recorded on the Subdivision Plat, recorded Operation and Maintenance Manual or other instrument in a form acceptable to the city.

The same expectations for maintenance also apply to City owned CMs which are inspected and maintained by City Staff.

MS4 Permit Requirement:

Part I.E.4.a.vii. Long-Term Operation and Maintenance and Post Acceptance Oversight:

*(B) Oversight shall include inspections of field conditions and control measures to confirm conformity with the site plan, identify any inadequate control measures, and identify control measures requiring routine maintenance, such as trash removal. All functional elements of control measures shall be inspected at a frequency determined by the permittee. Inspections of each control measure shall occur at least once during the permit term except when inspections for oversight of control measures on individual residential lots serving only the individual lot shall occur as determined by the permittee and may rely on alternative oversight process.*

The city will evaluate the current control measures covered under the permit. These control measures will be inspected once during the permit term or if a complaint is received. City owned CMs are inspected yearly.

The intent of the inspection is to assess whether the control measure is functioning as designed. The as-built drawings are checked when needed to confirm conformity with the plan. The inspection identifies any inadequate control measures and identifies control measures requiring routine maintenance, such as trash and sediment removal. City owned and/or operated control measures are tracked in the same database with privately owned control measures. City owned control measures also receive the same minimum inspection frequency that privately owned and/or operated permanent control measures have to meet. See Appendix C for inspection form.

If corrective action(s) or maintenance is needed, staff communicates these needs to the responsible party.

MS4 Permit requirement:

Part I.E.4.b.vii. Recordkeeping – Post Acceptance Oversight: Maintain inspection records with the following minimum information for all inspections conducted to meet the minimum inspection frequency:

- (A) Inspection date
  - (B) Name of inspector
  - (C) Control measure identification, including the type of control measure
  - (D) Owner of the control measure
  - (E) Confirmation that the control measure operates in accordance with the approved plan
  - (F) Inspection findings including, when present: inadequate control measures and control measures requiring routine maintenance
  - (G) Confirmation that the control measure is operating as designed or a list of follow up actions
- Permittees only have to keep the inspection records for the once a permit term inspection.  
Permittees do not have to keep records for inspections conducted more frequently than required by this permit.

### **Post Acceptance Oversight Recordkeeping:**

Copies of all completed inspection reports, findings and corrective actions will be documented and stored accordingly.

### **Section 7: Enforcement Response (Part I.E.4.a.viii)**

This section, titled Enforcement Response, documents the requirements for enforcement to ensure compliance with Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part I.E.4.a.viii. Enforcement Response:

*Implement appropriate written enforcement procedures and actions to meet the requirements of Part I.E.4. The permittee must escalate enforcement as necessary based on the severity of violation and/or the recalcitrance of the violator to ensure that findings of a similar nature are enforced upon consistently. The permittee must have processes and sanctions to minimize the occurrence of, and obtain compliance from, chronic and recalcitrant violators of control measure requirements. Written enforcement procedures must include informal, formal, and judicial enforcement responses.*

Part I.E.4.c.vii. Enforcement Response:

*...The document(s) must detail the types of escalating enforcement responses the permittee will take in response to common violations and time periods within which responses will take place.*

If operation standards for post-construction CMs are not being met; or repairs or maintenance of the post-construction CM as required, the city may, in writing, direct the landowner and/or the person responsible to correct operational failures, repair, maintain any post-construction CM in order to keep the CM in acceptable working condition. City Owned facilities which are deficient do not progress through the below chain of enforcement and instead are inspected, scheduled for maintenance, and repaired yearly depending on severity.

The enforcement process is:

1. No infractions = Inspection logged as Passing
2. Minor infractions = Inspection logged as Routine Maintenance. Informal warning may be given to the owner and a follow up inspection may be set by the inspector depending on the need and circumstances, though it is not required.
3. Major infractions/threat to health or environment = Inspection logged as Notice of Violation. Depending on circumstances inspector may start with an Informal warning and set a follow up inspection (typically within one month later). Alternatively, Inspector may also choose to immediately send a Notice of Violation to the owner and set a Follow Up inspection (typically one month later).
  - a. If the first formal Follow Up inspection notes recalcitrance or lack of response, Inspector may set further Follow Up Inspections at their discretion or advance immediately to a second Notice of Violation. Should weather or other conditions disallow remediation the Inspector, at their discretion,

- may opt to move any Follow Up inspection beyond the typical one-month window.
- b. If sufficient time is given for the owner to remedy the findings and there is still an insufficient response, the Inspector may escalate the findings to Code Compliance for legal enforcement.

