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**GENERAL PROVISIONS**

**§ 55.01 INTENT AND PURPOSE.**

(A) *Intent.* The intent of this chapter to establish procedures and standards for the review of drainage patterns and stormwater control structures.

(B) *Purpose.* The purpose for this chapter is to provide the City with a mechanism to control and regulate stormwater runoff and discharge. Uncontrolled stormwater runoff and discharge is known to cause the following adverse effects:

- (1) Soil erosion;
- (2) Surface water pollution and sedimentation;
- (3) Economic loss due to flooding;
- (4) Jeopardizing the public safety as a result of flooding; and
- (5) Impassable or unusable roads and bridges as a result of flooding.

(Ord. 420-4-97, passed 4-21-97)

## § 55.02 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

***DIRECTOR OF PUBLIC SERVICES.*** The Director of Public Services for the City or any designee thereof

***DRAINAGE PATTERNS.*** The methods by which surface water or groundwater is carried from one pail of a lot or parcel to another part of the lot or parcel or to adjacent properties.

***STORMWATER RUNOFF AND CONTROL FACILITY*** The method, structure, area, or related items which are designed to control, store, receive, or convey stormwater from storms or runoff events. Such facilities shall be designed, constructed, and maintained in accordance with standards and criteria developed by the City Office of Public Services. (Ord. 420-4-97, passed 4-21-97)

## § 55.03 APPLICABILITY AND SCOPE; EXEMPTIONS.

(A) *Review required.* Unless exempted by this chapter, no building, parking lot, drive, road, development, or similar item shall be constructed, expanded, added to, or enlarged, and no mass grading of a lot or parcel shall take place without first being reviewed by the Director of Public Services to determine the effects of the proposed project on drainage patterns and stormwater runoff.

(B) *Exemptions.* The following are exempt from review by the Director of Public Services:

- (1) Single-family homes, accessory buildings, and accessory uses;
- (2) Two-family homes, accessory buildings, and accessory uses;
- (3) Interior remodeling, maintenance, and structural alteration for all buildings;
- (4) Exterior modifications to all buildings

that do not increase the size of the building;

(5) Exterior modifications, which, in the opinion of the Director of Public Services, do not increase the amount of stormwater runoff or drainage patterns;

(6) Repairs and maintenance to buildings, parking lots, roads, and similar items which do not affect drainage patterns or stormwater runoffs;

(7) Accessory buildings under 400 square feet in size, and/or accessory buildings that are deemed by the Director of Public Services to have no effect on drainage patterns or stormwater runoff; and

(8) Other structures, buildings, uses, or activities that are deemed by the Director of Public Services to have no effect on drainage patterns or stormwater runoff.

(Ord. 420-4-97, passed 4-21-97)

## § 55.04 REVIEW AND DETERMINATION BY DIRECTOR OF PUBLIC SERVICES.

(A) *Sketch plan required; contents.* To initiate a review and determination of the effects of a proposed project by the Director of Public Services, the applicant or developer shall submit a sketch plan to the Director of Public Services. The sketch plan shall at a minimum include the following:

- (1) The names, addresses, and phone numbers of the applicant or developers;
- (2) A legal description of the property;
- (3) A sketch drawing of the site showing property lines, existing Improvements, proposed improvements, and future improvements, if known;
- (4) Additional Information, such as downstream capacities, calculations, or other pertinent information that will allow the Director of Public Services to determine whether existing stormwater runoff and control facilities are adequate; and
- (5) All proposed stormwater flow contributions and control facilities and stormwater connections to the City's stormwater collection or drainage system.

(B) *Method of review by director of public services.*

(1) The Director of Public Services shall review the sketch plan for completeness and for conformance to this chapter. The policies and criteria shall be kept on file at the Office of Public Services and shall be made available to any individual who requests copies. The Director of Public Services may request additional information from the applicant or developer in order to complete the review.

