STORMWATER

4.00 DESIGN STANDARDS

4.01 PURPOSE

The purpose of the Stormwater Capacity Design Standards is to provide a consistent policy under which certain physical aspects of stormwater conveyance design will be implemented. These standards have the objective of developing a stormwater conveyance system that must:

A. Be consistent with the most current stormwater studies, master plans, and discharge permits for Springfield, the Springfield Development Code (SDC), APWA standard construction specifications, City of Springfield standard construction details and other Chapters of this Manual;

B. Be of adequate design to safely manage all volumes of water generated upstream and on the site to an approved point of discharge;

C. Provide conveyance for stormwater generated by future development upstream;

D. Prevent the uncontrolled or irresponsible discharge of stormwater onto adjoining public or private property;

E. Prevent the capacity of downstream channels and stormwater management facilities from being exceeded;

F. Have sufficient structural strength to resist erosion and all external loads that may be imposed;

G. Avoid impacts to stream water quality and quantity, and seek to maintain the historic hydrograph, including peak and base flows;

H. Maximize efficient use of Springfield's natural drainage systems and wetlands;

I. Require groundwater recharge wherever possible by utilizing stormwater management techniques that decrease impermeable surfaces and increase infiltration to manage stormwater runoff;

J. Promote the protection of the Springfield's existing high level of overall water quality and facilitate implementation of further water quality improvements;

K. Be designed in a manner and use materials that allow economical maintenance;

L. Be designed using methods and materials to insure a minimum practical design life of 75 years for all systems and 100+ years in traveled right-of-way; and

M. Be designed based on future land use.

4.02 GENERAL DESIGN CONSIDERATIONS

Stormwater system design within a development site must include provisions to address water quality and the collection and conveyance of runoff from all public and private impermeable

surfaces. Furthermore, the design must provide for the future extension of the stormwater system to the entire drainage basin in conformance with current adopted stormwater master plans or approved modifications to those plans.

All stormwater system designs must be based upon the requirements in Springfield Development Code 4.3.110, which requires an engineering analysis that takes into consideration water quality issues, infiltration capacity on-site, existing runoff rates and discharge points onto neighboring properties, pipe flow capacity, conflict with existing or proposed utilities, and potential construction problems.

In all locations of new or redevelopment the primary method for stormwater management will utilize Low Impact Development Approaches (LIDA), discussed in more detail in Section 4.17.

4.03 ACCOUNTABILITY FOR STORMWATER SYSTEM DESIGN

This Chapter presents Springfield's standards for engineering and design of stormwater system facilities. While Springfield believes these standards are appropriate for a wide range of development proposals, compliance solely with these requirements does not relieve the professional engineer of their responsibility to ensure stormwater facilities are engineered to provide adequate protection for public and private property and natural resources.

To assist applicants in preparing a Stormwater Study, Springfield has developed a Stormwater Scoping Sheet to ensure that site stormwater system design is prepared in compliance with this Manual and the Springfield Development Code. The Stormwater Management System Scope of Work must be completed for each development and can be found on the City's website.

Other agencies may require some form of stormwater system review and impose requirements that are separate from, and in addition to, Springfield's requirements. The applicant must coordinate with these agencies and resolve any conflicts or concerns in stormwater conveyance and water quality requirements.

4.04 DESIGN OF STORMWATER SYSTEMS

A. Manhole Design:

1. Manholes must be provided at least every 500 feet, at every grade change, and at every change in alignment and junction of 2 or more lines. Manhole lids must have a minimum of 6 inches of clearance from the edge of a curb or gutter and must not be in a wheel path of the traveled way.

2. All manholes must be a minimum of 48 inches in diameter.

3. Pipe crowns of branch or trunk lines entering and exiting junctions must be at the same elevation. If a lateral is placed so its flow is directed against the main flow through the manhole or catch basin, the lateral invert must be raised to match the crown of the mainline pipe.

4. Manholes on a sealed joint system (tight line) and all stormwater systems on slopes greater than 10 percent must be constructed with a 20-foot, parallel perforated line to collect ground and trench water into the system.