For any deficiency observed during an inspection, a recommended corrective action will be identified in the inspection report, which can serve as a written warning. A copy of the inspection report will be mailed/emailed or otherwise delivered to the owner upon completion. These documents will become a part of the permanent file for this facility.

MS4 Permit requirement:

Part I.E.4.b.viii. Recordkeeping – Enforcement Response: Maintain records of the enforcement response.

### **Enforcement Response Recordkeeping:**

Copies of all enforcement correspondence and inspections will be documented and stored accordingly.

### **Section 8: Tracking (Part I.E.4.a.ix)**

---

This section, titled Tracking, documents the tracking requirements for control measures to ensure compliance with Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part I.E.4.a.ix. Tracking:

*Implement and document procedures and mechanisms to track the location of and adequacy of operation of control measures implemented in accordance with the program.*

The post construction control measures inventory is a geodatabase available in GIS. Mapping of the storm drain system (e.g., CMs, outfalls, and other features) is an important tool enabling the city to spatially view how these features collectively interact to influence downstream water quality.

MS4 Permit requirement:

Part I.E.4.b.ix. Recordkeeping – Tracking: Maintain records of the required control measure and regional WQCV control measure and facilities information.

### **Tracking Recordkeeping:**

Records are maintained in the city's electronic media servers.

### **Section 9: Training (Part I.E.4.a.x)**

---

This section documents the training requirements for review, inspection, and enforcement of control measures to ensure compliance with Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part I.E.4.a.x. Training:

*Train applicable municipal staff to inspect the control measures in accordance with the permittee's procedures in Part I.E.4.a.vi and vii. The permittee must identify those who will be likely to inspect the control measures and provide training to those individuals. The training must also include information on trash and its effects on water quality.*

The city conducts long-term operation and maintenance inspections of permanent control measures. City staff that inspect control measures are trained through on-the-job experience as well as attending classes offered by the Colorado Stormwater Training Center or other reputable training sources such as Environmental Protection Agency, the International Erosion Control Association, Center for Watershed Protection, etc. The city and other community agencies such as the Colorado Stormwater Council also periodically offer trainings using qualified staff from the Colorado Stormwater Training Center or other reputable training sources.

MS4 Permit requirement:

Part I.E.4.b.x. Recordkeeping – Training: Name and title of each individual trained, date of training, the type of training, and a list of topics covered.

### **Training Recordkeeping:**

Training records and all applicable training certificates and course descriptions must be emailed to the Stormwater Coordinator. The documents will be stored accordingly.

### **Section 10: Overlapping Permit Areas (Part I.E.4.a.xi)**

This section, titled Overlapping Permit Areas, details the stormwater procedures followed in cases of overlapping permit areas for compliance with the Post-Construction Stormwater Management in Development and Redevelopment Program.

MS4 Permit Requirement:

Part I.E.4.a.xi. For Applicable Development Sites that Overlap Multiple Permit Areas co-regulating MS4 permittee), when a written agreement is in place with a co-regulating MS4 permittee the following is required:

*(A) Control measure requirements may be imposed on the operator in accordance with the requirements of a co-regulating MS4 permittee pursuant to the written agreement. This requirement does not apply to applicable development sites in the permit area of the Colorado Department of Transportation.*

*(B) Site plan review/acceptance and site inspection actions may be conducted by a co-regulating MS4 permittee to meet the requirement of the permit.*

The city has an overlapping agreement form (Appendix D) that is used in situations where post construction activities cross over into another MS4 permit area. Generally the city is the one that will conduct the inspections for the overlapping area and submit copies of the reports to the head of the Stormwater Program of the adjoining MS4.

MS4 Permit requirement:

Part I.E.4.b.xi. Recordkeeping – Applicable Development Sites that Overlap Multiple Permit Areas: Copies of any written agreements between co-regulating MS4 permittees when required by Part I.E.4.a.xi.

### **Overlapping Agreement Recordkeeping:**

Copies of the overlapping agreement shall be stored in the project file.

**APPENDIX A - POST-COSTRUCTION RECORDKEEPING**

# PROJECT SHEET **BASE DESIGN STANDARDS**

Complete one Project Sheet for each project that includes Stormwater Quality Control Measures (CMs) and submit to the COT Project Manager for review.