(2) Following the review of the sketch plan, the Director of Public Services shall make a determination of the effects of drainage patterns and stormwater runoff. The determination shall be one of the following:

(a) Determine that the proposed project's drainage/stormwater runoff can be adequately handled by existing drainage or stormwater facilities and that no detailed plan review is necessary and that a storm water permit can be issued; or

(b) Determine that the proposed project's drainage/stormwater runoff is of such flow and/or volume that it cannot be adequately handled by existing facilities and that a detailed plan review is necessary; or

(c) Determine that additional information is necessary to make a finding whether a detailed plan review is necessary or not.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.05 DETAILED SITE PLAN**

(A) *Applicability.* In the event a detailed site plan is required, the proposed project shall be subject to the requirements of this section.

(B) *Submission of detailed site plan.* In order to initiate a detailed site plan review of the proposed project, the applicant or developer shall submit to the Director of Public Services, three copies of detailed site plans showing at a minimum, the following:

- (1) The applicant or developers name, address, and telephone number; and
- (2) The legal description, address, and tax

parcel number of the property; and

(3) A site plan drawn to a scale of not greater than 1" = 20' for a development of not more than three acres and a scale of not less than 1" = 100' for a development in excess of three acres. The site plan shall illustrate the following:

(a) All property dimensions.

(b) Topographic elevations at two-foot contours. This requirement may be altered or waived by the Director of Public Services.

(c) Water courses and waterways, including man-made improvements.

(d) Existing public and private right-of-ways, easements, and utilities.

(e) Existing and proposed buildings, structures, and other Improvements.

(f) A grading plan showing proposed grades and finished floor elevations.

(g) Location, type, and method of stormwater runoff and control facilities.

(h) The name and address of the person or firm that prepared the detailed site plan and the date it was completed.

(C) *Review of detailed site plan.* The Director of Public Services shall review the detailed site plan for conformance and compliance with standards and criteria for designing stormwater runoff and control facilities. The standards and criteria shall be on file in the Office of Public Services and shall be made available upon request. The Director shall provide written notification of approval, request for additional information, or denial of permit within 30 days of receipt of submittals.

(D) *Approval of detailed site plans and stormwater runoff facilities; issuance of permit to connect to City storm sewers.*

(1) In the event that the Director of Public Services determines that the detailed site plan and the proposed stormwater runoff and control facilities are

adequate, the Director shall issue a permit and place a stamp on three sets of plans indicating their approval. One set of plans shall remain In the Office of Neighborhood Services, one set of plans shall remain In the Department of Public Services, and the other shall be returned to the applicant or developer.

(2) In those cases where hook-ups or use of the City's storm sewers are approved, the Director of Public Services shall issue to the applicant or developer a permit for hook up or use.

(E) *Rejection of detailed site plan and storm-water runoff facilities.* In the event that the detailed site plan is deemed incomplete and/or the proposed stormwater runoff and control facilities fail to satisfy the standards and criteria for design, the Director of Public Services shall inform the applicant or developer of the rejection by letter. The letter shall indicate the reasons for rejection and describe the steps necessary for correction and approval. (Ord. 420-4-97, passed 4-21-97)

#### **§ 55.06 INSPECTION BY CITY TO ASSURE CONFORMANCE TO APPROVED PLANS AND PERMITS.**

The City may inspect the installation of; construction of; and maintenance to approved stormwater runoff and control facilities. Purpose inspection shall be to assure that the stormwater runoff facilities were constructed, Installed, and maintained in accordance with approved plans. In the event it is found by the City that the stormwater runoff have not been constructed, installed, and maintained in accordance with approved plans, the Director of Public Services shall notify the applicant or developer and set forth and order any corrective measures in writing (Ord. 420-4-97, passed 4-21-97)

*Editor's note:*

*The bracketed text was missing from the original enacting ordinance and was inserted at the discretion of the editor.*

#### **§ 55.07 FEES.**

The City Commission may by resolution establish a schedule of fees for the review of sketch plans, review of detailed site plans and stormwater runoff and control facilities, and for

permits to hook up to City storm sewers. The schedule of fees shall be available for Inspection in the City Clerk's office and the Department of Public Services. (Ord. 420-4-97, passed 4-21-97)

#### **§ 58.08 ENFORCEMENT AND PENALTIES.**

(A) Any activity carried on in violation of the provisions of this chapter is declared to be a nuisance per Se.