5. Inside drop structures are not allowed. A manhole may have a free inside drop of up to 2 feet.

6. All manholes must have a minimum 12-inch ledge on 1 side of the channel in the base at an elevation of 0.8 of pipe height, except for water quality manholes.

7. Details of pipe configuration and flow channelization must be submitted with the plans where pipes into or out of a manhole are larger than 24 inches, or where more than 3 mainline connections are made.

8. Connections to an existing manhole, elevation of the existing ledge, and elevations of existing inlets and outlets must be submitted with the plans.

9. Connections are allowed directly into a manhole if the manhole is properly channelized. No more than 3 side laterals (maximum number of penetrations must not exceed 4) must be connected to a manhole unless otherwise approved by the City Engineer. There must be a minimum of 8 inches separating connections as measured from the outside diameter of the pipe.

B. Water Quality Manholes/Structures:

1. Water quality manholes or structures must be an approved, manufactured unit. All capacity, efficiency, and operations and maintenance plans must be submitted at the time of plan review.

2. Each water quality manhole or structure must be designed for the runoff from the upstream watershed at build out, based on the applicable comprehensive land use plan. No flow may be introduced into the manhole or structure in addition to the design amount.

3. Water quality manholes must be a minimum of 60 inches in diameter, unless otherwise approved by the City Engineer.

4. Water quality manholes must not be used in a submerged or surcharged system. The manufacturer's required head losses must be accommodated for in the system design.

5. Water quality structures and water quality catch basins must meet the requirements of current Stormwater Quality Standards as specified in Springfield Development Code 4.3.110 (C) & (D).

C. Pipe Type:

1. Concrete pipe – standard pipe material for stormwater system design within Springfield. Refer to the APWA Standard Construction Specifications for pipe bedding details.

2. PVC – standard pipe material for stormwater design within Springfield. Must use factory (manufactured) fittings suitable for the PVC type required. All PVC pipe with less than 3' of cover from top of finished pavement must be C900 type.

3. HDPE with manufactured fittings – may be used in all areas that meet manufacturer's installation requirements when approved by the City Engineer. Pipe loading analysis may be required on a case-by-case basis.

4. Ductile iron – may be used when sufficient depth of cover over the pipe is not

available for the above pipe types due to existing topographic demands and conflicting site and building code requirements.

D. Pipe Size:

1. Pipe from an inlet to the main line in the public system must be a minimum of 10 inches in diameter.

2. Main line pipe must be a minimum of 12 inches in diameter.

3. Service laterals for single-family residences must be 6 inches in diameter. All other service laterals must be a minimum of 10 inches in diameter.

E. Minimum and Maximum Velocities:

1. All storm pipes must achieve a minimum velocity of 3 feet per second at 0.5 part full based upon Table 4-1 and the associated 'n' value.

2. All pipe exceeding critical flow velocities must have analysis data submitted showing the effects of hydraulic jump at manholes and downstream water levels for peak flow situations.

Table 4-1: Manning's 'n' Values for Pipes

Type of Pipe Material	**For design and capacity analysis**
• Concrete Pipe / Box Culverts	0.013
• PVC Pipe	0.009
• Ductile Iron Pipe Cement Lined	0.014
• Helical Corrugated HDPE Pipe	0.024
• Solid Wall HDPE Pipe	0.009

F. Pipe Location:

1. All public stormwater pipes must be located within the public right-of-way or City owned stormwater treatment facilities. The stormwater line must not be closer than 5 feet to the edge of public right of way. The City Engineer may grant exceptions for systems with physical constraints precluding the location within the public right-of-way such as shared access easements.

2. Stormwater pipes in easements must be located in the center of the easement unless otherwise approved by the City Engineer. The centerline of a stormwater pipe must not be located closer than 7 feet to the edge of the easement. Minimum easement size must be ½ of the pipe's diameter plus 14 feet.