## SITE INFORMATION

Project Name:	
Project Location:	
Submitted Date:	Submitted By:
Acreage Disturbed:	
Existing Impervious:	New Net Impervious:
COT Review Date:	COT Reviewed By:
Does project overlap multiple MS4 Jurisdictions? <input type="checkbox"/> Yes <input type="checkbox"/> No (if no fill out section below)	
If project overlaps jurisdictions, provide written agreement to COT Project Manager designating responsibility for CM requirements, review, inspections	

## DESIGN STANDARDS

Design Standards may be used in combination, as necessary, to meet the requirements. Additional design methods may be considered if they comply with the MS4 Permit. Evaluation of suitability of Stormwater Quality Control Measures (CMs) is based on pollutant removal, flood attenuation and long-term maintenance. CMs must be designed in accordance with the most current version of [USDCM vol. 3, Chapter 4 "Treatment BMPs"](#) and meet the specific requirements for each Design Standard used.

1. Indicate below, which Design Standards will be used for the project, and
2. Complete a separate, corresponding Design Standards checklist for each CM (e.g., WQCV, etc.)

<i>Design Standard</i>	<i># CMs</i>	<i>Location/Identifying information</i>
WQCV		
Pollutant Removal		
Runoff Reduction		
Regional WQCV Control Measure		
Regional WQCV Facility		

# CHECKLIST WQCV Standard

## WQCV STANDARD Criteria

The control measure(s) is designed to provide treatment and/or infiltration of the WQCV and:

- 1) 100% of the applicable development site is captured, except the permittee may exclude up to 20 percent, not to exceed 1 acre, of the applicable development site area when the permittee has determined that it is not practicable to capture runoff from portions of the site that will not drain towards control measures. In addition, the permittee must also determine that the implementation of a separate control measure for that portion of the site is not practicable (e.g., driveway access that drains directly to street).
- 2) Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the control measure implemented. Consideration of drain time shall include maintaining vegetation necessary for operation of the control measure (e.g., wetland vegetation).

Complete checklist if using the WQCV Standard to meet Design Standard requirements and submit to the COT Project Manager for review.

Project Name:
Control Measure Type:
Referenced Drainage Report/Drainage Conformance Letter:
<b>Requirements</b>
Control measure(s) provide treatment and/or infiltration of the WQCV for 100% of the site? <input type="checkbox"/> Yes (if Yes skip sections below) <input type="checkbox"/> No (if No, fill out sections below)
% of site not treated by control measures (not to exceed 20%):
Acres of site not treated by control measures (not to exceed 1 acre):
Provide explanation that the excluded area is impractical to treat:
Provide explanation that another CM is not practicable for the untreated area:

# CHECKLIST Pollutant Removal Standard

## POLLUTANT REMOVAL STANDARD Criteria

The control measure(s) is designed to treat at a minimum the 80th percentile storm event. The control measure(s) shall be designed to treat stormwater runoff in a manner expected to reduce the event mean concentration of total suspended solids (TSS) to a median value of 30 mg/L or less.

- 1) 100% of the applicable development site is captured, except the permittee may exclude up to 20 percent not to exceed 1 acre of the applicable development site area when the permittee has determined that it is not practicable to capture runoff from portions of the site that will not drain towards control measures. In addition, the permittee must also determine that the implementation of a separate control measure for that portion of the site is not practicable (e.g., driveway access that drains directly to street). Substantiating data must meet criteria in USDCM vol.3, T-11 and be included in the submittal.

*Complete checklist if using the Pollutant Removal Standard to meet Design Standard requirements and submit to the COT Project Manager for review.*

Project Name:	
Control Measure Type:	
Referenced Drainage Report/Drainage Conformance Letter:	
<b>Requirements</b>	
Control measure(s) provide treatment of the 80th percentile storm event. The control measure(s) treat stormwater runoff in a manner expected to reduce the event mean concentration of total suspended solids (TSS) to a median value of 30mg/L or less for 100% of the site?	
<input type="checkbox"/> Yes (if Yes, fill out Sections A and B) <input type="checkbox"/> No (if No, fill out Sections A-F)	
A.	Storm Event:
B.	TSS mg/L reduction:
C.	% of site not treated by control measures (not to exceed 20%):
D.	Acres of site not treated by control measures (not to exceed 1 acre):
E.	Provide explanation that the excluded area is impractical to treat:

F.	Provide explanation that another BMP is not practicable for the untreated area:
----	---

## CHECKLIST Runoff Reduction Standard

### **RUNOFF REDUCTION STANDARD Criteria**

The control measure(s) is designed to infiltrate into the ground where site geology permits, evaporate, or evapotranspire a quantity of water equal to 60% of what the calculated WQCV would be if all impervious area for the applicable development site discharged without infiltration. This base design standard can be met through practices such as green infrastructure. "Green infrastructure" generally refers to control measures that use vegetation, soils, and natural processes or mimic natural processes to manage stormwater. Green infrastructure can be used in place of or in addition to low impact development principles.