(B) Remedies to correct violations shall be carried out in the following manner

(1) *Stop work orders.* Whenever any work is being done contrary to the provisions of this chapter, the City Manager or his agent shall order the work stopped by notice in writing served on any persons engaged in doing or causing such work to be done, and any such persons shall stop such work until authorized, In writing, by the City Manager or his agent to proceed with the work

(2) *Penalties.*

(a) In addition to the rights and remedies herein provided to the City, any person violating any provision of this chapter shall be deemed responsible of a municipal civil infraction. The penalty for a municipal civil infraction shall be a fine of not less than \$25 and not more than \$500 plus costs. Costs may include all expenses, direct and indirect, to which the City has been put In connections with the municipal civil Infraction up to the entry of judgment. The City may seek or employ other remedies and sanctions available under state law for municipal civil infractions. Each day such violation is continued or permitted to continue shall constitute a separate offense and shall be punishable as such.

(b) The penalty for repeat offenses of the same chapter provision within two years of a prior offense shall be a fine of not less than \$50 and not more than \$500, plus costs and all other remedies and sanctions available under state law for municipal civil Infractions.

(c) A judgment, order, or abstract of the district court shall establish proof of a prior offense.

(3) *Appearance tickets.* Municipal civil infraction tickets can be issued as citations for violations of this chapter.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.09 CONSTRUCTION OF CHAPTER; OTHER APPLICABLE LAW**

The provisions of this chapter shall be construed, whenever possible, to be consistent with and In addition to relevant local, state, and federal regulations, requirements, and standards.  
(Ord. 420-4-97, passed 4-21-97)

**STORM WATER AND DETENTION TECHNICAL GUIDELINES**

**§ 55.30 INTENT AND PURPOSE.**

The intent of these provisions (§§ 55.30 through 55.35, §§ 55.40 through 55.42, §§ 55.50 through 55.61, and §§ 55.70 and 55.71) is to establish technical procedures and standards for the review of drainage patterns and storm water control structures. The purpose of the chapter is to provide the city of big rapids with a mechanism to control and regulate storm water runoff and discharge.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.31 DEFINITIONS.**

For the purpose of this subchapter, the following definitions shall apply unless the context clearly Indicates or requires a different meaning.

**CATCHMENT AREA** The entire area that will contribute flow to the proposed storm drain. Limits of catchment area may or may not coincide with property boundaries.

**DETENTION POND.** An acceptable storage facility used to contain stormwater runoff and slow the rate of discharge to downstream waters.

**DIRECTOR OF PUBLIC SERVICES.** The Director of Public Services of the City or his designee.

**DRAIN.** Either an open or closed conduit intended

to provide for natural or manmade conveyance of stormwater from higher land to a downstream area.

**ENGINEER.** The engineer, or authorized licensed agent of the City.

**HYDRAULIC GRADE LINE.** The hydraulic grade line will be taken as the anticipated surface of water taking into account energy losses.

**ORIFICE AND WEIR.** A specifically designed structure used to regulate the flow rate leaving the detention pond.

**PROPRIETOR.** Any person, firm, association, partnership, corporation, or combination of any of them, who intends to develop, or improve land.

**STORMWATER.** Precipitation that disperses as overland flow and does not infiltrate into subsurface soils.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.32 STORMWATER DESIGN.**

In order to protect the health, safety, and welfare of the citizens of the City, the following design considerations are made to prevent flooding, surface pollution, economic loss, or loss of life.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.33 DIRECTION OF FLOW.**

Under no circumstances can a development alter the natural direction of flow from its previous direction unless determined unavoidable by the Director of Public Services. The Director will evaluate the change in direction and give written approval detailing conditions of the change. All flow resulting from an approved change will be required to flow into a detention pond as defined by this chapter. The proprietor will minimize the total quantity of flow being redirected.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.34 CONNECTIONS AND ASSOCIATED WATER QUALITY.**

(A) Storm drains built and discharging to any surface water, or manmade conveyance, whether owned, operated, or maintained by the City, and

traversing the City limits, will be limited to rainfall and naturally occurring overland flow. Discharge of sanitary water, gray water from sinks, bath tubs, washing machines, or any other plumbing fixtures into storm system is prohibited. Other connections prohibited include the direct connection of roof drains to a City sanitary sewer system, and any other connection that will cause or allow pollutant transport.