3. Stormwater pipes must be located so that manholes are not in the wheel path.

4. Stormwater laterals must be provided on the down slope side of all lots in developments where gravity drainage to the street or other approved discharge location cannot be provided.

5. The crowns (inside tops) of pipes must match wherever practical when changing pipe

sizes at manholes.

G. Distance Between Structures:

1. The maximum length of pipe between stormwater structures must be 500 feet for all systems with pipe 24 inches and smaller. Larger diameter pipe systems must not exceed 600 feet between structures.

H. Alignment:

1. Pipe must be laid on a straight alignment and at a uniform grade rate from structure to structure except as provided for in the Hillside Overlay District as specified in Chapter 7 and SDC 3.3-500.

I. Pipe Cover:

1. Pipe cover must be measured from the finished ground elevation to the top of the outside surface of the pipe in areas outside paved areas. In paved areas, the pipe cover must be measured from the lowest point of the gutter section to the top outside surface of the pipe.

2. The minimum pipe cover must be 18 inches for concrete reinforced pipe and 36 inches for plain concrete and plastic pipe materials or per the manufacturer's requirement for the proposed materials.

J. A sealed pipe system must be required within sensitive areas or where contamination of either the ground water or the stormwater from contaminated ground areas is a particular concern.

K. Perforated pipe drain systems, 'soakage trenches' or other UIC for public stormwater disposal are not allowed in the City of Springfield.

4.05 CATCH BASIN/INLET DESIGN

A. All inlet and catch basin openings must be designed to accept flow from a 10 year storm event with gutter spread not to extend more than 3 feet into the adjacent roadway. Combination inlets with grates, where used, must be of multi-chambered design, and must be designed, as far as practical, to avoid failure due to accumulation of debris.

B. The standard curb inlet used is Springfield Standard Drawing 4-21 (double chambered curb inlet) or ODOT standard RD 371 and RD 372. The standard catch basin to be used is Springfield Standard Drawing 4-11 or ODOT standard Drawing RD 364. In areas where a combination inlet is necessary ODOT standard RD 366 is to be used. All grates used must be bike and pedestrian friendly (ODOT standard type 2).

C. All catch basins must be constructed with an 18 inch sump.

D. A main stormwater line larger than 12 inches must not pass through a catch basin or inlet, unless approved by the City Engineer.

E. Flows in streets during the 2-year event must not run deeper than 4 inches against a curb or extend more than 3 feet into the adjacent travel lane (bicycle or vehicle). Streets classed as collector and above and streets in commercial areas must meet the above

requirements for the 10 year event. Inlets in sag locations must be designed with no more than 6 inch depth of water (top of curb) above the gutter flow line during the 25-year event.

F. A catch basin must be provided just upslope to curb returns or ADA ramps if present on streets with a centerline gradient of 3 percent or more or a street gutter flow run of 100 feet or more.

G. Catch basins may connect to main stormwater lines with a manufactured tee connection when the main stormwater line is at least 1 size larger that the catch basin line. An Insert-A-Tee may be used when the catch basin line is ½ or smaller of the diameter of the main line. When the catch basin line is the same size as the main stormwater line, the connections must be made at a manhole or other approved structure. The maximum length of pipeline between the catch basin and the mainline must be 40 feet for 10 inch pipe and 60 feet for 12 inch pipe.

4.06 AREA DRAINS AND DITCH INLETS

A. The standard area drain must be as shown in Springfield Standard Drawing No. 4-11 and 4-12 or ODOT standard drawings RD 364 and RD 368 for area drains, and RD 370 may be used for ditch inlets.

B. A main stormwater line must not pass through a field inlet or ditch inlet.

C. Ditch inlets can be located at the upper terminus of a main stormwater line.

4.07 CONSTRUCTED CHANNELS

A. When constructed channels are used or modified, they must be lined with vegetation whenever possible. The proposed vegetation will require a planting plan as part of site plan/building plan approval.

B. Rock-lined channels must only be used where a vegetative lining will not provide adequate protection from erosion per Table 4-2.