*Complete checklist if using the Runoff Reduction Standard to meet Design Standard requirements and submit to the COT Project Manager for review.*

Project Name:
Control Measure Type:
Referenced Drainage Report/Drainage Conformance Letter:
<b>Requirements</b>
Control measure infiltrates, evaporates or evapotranspirates at least 60% of WQCV? <input type="checkbox"/> Yes <input type="checkbox"/> No

# CHECKLIST Regional WQCV Control Measure Standard

## REGIONAL WQCV CONTROL MEASURE STANDARD Criteria

Control Measure(s) must be designed to accept the drainage from the applicable development site. Stormwater from the site must not discharge to a water of the state before being discharged to the Regional WQCV Control Measure. The Regional WQCV Control Measure must be designed to provide treatment and/or infiltration of the WQCV for the applicable development site.

*Complete checklist if using the Regional WQCV Control Measure Standard to meet Design Standard requirements and submit to the COT Project Manager for review.*

Project Name:
Control Measure Type:
Referenced Drainage Report/Drainage Conformance Letter:
<b>Requirements</b>
Control Measure(s) are designed to accept the drainage from the site? <input type="checkbox"/> Yes <input type="checkbox"/> No
Stormwater from the site does not discharge to a water of the state before being discharged to the Regional WQCV Control Measure? <input type="checkbox"/> Yes <input type="checkbox"/> No
The Regional WQCV Control Measure is designed to provide treatment and/or infiltration of the WQCV for the site? <input type="checkbox"/> Yes <input type="checkbox"/> No



Stream channel stabilized (include documentation):	
Stream Reach	Method of Stabilization:
Date Completed:	Included in project scope:

# CHECKLIST Constrained WQCV Standard

## APPLICABILITY

Constrained Redevelopment Sites are sites where the impervious area is greater than 75%. **The Constrained Site Standard can only be used if it is determined that it is not practicable to meet any of the Base Design Standards; WQCV Standard, Pollutant Removal Standard or Runoff Reduction Standard.** It is incumbent on the design engineer to demonstrate adherence to Base Design Standards has been thoroughly evaluated and found to be infeasible before a Constrained Site Standard is proposed.

The minimum treatment levels are included below and treatment should be maximized to the extent feasible under constrained site conditions.

---

## CONSTRAINED WQCV STANDARD Criteria

Control measure(s) must be designed to provide, at a minimum, treatment and/or infiltration of the WQCV for 50% of the impervious area of the applicable redevelopment site. Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the control measure implemented.

*Complete checklist if using the Constrained WQCV Standard to meet Design Standard requirements and submit to the COT Project Manager for review.*

Project Name:
Control Measure Type:
Referenced Drainage Report/Drainage Conformance Letter:
<b>Requirements</b>
Control measure(s) provide treatment and/or infiltration of the WQCV for 50% of the site? <input type="checkbox"/> Yes <input type="checkbox"/> No
Provide an evaluation of the infeasibility of Base Design Standards and justification for use of Constrained Site Standard:

## CHECKLIST Constrained Pollutant Removal Standard

### APPLICABILITY

Constrained Redevelopment Sites are sites where the impervious area is greater than 75%. **The Constrained Site Standard can only be used if it is determined that it is not practicable to meet any of the Base Design Standards; WQCV Standard, Pollutant Removal Standard or Runoff Reduction Standard.** It is incumbent on the design engineer to demonstrate adherence to Base Design Standards has been thoroughly evaluated and found to be infeasible before a Constrained Site Standard is proposed.

The minimum treatment levels are included below and treatment should be maximized to the extent feasible under constrained site conditions.

---

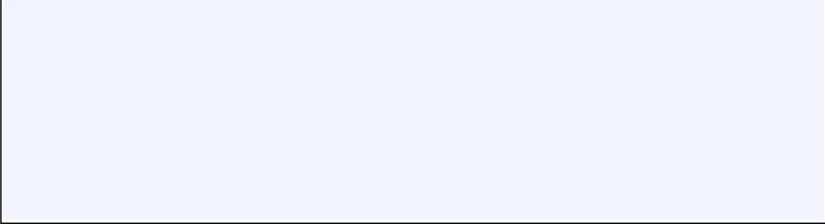
### CONSTRAINED POLLUTANT REMOVAL STANDARD Criteria

Control measure(s) must be designed to provide treatment of the 80th percentile storm event. The control measure(s) shall be designed to treat stormwater runoff in a manner expected to reduce the event mean concentration of total suspended solids (TSS), at a minimum, to a median value of 30mg/L or less for 50% of the development area including 50% or more of the impervious area.