(B) Specific direct connections that will be required for review and approval of the design and facilities to be allowed include sump pump discharge lines and footing drains. Sump pump connections shall be protected from pollutants entering the sump pit and being pumped into the City storm sewer.  
(Ord. 420-4-97, passed 4-21 -97)

**§ 55.35 QUANTITY OF FLOW CALCULATIONS.**

(A) Flow calculations submitted to the City shall be based on the rational method “Q = CIA” for developments with catchment areas less than ten acres, where Q is the computed runoff in cubic feet per second (cfs), c is the weighted C factor, I is the intensity for a ten-year storm event, and A is the total acreage in the tributary study area. For developments with catchment areas greater than ten acres, the “TR 55” method or other method acceptable to the Director of Public Services will be used for design.

(B) The weighted C value indicates the percent of runoff expected at peak conditions. The weighted coefficient will be computed as the sum of areas multiplied with the associated C value and then divided by the total drainage area. C values for areas of development will be taken from the following table:

<i>Description of Area</i>	<i>Coefficients</i>
Business	
Downtown areas	0.70 -0.95
Neighborhood areas	0.50 -0.70
Residential	
Single-family areas	0.30 -0.50
Multi-unit, detached	0.40 -0.60
Multi-unit, attached	0.60 -0.75
Residential (suburban)	0.25 -0.40
Apartment dwelling areas	0.50 -0.70

<i>Description of Area</i>	<i>Coefficients</i>
Industrial	
Light areas	0.50 -0.80
Heavy areas	0.60 -0.90
Parks, cemeteries	0.10 -0.25
Playgrounds	0.20 -0.35
Railroad yard areas	0.20 -0.40
Unimproved areas	0.10 -0.30
<i>Streets</i>	
Asphalt	0.90 -0.95
Concrete	0.90 -0.95
Brick	0.80 -0.90
Drives and walks	0.80 -0.90
Roofs	0.80 -0.95
Lawns, sandy soil	
Flat, 2%	0.05-0.10
Average, 2% -7%	0.10-0.15
Steep, 7%	0.15-0.20
Lawns, heavy soil	
Flat, 2%	0.13-0.17
Average, 2% -7%	0.18-0.22
Steep, 7%	0.25-0.35

(C) The value used for the intensity shall be obtained using the ten-year storm event as shown in Appendix A, attached to Ord. 420-4-97. The time of concentration used will be calculated by a reasonable method and presented to the Director of Public Services for review. Developments located in the following zones will require a minimum time of concentration of 5 minutes: Residential/Commercial, Commercial 1,2, or 3 and Industrial (RC, C-1, C-2, C-3, and I). Residential developments (R-1, R-2, and R-3) will require a minimum time of concentration of 15 minutes.

(D) The total design acreage should include the entire catchment area, either within or contiguous to the developed limits where water traverses to the proposed drain. The proprietor must provide information to delineate the drainage limits and determine the anticipated catchment area.

(E) The Director of Public Services reserves the right to request a field determination of the catchment boundary to be used for design in order to fulfill the intent and purpose of this chapter. (Ord. 4204.97, passed 4-21-97)

**STORM DRAIN DESIGN FACILITIES**

**§ 55.40 INLET CAPACITIES FOR STORM CATCHMENTS**

Inlet capacities of catch basins will be specifically analyzed according to the anticipated flow calculated by the method detailed in ~ 55.35 of this chapter. The maximum height of water allowed to pond over inlet structures set *in* parking, driving, or walking areas will be 0.5 feet from top of grate. The maximum height of water for inlet structures set in road ditches or grassed areas will be 1.5 feet from top of grate. This condition may be waived if in the opinion of the Director of Public Services; the resulting elevation of water will not cause adverse effects and still fulfills the Intent and purpose of this chapter. Under no condition can the water level be more than two feet from the top of casting. (Ord. 420-4-97, passed 4-21-97)