C. Channel Design:

1. Constructed open channels must be sized to pass the required flows and have side slopes no steeper than 2:1. Any proposed constructed channel improvement that does not meet these requirements may be required to be piped by the City Engineer.

2. Channels designed to handle the runoff from a development must be constructed from the development to an existing public stormwater system with an established outfall to a receiving waterway.

3. Channels must not contain protruding pipes, culverts or other structures that reduce or hinder the flow characteristics of the channel, except for structures that are required and designed to dissipate velocities. Channels must be designed to prevent scouring and erosion. All pipes will be provided with protection per ODOT standard detail RD317.

4. Channel protection must be as shown in Table 4-2.

D. Access – Maintenance:

1. Access roads or other suitable access ways for maintenance purposes must be provided when surface water systems do not border public right-of-way with a suitable road. Access must be provided along one side of the system as necessary for vehicular maintenance access.

2. Access roads must have a maximum grade of 15 percent, and a maximum cross slope of 3 percent.

3. A turnaround with 40-foot minimum outside turning radius must be provided on the access road or access provided at both ends to the public right of way.

4. Access roads must be a minimum of 12 feet wide on curved sections and 10 feet on straight sections.

5. Access roads in excess of 50 feet in length must have a turnaround unless approved by the City Engineer.

6. Access roads must have the capability of supporting a 20-ton vehicle under all weather conditions.

7. The first 18 feet of access roads must be paved with a durable, dust free top course past the edge of the road or sidewalk. Past the first 18 feet access roads will be surfaced with an all-weather top course, with preference given to permeable materials such as grass pave or permeable concrete.

Table 4-2: Channel Protection for Channel Construction

Greater Than (FPS)	Less Than or Equal to (FPS)	Required Protection	Thickness	Min. Height Above Design Water Surface
0	5	Vegetation Lining	N/A	0.5 ft.
5	8	Riprap Class 50	1 ft.	1 ft.
8	12	Riprap Class 100 with check dams	2 ft.	2 ft.
12	20	Gabion or Velocity Dissipaters	Varies	2 ft.

4.07.1 Roadside Ditches

A. Existing or new roadside ditches must be constructed with a maximum depth of 2 feet as measured from the shoulder of the road and a minimum depth of the adjacent road section (typically 16 inches for the City of Springfield standard road section).

B. Side slopes must be 2H:1V or less.

C. The ditches must be vegetated with plants or seeds from Appendix F Approved Vegetation List in the Springfield Development Code.

D. Velocity when flowing full must not exceed the erosive velocity limits of the soil or lining in the ditch.

4.08 OUTFALLS

Outfalls must conform to the requirements of all federal, state, and local regulations. Outfall design must be based on considerations to protect the outfall area and channel from scour, sloughing and channel degradation rather than hydraulic efficiency. The design velocity from the outfall for its largest recurrence interval design storm must be consistent with the velocity in the receiving channel for the same recurrence interval design storm as the outfall design storm. If the velocity from the outfall is greater than the velocity in the receiving channel, erosion protection and energy dissipation may be required. Installation of backflow prevention gates may be necessary when the outfall is in a tail-water condition.

A. Outfalls must be placed above the mean low water level except as permitted by the City Engineer.

B. All outfalls must be provided with a rock splash pad or other approved erosion control protection measures. Rock protection at outfalls must be designed in accordance with the ODOT standard detail RD317 and Table 4-2 above. Mechanisms that reduce velocity prior to discharge from an outfall are encouraged and may be required. Examples are drop manholes and rapid expansion into pipes of much larger size.

C. An engineered energy dissipater, that may include stilling basins, drop pools, hydraulic jump basins, baffled aprons, or bucket aprons, must be provided for outfalls with velocity at design flow greater than 10 FPS. These must be designed using published references such as *Hydraulic Design of Energy Dissipaters for Culverts and Channels* published by the Federal Highway Administration of the United States Department of Transportation, and others. Design reference must be included on the construction plan submittal.