*Complete checklist if using the Constrained Pollutant Removal Standard to meet Design Standard requirements and submit to the COT Project Manager for review.*

Project Name:
Control Measure Type:
Referenced Drainage Report/Drainage Conformance Letter:
<b>Requirements</b>
Control measure(s) provide treatment of the 80th percentile storm event. The control measure(s) treat stormwater runoff in a manner expected to reduce the event mean concentration of total suspended solids (TSS) to a median value of 30mg/L or less for 50% of the site? <input type="checkbox"/> Yes <input type="checkbox"/> No
Storm Event:
TSS mg/L reduction:
% of site treated:

Provide an evaluation of the infeasibility of Base Design Standards and justification for use of Constrained Site Standard:



# CHECKLIST Constrained Runoff Reduction Standard

## APPLICABILITY

Constrained Redevelopment Sites are sites where the impervious area is greater than 75%. **The Constrained Site Standard can only be used if it is determined that it is not practicable to meet any of the Base Design Standards; WQCV Standard, Pollutant Removal Standard or Runoff Reduction Standard.** It is incumbent on the design engineer to demonstrate adherence to Base Design Standards has been thoroughly evaluated and found to be infeasible before a Constrained Site Standard is proposed.

The minimum treatment levels are included below and treatment should be maximized to the extent feasible under constrained site conditions.

## CONSTRAINED RUNOFF REDUCTION STANDARD Criteria

Control measure(s) must be designed to infiltrate, evaporate or evapotranspire, at a minimum, a quantity of water equal to 30% of what the calculated WQCV would be if all impervious area discharged without infiltration. This Standard can be met through practices such as Green Infrastructure and Low Impact Development practices.

*Complete checklist if using the Constrained Runoff Reduction Standard to meet Design Standard requirements and submit to the COT Project Manager for review.*

Project Name:
Control Measure Type:
Referenced Drainage Report/Drainage Conformance Letter:
Requirements
Control measure infiltrates, evaporates or evapotranspires at least 30% of WQCV? <input type="checkbox"/> Yes <input type="checkbox"/> No
Provide an evaluation of the infeasibility of Base Design Standards and justification for use of Constrained Site Standard:

## DEFINITIONS

**Applicable Sites:** Applicable development sites must meet the requirements of Part I.E.4. “Applicable development sites” are those that result in land disturbance of greater than or equal to one acre, including sites less than one acre that are part of a larger common plan of development or sale, unless excluded below. Applicable development sites include all new development and redevelopment sites for which permanent water quality control measures were required in accordance with an MS4 permit. “New Development” means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision for a site that does not meet the definition of redevelopment. “Redevelopment” includes a site that is already substantially developed with 35% or more of existing imperviousness; with the creation or addition of impervious area (including removal and/or replacement), to include the expansion of a building footprint or addition or replacement of a structure; structural development including construction, replacement of impervious area that is not part of a routine maintenance activity; and land disturbing activities. At a minimum, applicable development sites includes all

sites meeting the criteria of the previous MS4 Page 27 of 63 Permit No. COR090000 permit for renewal permittees and completed after the date in Part I.H for all (renewal and new) permittees.

Pavement Management Sites: Sites, or portions of sites, for the rehabilitation, maintenance, and reconstruction of roadway pavement, which includes roadway resurfacing, mill and overlay, white topping, black topping, curb and gutter replacement, concrete panel replacement, and pothole repair. The purpose of the site must be to provide additional years of service life and must be limited to the repair and replacement of pavement in a manner that does not result in an increased impervious area and the infrastructure must not substantially change.

Excluded Roadway Redevelopment: Redevelopment sites for existing roadways, when one of the following criteria is met:

- 1) The site adds less than 1 acre of paved area per mile of roadway to an existing roadway, or
- 2) The site does not add more than 8.25 feet of paved width at any location to the existing roadway.

\*For redevelopment sites for existing roadways, only the area of the existing roadway is excluded from the requirements of an applicable development site when the site does not increase the width by two times or more, on average, of the original roadway area. The entire site is not excluded from being considered an applicable development site for this exclusion. The area of the site that is part of the added new roadway area is still an applicable development site.