**§ 55.41 STORM SEWER NETWORKS AND APPURTENANCES.**

(A) The minimum pipe diameter will be 12” and made of reinforced concrete or other material if approved by the Director of Public Services. Drains specifically intended for roof drainage, sump discharge, and footings may be of smaller size. Minimum and maximum grades allowable for any pipe are as follows:

<i>Pipe Diameter</i>	<i>Minimum Pipe Grades</i>	<i>Maximum Pipe Grades</i>
12”	0.32	4.88
15”	0.24	3.62
18”	0.20	2.84
21”	0.16	2.30
24”	0.14	1.94
30”	0.10	1.44
36”	0.08	1.12
42”	0.06	0.92

(B) Catch basins with a 2’ sump will be used for all storm inlets. The minimum Internal diameter catch basin will be 4’, have mastic joints or O-ring joints, have a bituminous sealant between casting and pavement, and be built to meet ASTM C 478. Manholes or catch basins will be set at every Intersection of pipe larger than 8”, change in grade, change in direction, or at a maximum distance of 350’. Proprietors shall contact the Public Services Department to obtain a list of current castings to be used.

(C) Storm conveyance networks will be designed to provide for the ten-year peak discharge as calculated by § 55.35 of this chapter. The method necessary to analyze pipe or channel hydraulics will be based on Manning’s Equation as given below:

$$Q = A * 1.486/n * (R)^{(2/3)} * (S)^{1/2}$$

where:

Q = Cumulative flow from ten-year storm event

A = Cross sectional area of pipe or channel

R = Hydraulic radius

S = Slope of hydraulic grade line based on ten-year storm event

n = Manning’s coefficient taken from table below

**Typical Manning’s Coefficients**

Concrete pavement	0.011
Concrete pipe	0.012
Cast iron	0.012
Vitrified clay	0.014
Channel lined with asphalt	0.015
Earth, clean	0.018
Gravel	0.023
Corrugated metal	0.024
Earth with grass and weeds	0.030
Earth with dense weeds and brush	0.080

(D) Storm conveyance channels will be designed to ensure that the elevation of the hydraulic grade line will not permit uncontrolled flooding. If surcharging of manholes will be required to meet the anticipated ten-year storm event, the hydraulic line must be included In the profile view of submitted plans. Calculations supporting drainage requirements for the Director of Public Service’s review will also be necessary.

(Ord. 420-4-97, passed 4-21-97)

**§ 58.42 ADDITIONAL DESIGN CONSTRAINTS.**

(A) Velocities in open channels shall not become erosive for the type of soil and type of vegetation anticipated to carry the water. Pipe outlets such as footing drains, farm tiles, sump pump discharges, and other connections to a City-maintained channel will be protected from erosion by means as determined by the Director of Public Services. Typical methods include rip rap, outlet elevations lowered, drop structures, oversized pipe diameter, or other methods as determined necessary.

(B) Pipe outlets will be designed and installed to adequately resist erosion. The proprietor will design adequate channel or bed stabilization using acceptable methods for transition from pipe to channel flow. Any damage incurred to the City storm sewers will be the responsibility of the proprietor.

(C) All charges, including legal fees, will be charged against the proprietor to repair damage resulting from the discharge.  
(Ord. 420-4-97, passed 4-21-97)

**PEAK FLOW REDUCTION**

**§ 55.50 STORMWATER DETENTION.**

The intent of this subchapter is to decrease the rate water enters the City storm sewer during peak flows.  
(Ord. 420-4-97, passed 4-21-97)

**§ 58.51 PROJECTS SUBJECT TO DETENTION REQUIREMENTS.**

Land subject to detention requirements includes new development within the City limits or an adjoining parcel that will connect to City storm or drains. All projects requiring detailed storm drain review as defined in § 55.05 will require detention facilities unless specifically mentioned above.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.52 SEQUENCING OF PONDS.**