4.09 STORMWATER TREATMENT FACILITY DESIGN

Treatment ponds and other open impoundment facilities must be constructed to comply with the requirements of ORS 537, in general and more specifically, ORS 537.400 Ponds and Reservoirs. All stormwater treatment ponds must be designed by an Oregon licensed Civil Engineer and comply with the following specifications:

A. Facility Geometrics:

1. Interior side slopes up to the maximum water surface must be no steeper than 2H:1V if an access ramp is available with slope less than 3H:1V and a fence is provided around the perimeter. If these are not provided the slopes must be no steeper than 3H:1V. If the interior slope needs to be mowed, the slope must be 4H:1V.

2. Exterior side slopes must not be steeper than 2H:1V unless analyzed for stability by an Oregon licensed Geotechnical Engineer.

3. A retaining wall can be used with City Engineer approval. An access ramp no steeper than 3H:1V must be provided and a fence provided around the perimeter of the retaining wall.

B. Water Quality Considerations:

1. Facility bottoms must be graded to drain to the outlet. Inlets to the facility must have a forebay to capture sediments. A perforated pipe underdrain will be

provided to fully drain the pond if the soil the pond is constructed in does not have an infiltration rate in excess of 0.25 inches per hour as determined by an on-site infiltration test per Appendix D in the City of Springfield Development Code.

2. The inlet and outlet structures must be separated as much as possible and still maintain positive slope from the inlets to the outlets of the pond to promote maximum residence time and to prevent short-circuiting. Baffles or a sinuous channel may be required to increase the residence time and flow path if locating outlet structures far enough apart is not practical.

3. Stormwater treatment facilities must be designed so that the drawdown time does not exceed 48 hours. In the event drawdown time exceeds 48 hours, additional calculations must be submitted showing the proposed facility can contain an additional 25-year, 24-hour return period storm.

4. The use of a sedimentation forebay must be required during the construction process if the pond is to be used for sedimentation control as determined by the Land Drainage and Alteration Permit. After construction is complete, the pond must be completely cleaned and all sediment removed prior to acceptance of the project or final site approval as a stormwater treatment structure.

C. Overflow:

1. An overflow system must provide controlled discharge of the design storm event for developed contributing area without overtopping any part of the facility embankment or exceeding the capacity of the overflow. The design must provide controlled discharge directly into the downstream conveyance system. An emergency overflow must be provided to safely pass the 100-year, 24-hour design storm event before the pond embankment is overtopped in the event of control structure failure and for storm/runoff events exceeding design. The emergency overflow must be located to direct overflows safely towards the downstream conveyance system. The emergency overflow must be stabilized with riprap or other approved means and must extend to the toe of each face of the berm embankment.

D. Berm Embankment - Slope Stabilization:

1. Facility berm embankments higher than 6 feet must be designed by an Oregon licensed Civil Engineer or Geotechnical Engineer. The berm embankment must have a minimum 10 foot top width where necessary for maintenance access; otherwise, top width may vary as recommended by the design engineer, but in no case may top width be less than 4 feet.

2. The toe of the exterior slope of facility berm embankment must be no closer than 5 feet from the tract or easement property line.

3. The facility berm embankment must be constructed on native consolidated soil (or adequately compacted and stable fill soils analyzed by an Oregon licensed Geotechnical Engineer) free of loose surface soil materials, roots and other organic debris.

4. The facility berm embankments must be constructed by excavating a ‘key’ equal to 50 percent of the berm embankment cross-sectional height and width or as designed by an Oregon licensed Geotechnical Engineer.

5. The berm embankment must be constructed on compacted soil (95 percent minimum dry density, per AASHTO T99, placed in 6 inch lifts, with the following soil characteristics: a minimum of 30 percent clay, a maximum of 60 percent sand, a maximum of 60 percent silt, with nominal gravel content) or as designed by an Oregon licensed Geotechnical Engineer.

6. Anti-seepage collars must be placed on pipes in berm embankments that impound water greater than 4 feet in depth at the design water surface.

7. Exposed earth on the facility bottom and side slopes must be seeded with seed mixture or planted per an approved planting plan for the facility and approved by the City Engineer.