Non-Residential and Non-Commercial Infiltration Conditions: This exclusion does not apply to residential or commercial sites for buildings. This exclusion applies to applicable development sites for which post-development surface conditions do not result in concentrated stormwater flow during the 80th percentile stormwater runoff event. In addition, post-development surface conditions must not be projected to result in a surface water discharge from the 80th percentile stormwater runoff events.

Specifically, the 80th percentile event must be infiltrated and not discharged as concentrated flow. For this exclusion to apply, a study specific to the site, watershed and/or MS4 must be conducted. The study must show rainfall and soil conditions present within the permitted area; must include allowable slopes, surface conditions, and ratios of impervious area to pervious area; and the permittee must accept such study as applicable within its MS4 boundaries.

Sites with Land Disturbance to Undeveloped Land that will Remain Undeveloped:

Permittees may exclude sites with land disturbance to undeveloped land (land with no human-made structures such as buildings or pavement) that will remain undeveloped after the site.

Stream Stabilization Sites

Trails: Bike and pedestrian trails are excluded. Bike lanes for roadways are not included in this exclusion, unless attached to a roadway that qualifies under another exclusion.

Aboveground and Underground Utilities: Activities for installation or maintenance of underground utilities or infrastructure that does not permanently alter the terrain, ground cover, or drainage patterns from those present prior to the construction activity. This exclusion includes, but is not limited to, activities to install, replace, or maintain utilities under roadways or other paved areas that return the surface to the same condition.

Large Lot Single Family Sites: A single-family residential lot, or agricultural zoned lands, greater than or equal to 2.5 acres in size per dwelling and having a total lot impervious area of less than 10 percent. A total lot imperviousness greater than 10 percent is allowed when a study specific to the watershed and/or MS4 shows that expected soil and vegetation conditions are suitable for infiltration/filtration of the WQCV for a typical site, and the permittee accepts such study as applicable within its MS4 boundaries. The maximum total lot impervious covered under this exclusion shall be 20 percent.

Oil and Gas Exploration (Excluded Site)



## **APPENDIX B - CONSTRUCTION INSPECTIONS AND ACCEPTANCE**

---



## Water Quality Facility Construction Inspection

Facility Information			
<b>Facility Type:</b>	Water Quality Pond/Extended Detention Basin	<b>Facility ID:</b>	Example Form
<b>Project:</b>	Example Form	<b>Date:</b>	09/30/2021
<b>Inspected By:</b>	Example Person	<b>Type of Inspection:</b>	Initial

Water Quality/Extended Detention Basin
<b>Forebay/Inlets</b>
<b>Forebay is gently sloped towards outlet pipe/notched weir?</b>
<b>Comments:</b>
<b>Energy dissipation materials (E.g., rip rap) are installed according to design?</b>
<b>Comments:</b>
<b>Are bolts or any other blockages removed from inside the inlet pipes to the pond?</b>
<b>Comments:</b>
<b>Is the forebay clear of any sediment or debris?</b>
<b>Comments:</b>
<b>Trickle Channel</b>
<b>Shape, width, and depth meet design specifications?</b>
<b>Comments:</b>
<b>Slope is gentle and continuous towards the outlet structure?</b>
<b>Comments:</b>
<b>Is the Trickle Channel free of any sediment or debris?</b>
<b>Comments:</b>
<b>Micropool</b>
<b>Shape, width, and depth meet design specifications?</b>
<b>Comments:</b>
<b>Is the micropool clear of sediment and debris?</b>
<b>Comments:</b>
<b>Outlet Structure</b>
<b>Trash rack dimensions and type meet design specifications?</b>
<b>Comments:</b>
<b>Well screen extends to the bottom of the micropool (if a micropool is present)?</b>
<b>Comments:</b>
<b>Number and size of orifices meet design specifications?</b>
<b>Comments:</b>
<b>Does bottommost orifice hole match elevation of micropool?</b>
<b>Comments:</b>
<b>Metal cap/plate is installed on top of the opening between the well screen and orifice plate?</b>
<b>Comments:</b>
<b>Safety grate size and type meet design specification?</b>
<b>Comments:</b>
<b>Is the Orifice Plate firmly affixed to the concrete wall of the box with a rubber gasket?</b>
<b>Comments:</b>