Each parcel as described on the date of acceptance of this chapter will have only one pond. If a property is split or is partially developed, the pond calculations will be based on the entire parcel and not limited to the area developed.  
(Ord. 420-4-97, passed 4-21-97)

**§ 55.53 MAINTENANCE OF STORAGE AREAS.**

(A) Maintenance of the detention pond is the responsibility of the property owner. If the property owner is not maintaining the pond and the resulting condition negates the intent and purpose of this chapter, the City will issue a written notice granting ten days to correct the situation. If, after the written notice, the pond is not maintained, the City will post a 24-hour notice to enter the premises and perform the necessary maintenance. Costs associated with the maintenance, including materials, labor, legal fees, and out of pocket expenses incurred by the City will be billed to the property owner.

(B) Examples of maintenance that will be required include but are not limited to the following:

- (1) Periodic Inspection of operation;
- (2) Mowing weeds, grass, and removal of saplings;
- (3) Removal of sediments from pond bottom;
- (4) Removal of debris and other non-toxic pollutants;
- (5) Repair of erosion damage; and
- (6) Maintenance of outlet structures (Ord. 42 0-4-97, passed 4-21-97)

**§ 55.84 DESIGN CONSIDERATIONS.**

The ponds shall be designed to minimize adverse effects, promote safety, limit the rate drainage leaves the site, and be aesthetically pleasing. Ponds shall be designed to reduce the loss of soil particles and promote a higher quality of water. Such practices may include longer detention ponds, baffles, and other creative methods.  
(Ord. 420-4-97, passed 4-21-97)

## **§ 55.55 DESIGN REQUIREMENTS FOR DETENTION PONDS.**

(A) Wherever practical, ponds shall be located in natural depressions or low lands but not in protected wetlands or regulated floodplain areas. Discharge for ponds should be directed towards wetlands where applicable.

(B) All ponds built in the City are required to have all of the following characteristics unless specifically waived by the Director of Public Services:

(1) A minimum of 15-foot buffers must be maintained between adjacent property and the toe of berm for the detention pond.

(2) A maximum of 3:1 side slopes is required for all berms.

(3) The length to width ratio will be no less than 3:1 to promote adequate settling of solids.

(4) All Inlets to the pond will produce a nonerosive velocity of storm water when discharged during peak flows. Permanent erosion control measures will be required where exit velocities exceed four feet per second.

(5) The crest of the berm must have a minimum width of five feet around the entire pond.

(6) Pond bottom slopes will be 2% if grassed or 1% if concrete or asphalt is proposed. Concrete or asphalt will be considered for hydraulic purposes only, and proprietors are encouraged to use grass or natural vegetation.

(7) Pond cross slopes will be as listed in subdivision (B)(7).

(8) Maximum depth from the elevation to the emergency spillway and the pond base elevation will be four and a half feet, although three feet is more appropriate.

(9) The toe of any berm may not be any closer than 15 feet from any outbuilding, and 25 feet from any building intended for occupancy.

(10) A method for screening the pond will be submitted for review and approval to ensure that the pond will be aesthetically pleasing to the surrounding properties.

(11) Water loving trees such as willows shall not be planted within 80' of the pond.

(12) All obstacles, such as old farm tiles, that have the potential to affect the design performance will be reported to the Director upon discovery and will be rerouted, removed, or reconfigured to the Director's satisfaction to maintain the intended design of the pond.

(Ord. 420-4-97, passed 4-21-97)

## **§ 55.88 REQUIRED RELEASE RATE.**

The maximum allowable release rate will be determined by the three-year predevelopment conditions. The predeveloped condition will be taken as the three-year intensity multiplied by the weighted C (as determined for the rational formula) but cannot exceed 0.2 cfs per acre. Calculations supporting the release rate will be submitted along with other calculations required. The Director of Public Services may increase or decrease the allowable release rate based on the current capacity of the City storm sewers. (Ord. 420-4-97, passed 4-21-97)

## **§ 55.87 REQUIRED STORAGE VOLUME.**

(A) The volume of storage required will be based on the difference between the required release rate as determined in § 55.56 and the 25-year fully developed conditions. The acreage used for detention requirements will be taken as the developed property acres. The chart included in the § 55.70 has been provided to aid in the necessary calculations. This form must be attached with all required calculations for site plan approval.