4.10 DETENTION TANKS

Detention tanks serve as runoff capacity control through the means of underground storage. Detention tanks must be limited to large diameter pipes. In addition to runoff capacity control, detention tanks should be designed for factors such as environmental conditions (soil corrosiveness, inundation, etc.), maintenance access, and ground and/or surface loadings. Detention tanks must comply with the following specifications:

A. General Design:

1. The minimum pipe size allowed for a detention tank in the public stormwater system is 36 inches in diameter.

2. All tanks must be designed as flow-through systems, incorporating the use of in line manholes for maintenance and sediment removal.

3. Detention tank bottoms must be level and must be located a minimum of 0.5 feet below the inlet and outlet to provide sediment storage.

4. City owned tanks must be located in the public right-of-way; tanks proposed to be located outside the public right-of-way must be located in a public stormwater tract or easement, dedicated to the City of Springfield for that purpose.

B. Materials - Acceptable materials for detention are:

1. Reinforced concrete pipe, vaults, or chambers of at least 3000 psi concrete.
2. Dual wall HDPE PIPE.
3. PVC pipe.

All pipes must be installed with sufficient cover per the manufacturer's requirements for the pipe type used.

C. Buoyancy:

1. The effects of buoyancy must be considered in areas with a known high groundwater table or areas where seasonal high groundwater may cause flotation of the detention tank. Measures such as concrete anchors, concrete backfill, subsurface drains, etc. must be required in these areas, as well as supporting engineered calculations.

D. Structural Stability:

1. Special consideration must be given to ensure tanks meet requirements for potential traffic loading and overburden support. Tanks must be placed on stable, well-consolidated native material with appropriate bedding. A structural analysis, geotechnical analysis, and engineered calculations may be required with the design, demonstrating stability and constructability. For tanks proposed under the travel way, H20 live loadings must be accommodated.

E. Access Maintenance:

1. Access easements and roads must be provided when tanks are not located within the public right-of-way.

2. Access openings must be provided at a distance of no less than 50 feet from any location within the tank; be a minimum of 36 inches in diameter; and meet requirements per standard manhole details 4-1 and 4-1A for lid and surrounds.

3. All access openings must have surface access for maintenance vehicles.

4. The distance from tank invert to finished grade must be not more than 20 feet.

5. OSHA confined space requirements must be met for tanks, and entrances to confined spaces must be clearly marked.

4.11 INFILTRATION FACILITIES

4.11.1 Requirements for Permeable Pavements for Impermeable Area Reduction

Permeable Pavements may be used for impermeable area reduction only and not utilized for stormwater quality treatment or stormwater destination from other impermeable surface.

All permeable pavements used for driveways, residential, or commercial parking areas must be constructed of material that is firmly bonded so that it cannot be displaced or moved during its intended use and is durable and dust free. Loose fill permeable pavements are allowed on maintenance and emergency access areas or other areas that are not to be used for daily vehicular traffic.

Permeable pavements are not allowed in areas with a high likelihood of pollutant spills such as (but not limited to) vehicle service areas, loading docks, and trash enclosures or handling areas. Permeable pavements should not be used in high traffic areas such as drive through lanes, loading/unloading areas, or main access aisles of parking lot.

If permeable pavement is to be used in a proposed development, the use must be approved during site plan review (if applicable), Drinking Water Protection permit (if applicable), and building permit review. To be approved the following items are required to be submitted for review:

A. Site Requirements:

1. The location of the permeable pavement on the site showing the permeable pavement location is no steeper than 5 percent slope in any direction and setback from any foundation by at least 10 feet and any private property line by at least 5 feet. Permeable pavement may be placed directly adjacent to public right-of-way but may not be placed in utility easements.

2. An on-site infiltration test by a qualified professional using the method in the City of Springfield Development Code Appendix C showing the soil is suitable for permeable pavement installation so that the base aggregate can contain the 10 year storm OR an underdrain system is provided to a public system with sufficient capacity for the discharge from the underdrain system.