<b>Is the Restrictor Plate firmly affixed to the concrete wall of the box?</b>
Comments:
<b>Emergency Overflow/Spillway</b>
<b>Overflow weir length and depth meet design specifications?</b>
Comments:
<b>Overflow weir is lower than top of basin walls/embankments and higher than outlet structure overflow?</b>
Comments:
<b>Rip-rap or other energy dissipation is installed downstream of the spillway per design specifications?</b>
Comments:
<b>Overall Pond Condition</b>
<b>Do any of the embankments of the pond appear steeper than 3:1?</b>
Comments:
<b>Does the bottom of the pond slope towards the trickle channel and outlet to support positive drainage?</b>
Comments:
<b>Is the pond free of excess sediment, trash and/or other debris?</b>
Comments:
<b>Are there any issues with erosion along pond embankments that should be addressed through erosion control practices?</b>
Comments:
<b>Has the pond been properly stabilized or is it in the process of being stabilized per plan specifications?</b>
Comments:
<b>Is the maintenance access path of the correct size, length and material per plan detail?</b>
Comments:

<b>Results</b>
Approved?
Additional Notes:

**APPENDIX C – LONG TERM OPERATION AND MAINTENANCE**

**\*\*See below for example of a Post Construction Inspection form for Water Quality Features.**

## **Facility Conditions**

Is water standing/ponding or flowing as designed?

Flowing

Standing

N/A

Any clear odors, sheens, or unusual algae blooms in the feature?

Yes

No

N/A

Are inlets/forebays clear of sediment and debris to allow positive drainage into the facility?

Yes

No

N/A

Are concrete channels through the feature clogged or damaged?

Yes

No

N/A

Is the outfall of the feature functioning appropriately?

Yes

No

N/A

Does the facility sides/slopes/bottom show signs of settling, erosion, sloughing or other instability?

Yes

No

N/A

Evidence of animal burrowing or other activity that could contribute to instability or increased erosion?

Yes

No

N/A

Is there evidence of encroachment into the facility or improper uses of the facility?

Yes

No

N/A

Do vegetated areas need mowing/thinning i.e. cattails, grass, trees, etc?

Yes

No

N/A

Are there areas that need to be re-vegetated?

Yes

No

N/A

Do any safety features, such as fences, grates or locks need repair or replacement?

Yes

No

N/A

Does the Water Quality structures appear damaged or vandalized (including cleanout risers)?

Yes

No

N/A

If applicable are the orifice plate(s) and/or well screen(s) obstructed/damaged?

Yes

No

N/A

If applicable is there debris or other obstructions directly in front of or inside the Outlet Structure/Overflow?

Yes

No

N/A

If applicable is the filter media evenly distributed and unclogged?

Yes

No

N/A

If applicable is the underdrain clear of sediment or debris?

Yes

No

N/A

For Underground Chambers is the Isolator Row clogged with sediment or debris (viewed through inspection port)?

Yes

No

N/A

For Porous Pavers are pavers cracked or any areas showing deformation?

Yes

No

N/A

For Porous Pavers are there any areas that are clogged with sediment or debris?

Yes

No

N/A

For Porous Pavers is the joint aggregate lower than ½” below the chamfer of the pavers?

Yes

No

N/A

---



Infrastructure Maintenance Center  
12450 Washington Street  
Thornton, Colorado 80241

Infrastructure – Engineering Services Division  
(720) 977-6210  
www.cityofthornton.net

August 25, 2023

**Subdivision:**  
**Pond Name:**  
**Pond ID:**  
**Location:**  
**Tax Parcel:**

## Re: Maintenance of Storm Sewer and Detention Facilities

### INITIAL NOTICE

Please be advised that an inspection was conducted on the above referenced property. You are in violation of your subdivision plat or approved drainage plan requirements to maintain the storm sewer and detention facility on your property and keep it free of litter, junk, trash, garbage and rubbish. The following issues need to be addressed immediately:

- 1.
- 2.

Dispose of all litter, junk, trash, garbage and rubbish properly.

**DO NOT ALLOW THIS DEBRIS TO BE FLUSHED DOWNSTREAM**

You are required to bring this property into compliance as soon as is practicable. A Follow Up Inspection of the property will be carried out by a City Stormwater Inspector to verify remediation in May of 2021.

***City Code Chapter 18, Article V, Division 7, Part 4 Stormwater Runoff and Flood Control Requirements***

Thank you for your immediate attention to this matter. If you have any questions, please call (719)-437-9548.