(B) During any storm event, the detention pond will be required to store a minimum of 20% of the total required for a period of 12 hours. The engineer will provide calculations by an acceptable method to demonstrate to the Director of Public Services that the pond is designed to store water for the 12-hour period. The percentage of total storage may be increased or decreased at the discretion of the Director. (Ord. 420-4-97, passed 4-21-97)

**§ 55.58 CONTROLLED OUTLET.**

(A) Methods that will be considered as acceptable outlet controls include perforated risers, vertically arranged orifices, horizontally arranged orifices, and broad crested weirs.

(B) The controlled outlet will be properly designed to handle the maximum allowable discharge for the site.

(C) The minimum diameter of pipe that can be utilized for controlled outlets is 6” in diameter. Outlets with multiple holes are acceptable, where fittings such as a solvent weld cap with only one hole drilled in the end will not be acceptable.

(CD) The Director of Public Services may request modified outlet conditions, configurations, sizing, and method in order to fulfill the intent and purpose of this chapter.

(Ord. 420-4-97, passed 4-21-97)

**§ 55.59 EMERGENCY OUTLET.**

(A) The emergency outlet will be designed to handle runoff from the ten-year developed condition for the entire catchment area as defined in § 55.35(D). Acceptable methods that can be used for emergency outlets include but are not limited to concrete lined channel, bituminous lined channel, horizontally arranged orifices, and vertically arranged orifices. The method used must be designed to prevent any channel or bank erosion that would threaten the integrity of the channel or bank.

(B) The design consideration will be such that the amount of water anticipated to reach the pond will be able to leave at the same rate assuming the controlled outlet has been plugged. The necessary elevation for the emergency outlet will be such that the required volume of storage will be maintained.

(Ord. 420-4-97, passed 4-21-97)

**§ 55.60 BERM ELEVATION (FREEBOARD).**

The maximum height of pond will be calculated based on the type of outlet proposed. Freeboard of at least 0.5’ above the highest discharge elevation for the emergency outlet shall be provided to ensure protection from overtopping and an uncontrolled release.

(Ord. 420-4-97, passed 4-21-97)

**§ 55.61 FAILED STORM WATER FACILITY.**

If a storm water facility fails during a flood event, the Director of Public Services will request that the pond be reconstructed. Since the existing pond failed, the reconstruction shall be viewed as a new facility and will require a permit in accordance with this chapter. (Ord. 420-4-97, passed 4-21-97)

**§ 55.70 DETENTION CALCULATION SHEET.**

*(The detention calculation sheet is set forth in full on the following page.)*

**DETENTION CALCULATION SHEET**

Name of Development  
 Weighted C Value (A)  
 Maximum Allowable Discharge (B) cfs  
 Development Area (C) Acres  
 Storm Recurrence Interval 25 Year  
 Name of development

Time (hour) (D)	Rainfall inch/hour (E)	I*C (E)*(A) (F)	Outlet CPS/ac (B)	Inflow (F)-(B) (G)	Storage (G)/12 (H)	Required Storage (D)*(C)*(H)
0.08	7.40					
0.17	5.80					
0.25	4.70					
0.33	4.18					
0.42	3.65					
0.50	3.25					
0.58	2.95					
0.67	2.77					
0.75	2.60					
0.83	2.48					
0.92	2.30					
1.00	2.12					
1.25	1.78					
1.50	1.55					
2.00	1.25					
2.50	1.06					
3.00	0.88					
3.50	0.78					
4.00	0.70					
Maximum Storage Required in far right hand column						Ac-Ft
Maximum multiplied by 43,560 = <b>Detention Volume Required</b>						CFT

