

ORDINANCE NO. 006, 2016
OF THE COUNCIL OF THE CITY OF FORT COLLINS
AMENDING CHAPTER 26 OF THE CODE OF THE CITY OF FORT COLLINS
AND THE FORT COLLINS STORMWATER CRITERIA MANUAL
TO MODIFY THE CRITERIA FOR UNDERGROUND DETENTION SYSTEMS

WHEREAS, on December 20, 2011, the City Council adopted Ordinance No. 174, 2011, which amended certain sections of Chapter 26 of the City Code and adopted a set of technical criteria governing the design and performance of stormwater improvements and related practices by adopting by reference certain portions of the Urban Drainage and Flood Control District (“UDFCD”) Criteria Manual, 2001 Edition, published by the Denver Urban Drainage and Flood Control District, as modified by the Fort Collins Amendments, also adopted by Ordinance No. 174, together referred to and codified as the Fort Collins Stormwater Criteria Manual (the “Manual”); and

WHEREAS, the Manual, including the separately codified Fort Collins Amendments, has been modified from time to time by limited technical revisions adopted administratively by the Utilities Executive Director and filed with the City Clerk as authorized by in City Code Section 26-500; and

WHEREAS, as adopted with the Fort Collins Amendments, the Manual currently prohibits underground detention as a stormwater management practice, except upon special review and exception granted at the discretion of the Utilities Executive Director; and

WHEREAS, as part of recent reviews of the City's Municipal Separate Stormwater System, and in an effort to align the Manual with Low Impact Development policies adopted by City Council in March 2013, City staff has developed a new amendment to the Manual that establishes detailed underground detention system criteria (“UDS amendment”); and

WHEREAS, the purpose of the UDS amendment is to facilitate appropriate use of underground stormwater detention as a best management practice, ensuring predictable, safe, maintainable, and effective construction and maintenance of such systems; and

WHEREAS, the UDS amendment was presented to the Water Board at its November 18, 2015, regular meeting, and the Board voted unanimously to recommend City Council adoption of the amendment; and

WHEREAS, the City Council finds that amending the Manual to facilitate predictable and appropriate construction and maintenance of underground stormwater detention systems, based on documented review criteria, benefits the City's citizens and Stormwater Utility customers by creating a regular process to accommodate such systems.

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF FORT COLLINS as follows:

Section 1. That the City Council hereby makes and adopts the determinations and findings set forth in recitals above.

Section 2. That Paragraph 4.16 of Volume 2, Chapter 10, Section H of the Fort Collins Amendments, which is a component of the Fort Collins Stormwater Criteria Manual, is hereby amended to read as follows:

4.16 Underground Detention

4.16.1 Policy

The use of structural underground detention is generally discouraged, except when the criteria set forth in 4.16.2 are satisfied. Underground BMPs should not be considered for detention storage when surface-based systems are practicable. The system owner must demonstrate that surface-based detention or other BMPs have been thoroughly evaluated and found to be infeasible before an underground system is proposed. If an underground storage system is proposed, a system owner must seek approval of such a system by the Utilities Executive Director, who may approve such a system upon a determination that the requirements of 4.16.2 are satisfied and that no adverse impacts are expected to result from the proposed system.

4.16.2 Underground Detention Criteria.

The purpose of this subsection is to set forth technical criteria to be utilized for the use of underground stormwater detention as a structural BMP to meet water quality and/or stormwater runoff detention requirements.

(a) All systems.

Any proposed underground stormwater detention system, including gravel reservoirs in porous interlocking concrete pavement (PICP) systems and chambers or pipes, shall satisfy the following design and operating criteria:

1. The system owner shall provide to the City a Standard Operating Procedures (SOPs) Manual detailing the operation and maintenance of the proposed system. The SOPs Manual must comply with approved and updated operational and maintenance procedures maintained by the City for different types of underground detention systems. The SOPs Manual must be submitted to and approved in written form by the Utilities Executive Director prior to system approval and operation. A final copy of the approved SOPs Manual must be maintained on-site by the party responsible for facility maintenance. Annual reports must be prepared and submitted to the City detailing the results of the maintenance program (i.e. inspection dates, inspection frequency, volume loss due to sedimentation, corrective actions taken, etc.);
2. Runoff must flow through a pre-treatment facility before it enters the underground detention system;
3. A gravity outfall is required at the invert, i.e. lowest point, of the underground detention system;