Sincerely,

Kurtis Vanatta  
Stormwater Inspector II

August 25, 2023

**Subdivision:** Cundall Farms  
**Pond Name:** Cundall Farms I  
**Pond ID:** J23140  
**Location:** Cundall Farms  
**Tax Parcel:** 0157312201116

## Re: MAINTENANCE OF STORM SEWER AND DETENTION FACILITY VIOLATIONS

### NOTICE AND ORDER OF VIOLATION

Be advised that this is a **Notice and Order of Violation** of maintenance of storm water and detention facilities on your property. Please be advised that an inspection was conducted on the above referenced property. You are in violation of your subdivision plat or approved drainage plan requirements to maintain the storm sewer and detention facility on your property, free of litter, junk, trash, garbage and rubbish. The following issues need to be addressed immediately:

The remaining violations are as follows:

1. The Outfall of the detention pond is clogged with sediment which needs removed.
  2. The Outlet Structure in the detention pond is clogged with trash and debris that should be cleaned out.
- You have the responsibility to maintain this property in accordance with the Subdivision Plat and/or approved drainage plan requirements.
  - The deadline for you to correct the above listed violations is Spring 2023.

**DO NOT ALLOW THIS DEBRIS TO BE FLUSHED DOWNSTREAM.**

#### ***City Code Chapter 18, Article V, Division 7, Part 4 Stormwater Runoff and Flood Control Requirements***

- You may voluntarily agree to immediate correction of the violation by the City, with the costs assessed against you.
- Failure or refusal to correct the violation may result in commencement of abatement procedures by the City, in addition to any other available remedies, and if the cost of such abatement, including up to 15 percent for inspection and incidental costs, is not paid to the City within 30 days after a notice of assessment is mailed to you, such costs will be certified to the County Treasurer and may be assessed as a lien against the property and collected in the same manner as real estate taxes against the property.

- You may make written demand to the Building and Codes Director for a hearing before abatement procedures are commenced. The hearing shall be conducted by the City Manager or designee, provided your written demand for such hearing is made within ten days from the date of this Notice and Order of Violation, and provided the written demand for a hearing contains your current address and a telephone number where you can be reached between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Written demand for a hearing shall be sent to the Building and Codes Director, City of Thornton, 9500 Civic Center Drive, Thornton, Colorado 80229.
- Failure or refusal to correct the violation as directed by this Notice and Order within the time permitted or refusal to request a hearing, authorizes the City to have the violation corrected by appropriate means.
- Code Compliance officers of the City, and those persons designated by the City to execute abatement, are hereby expressly authorized to enter upon private property for the purpose of causing the correction of violation. You shall be responsible for all associated cost of abatement, including attorney fees and court costs, if applicable.
- Failure to comply shall be a separate offense for each and every day or portion thereof during which a violation is committed, permitted, or continues. Upon conviction thereof, you shall be subject to a fine in the amount of up to \$1000.00 per day.

If you have any questions, please call (719)-437-9548.

Sincerely,

Kurtis Vanatta  
Stormwater Inspector II

## **APPENDIX D – OVERLAPPING AGREEMENT**

---



Thornton City Hall  
12450 Washington Street  
Thornton, CO 80241  
www.cityofthornton.net

Infrastructure Department  
Engineering Division  
PH 720-977-6210  
FAX 720-977-6201

Date \_\_\_\_\_

Agency \_\_\_\_\_

Re: Project \_\_\_\_\_

Dear \_\_\_\_\_:

The city of Thornton is requesting approval to administer the MS4 Post Construction Program Site Plan Review and Inspections for the upcoming Project\_\_\_\_\_, on behalf of the City/County\_\_\_\_\_. The majority of this project is within Thornton municipal boundaries, with only a small portion in\_\_\_\_\_. Thornton will oversee the MS4 Post Construction Program, including site plan review/acceptance and site inspections for the project, in accordance with the city of Thornton’s MS4 Post Construction Program, on behalf of the City/County of\_\_\_\_\_.

The contractor will be required to obtain any permits required by the City/County of\_\_\_\_\_. The contractor will be required to attend a pre-construction meeting, at which time the contractor will be made aware of the stormwater management control expectations for controlling stormwater runoff associated with this project. We are asking that the City/County of\_\_\_\_\_refer any complaints or construction related issues to Thornton for resolution and enforcement. As a matter of course, City/County\_\_\_\_\_reserves the right to protect their MS4 system through City/County\_\_\_\_\_Illicit Discharge Program if contaminated water flows off the project and into the local storm sewer system. Please sign and return one copy of this letter to indicate City/County\_\_\_\_\_concurrence with the Construction Stormwater Program delegation as noted above.

Please feel free to contact me if City/County of \_\_\_\_\_staff have any questions or concerns. Sincerely,

Keith Bisbe  
Stormwater Coordinator

Construction Stormwater Program Delegation of Overlapping Permit Areas, on behalf of the City/County\_\_\_\_\_.

Signed:\_\_\_\_\_Date:\_\_\_\_\_ (Name, City/County of \_\_\_)

KB/\_\_\_\_