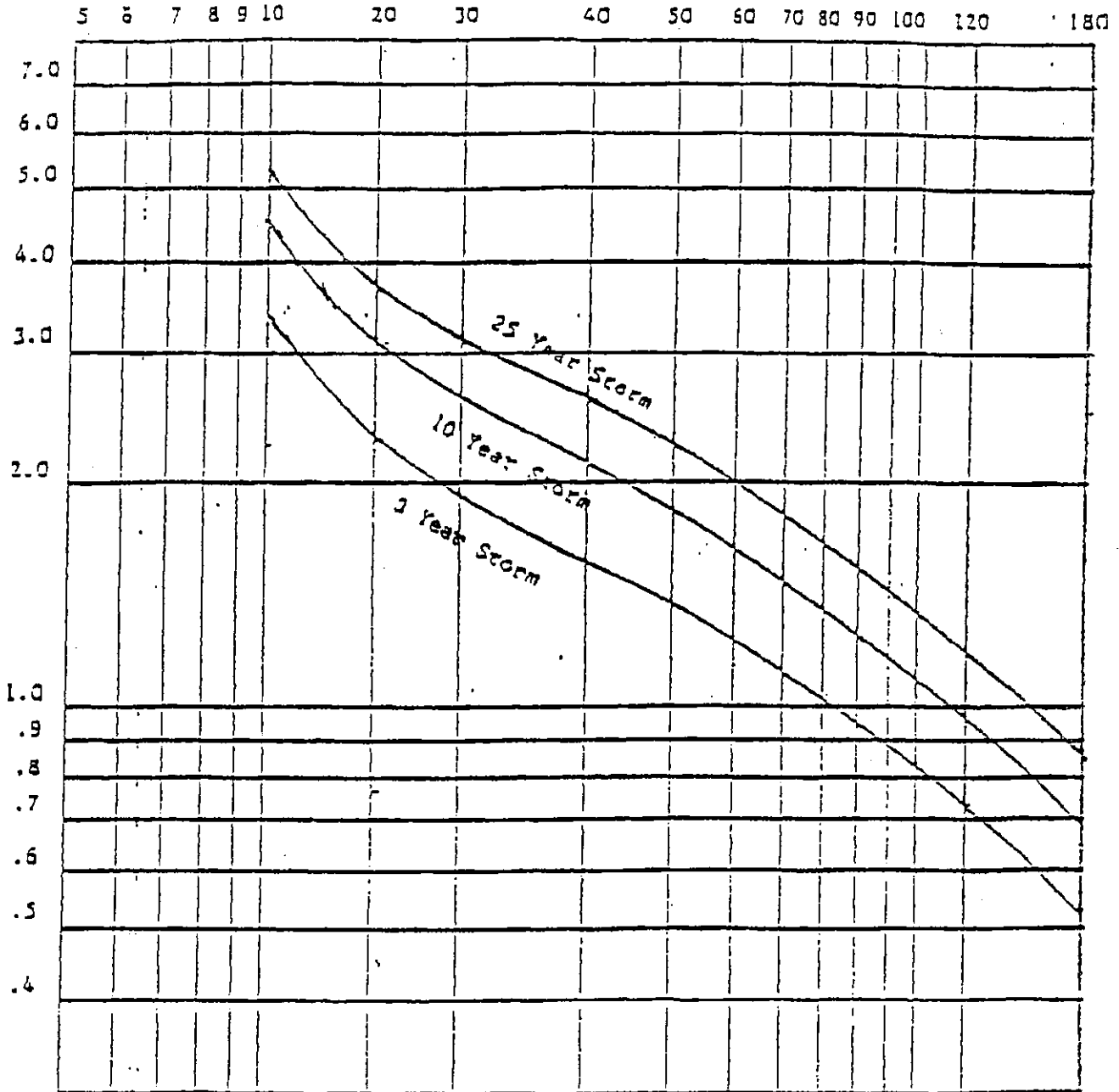
**§ 58.71 SCHEDULE OF FEES.**

Storm water engineer's review: \$225

# Appendix A

## DURATION OF RAINFALL

MINUTES



RAINFALL CURVES FOR  
3 YEAR, 10 YEAR AND 25 YEAR STORMS