4. An observation well is required at the downstream end with a perforated stand pipe, as well as a redundant overflow inlet located in a sump condition. The redundant inlet must be designed with pre-sedimentation control at the upstream end of the inlet;
5. The water table level must be documented to be at least one foot (1') below reservoir bottom during the high groundwater period of the calendar year;
6. Where underdrain drainage systems are needed, due to underlying soil conditions, the underdrain pipe diameter shall be at least eight inches (8"). Underdrain cleanouts are required at all changes in direction or elevation locations. If the minimum underdrain size (8") results in a release rate larger than allowed under this Manual, a restrictor plate must be added at the point of outflow;
7. Potential lateral movement of detained storage water outside the limits of the detention storage reservoir must be controlled, accounted and designed for in a manner that ensures the structural integrity of adjacent structures and infrastructure;
8. Infiltration testing must be performed during installation of open bottom/infiltrating systems, after excavation is complete and before rock placement in reservoir. These results must be submitted to the City and approval obtained before commencement of construction activities on the underground detention facility(ies). If the underground detention reservoir is intended to allow for infiltration, the bottom of the reservoir must be protected during construction to minimize compaction;
9. Annual visual inspection is required for all underground detention systems. Documentation verifying inspection and performance must be provided to the City within four (4) weeks after completion of annual inspection. These inspection reports must be filed and available at the City of Fort Collins Utilities office;
10. The underground detention system owner must submit for review a deed restriction on the affected real property, incorporating the SOPs and penalties specified for lack of performance. SOPs must be included in the site's Development Agreement, as well as in the deed restriction, subject to review by the City Attorney's Office. The deed restriction must provide for the continued, long term operation and maintenance of the underground detention system by subsequent owners of the affected property and must be fully executed by the owners of the affected property and recorded prior to system approval and operation; and
11. The deed restriction must also provide that if the City deems that the underground detention system is not being maintained in accordance with

the SOPs specified in the deed restriction, and the system owner has been given written notice and at least ten (10) days to cure and has not done so, the City shall have the right of entry to the property in order to maintain the system. The City may then charge the owner the time and material costs incurred by the City to take corrective action and maintain the system, in addition to any administrative costs incurred by the City.

(b) Detention reservoirs located in gravel void spaces of PICP systems. In addition to the criteria set forth in 4.16.2 (a), the following additional criteria apply to any Porous Interlocking Concrete Pavement (PICP) system with a gravel layer void space:

1. The maximum water quantity detention volume allowed in the subsurface void space is the greater of 0.2 acre-feet or 20% of the total water quantity and water quality detention required. The maximum total detention storage volume to be accounted for in the void space of gravel reservoirs shall be less than 1.0 acre-foot. Additional storage volume is allowed in chambers or pipes or a combination of all the system methods;
2. The material specified in the reservoir storage layer must comply with ASTM Number 2 specifications for rock aggregate, or an alternate approved in writing by the Utilities Executive Director. A 30% ratio for available storage volume in the reservoir layer must be used in volume calculations in order to account for potential sedimentation;
3. A minimum 13,500 pound-force vibratory plate compactor with a compaction indicator and/or a minimum 10-ton vibratory roller must be used to compact the system;
4. A PICP parking lot surface must be designed with a minimum 0.5% slope. All systems must be designed to account for volume detained based on the physical site characteristics and the ability of the system to intercept that volume; and
5. Maintenance vacuuming must be performed in accordance with the approved SOPs for the system. Any infiltration test on the system must be done in accordance with ASTM C1781. Surface infiltration testing locations must be indicated on a site map provided to the City pursuant to Section 4.16. If testing shows an average infiltration rate in excess of one hundred inches per hour (100"/hr.), vacuuming may occur at six month intervals. In no instance shall a system be vacuumed less than once each calendar year.

(c) Detention storage in chambers or pipes. In addition to the criteria set forth in 4.16.2 (a), the following additional criteria apply to any storage system using underground chambers and/or pipes:

1. All chambers or pipes must be placed with a minimum slope of 0.2%;
2. Maintenance access must be provided at point of inflow and point of outflow into the system. The access must be such that it would allow human access to inspect the functioning of the storage;
3. All pipes or chambers must be vacuum truck accessible through manholes;
4. An underdrain system is recommended for open bottom chambers if the soil underlying the storage reservoir does not consist of either Type A or Type B soils;
5. The minimum pipe size allowed for detention in pipes is fifteen inches (15");
6. The structural system capacity must be designed to support AASHTO HS20 (fire truck) loading, as well as anticipated lifetime AASHTO 18,000 lb. equivalent single axle loads (ESALs); and
7. The system must be inspected at least once every five (5) years using remote video technology. A written record of this inspection must be submitted to the Utilities Executive Director.

Introduced, considered favorably on first reading, and ordered published this 5th day of January, A.D. 2016, and to be presented for final-passage on the 19th day of January, A.D. 2016.

ATTEST:

W Winkelmann
City Clerk



[Signature]
Mayor

Passed and adopted on final reading on the 19th day of January, A.D. 2016.

ATTEST:

W Winkelmann
City Clerk



[Signature]
Mayor