B. Permeable pavement section requirements

1. A full cross-section of the pavement structure from the subgrade to the top of pavement must be provided by either the manufacturer of the pavement product or a licensed professional engineer.

2. Existing ground/subgrade. The subgrade should be uncompacted and native material if possible. If placed in compacted soil or compacted fill, an underdrain system is required.

3. Geotextile fabric is required between the base rock and the subgrade. If the section is designed to infiltrated into the subgrade the fabric must be permeable. Additional permeable fabric may be required between layers within the pavement section as shown by the manufacturer or engineer.

4. Aggregate base rock: A permeable layer of open graded base rock must be provided for storage of runoff and the structural platform for the wearing surface. The aggregate base layer must be designed to accommodate the specific volume of rainfall storage required and the anticipated surface design loads. In no case may the layer be less than 6 inches. This must be clearly labeled with for thickness and material, Diameter of aggregate base must be no greater than 2-1/2 inch and no less than 3/4-inch and consist of crushed rock.

5. Bedding course: Some permeable pavement products and designs require a mustow layer between the aggregate base rock and the paving course, typically sand or small diameter crushed rock. If used, this layer must be clearly labeled for thickness and material and no less than 1 inch thick.

6. Paving/top course: Paving courses must be designed for the anticipated surface loads and the aggregate base layer design. All paving courses must be permeable as to infiltrate stormwater directly into the aggregate base layer. Asphalt mixes must be of the open graded design. Permeable concrete mixes must be of the open graded design with little or no sand. Permeable pavers and other premanufactured products should be installed per manufacturer's recommendations.

7. Underdrains: If the permeable paving is to be installed in area without adequate infiltration an underdrain must be provided. This must consist of perforated PVC or HDPE pipe no less than 3 inches in diameter, provided with a wrapped, permeable geotextile material and drain to a stormwater management system, public or private, that meets the requirements in Chapter 4 of the City of Springfield EDSPM.

8. If propriety permeable pavement material is being proposed, a complete set of manufacturer's specifications for the permeable pavement section, installation, suitability for the intended use, and all materials is required.

C. Permeable Pavement Inspection Requirements
Inspection and proper documentation are required for permeable pavement at the following points in construction:

1. When excavation of the section is complete and the underdrain has been installed (if an underdrain is required) to verify the full depth of the section is excavated and the native material is uncompacted.

2. When the aggregate base rock is installed but before the bedding course or pavement/top course is installed. As part of this inspection a load ticket or other approved proof is required that the aggregate base rock meets the material as specified in the approved pavement section submitted with the development approval or the building permit.

3. When the top course is finished. As part of this inspection a load ticket or other approved proof is required that the pavement/top course meets the material as specified in the approved pavement section submitted with the development approval or the building permit.

4.12 PARKING LOT MAINTENANCE

Springfield highly recommends routine surface cleaning of parking lots. The use of "dry" cleaning techniques (sweeping, vacuuming, etc.) is highly preferred because they eliminate water discharges to the storm system. Absorbent material must be used on particularly oily or dirty surfaces prior to cleaning. Generally, parking lots should be cleaned prior to the wet season to dampen the effects of the first flush. Additional cleanings can be determined through on-site observations and accumulations of sediments. Parking lot debris from cleanup must be disposed of at a landfill.

Wet cleaning techniques (pressure washing, garden hoses, etc.) involving water for parking lot cleanup are regulated by the Springfield Municipal Code (SMC), Sections 4.370 and 4.372. If parking lots must be washed with water, contact the Environmental Services Division for information regarding requirements and disposal of cleaning water. Wash water must not be directed into the stormwater system under any circumstances without required BMPs being implemented.

Routine area drains and catch basin cleaning must also be done as part of parking lot cleaning activities. Storm catch basins collect debris such as oils, sediments, and trash. If not routinely cleaned this debris will plug the discharge pipe and cause flooding as well as discharging polluted water into the public stormwater system. Discharge of polluted stormwater is a violation of the SMC Section 4.372 and is subject to a fine.